IMPACT OF BANK CREDIT ON INDUSTRIAL SECTOR IN INDIA 1971-2016

A thesis submitted to the University of Hyderabad in partial fulfillment of the requirements for the award of the degree of

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In

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By

RAPAKA SRINIVAS

Thesis Supervisor

Prof. B. Nagarjuna

SCHOOL OF ECONOMICS

UNIVERSITY OF HYDERABAD

HYDERABAD - 500 046

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DECLARATION

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(Prof. Boppana Nagarjuna)
Research Supervisor

Dean
School of Economics

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IN MEMORY OF
MY LOVING FATHER

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ABBREVIATIONS

ADF:	Augmented Dickey–Fuller
AR:	Autoregressive
ARDL:	Autoregressive Distributed Lag Model
ASI:	Annual Survey of Industries
CAGR:	Compound Annual Growth Rate
CSO:	Central Statistical Organisation
DCs:	Developed Countries
DFI:	Development Finance Institutions
EPW:	Economic & Political Weekly
EPWRFITS:	EPW Research Foundation's India Time Series database
EXIM:	Export-Import Bank
FDI:	Foreign Direct Investment
FII:	Foreign Institutional Investment
GDP:	Gross Domestic Product
HDFC:	Housing Development Finance Corporation
HSBC:	Hongkong and Shanghai Banking Corporation
HUDCO:	Housing and Urban Development Corporation
ICICI:	Industrial Credit and Investment Corporation Of India
IDBI:	Industrial Development Bank Of India
IFCI:	Industrial Finance Corporation of India
IRF:	Impulse Response Function
IRFC:	Indian Railways Finance Corporation
LDC:	Less Developed Countries

LPG:	Liberalization, Privatization, Globalization
MA	Moving-Average
MNCs:	Multinational Corporation's
NABARD:	National Bank for Agriculture and Rural Development
NCV:	Normalized Co-Integrated Vector
NHB:	National Housing Bank
NIDC:	National Industrial Development Corporation
PFC:	Power Finance Corporation
PP:	Phillips Perron
PSLR:	Priority Sector Lending Requirement
RBI:	Reserve Bank of India
RCI:	Refinance Corporation for Industry
RRB:	Regional Rural Banks
SCICI:	Shipping Credit and Investment Corporation of India
SEZ:	Special Economic Zone
SFC:	State Financial Corporation
SIDBI:	Small Industries Development Bank of India
SLR:	Statutory Liquidity Ratio
SMEs:	Small and Medium Enterprises
SSI:	Small-Scale Industries
VAR:	Vector Auto Regression
VECM:	Vector Error Correction Model

CHAPTER 1

IMPACT OF BANK CREDIT ON INDIAN INDUSTRIAL PERFORMANCE

1.1. Introduction

Virtually every nation that experienced rapid economic growth and improvements in living standards of its people over the past 200 years has done so through industrialization. Nations that have successfully industrialized, i.e. transformed from a predominantly rural-primary-agricultural sector to the production of various manufactured goods, and have taken benefit of economies of scale, are those that have grown wealthy, whether they are the British eighteenth century, or Korea and Japan of the twentieth century, or China of the twenty-first century. Yet, despite the obvious benefits from industrialization and many countries ' successes in attaining it, many other nations like India remain less industrialized. comparatively. The questions asked are, on the one hand, what are the factors or policies that are germane for industrialization in some countries and, on the other hand, why were they elusive for India to industrialize? Consequently, a combination of government intervention through significant investment in key infrastructures such as telecommunications, roads, power, etc., and an extensive monetary policy thrust were identified as true factors leading to industrialization that would ultimately accelerate the process of growth.

There has been some debate on the interdependence between credit expansion and economic growth. While some economists argue that the expansion of the financial system is a by-product of economic growth, others assert that credit expansion is critical to growth itself. India's drive to expand its banking access and recent changes in the way transactions are produced raise the question of whether such changes directly affect the growth trajectory. This intends to analyse

furthermore, comprehend the connection between credit and development in India over the most recent couple of decades. Various measurements for credit and yield is utilized to test the relationship at a generally speaking just as sectoral level. The discoveries demonstrate a solid connection between the two factors. An investigation into the significance of credit in an economy and the role it plays in driving development has often been pursued. Those who claim that credit influences growth stress that the financial system, particularly banking, promotes effective allocation of resources from savers to borrowers with productive investment opportunities, thereby stimulating economic growth. Banks also function as a significant channel of monetary policy transmission by offering economic intermediation, accepting and deploying huge quantities of public funds, and generating money supply. There has been disagreement among economists that economic growth depends on effective utilization of physical resources and only real variables affect actual growth. However, expanding financial activity can create credit and influence economic growth.

Credit has been expanding in India. In latest times, capital markets such as debt and equity markets have acquired importance, and strategies such as Jan Dhan Yojana have improved the reach of the banking system. There is an increase in the use of credit cards to make consumer-based transactions. Therefore, the research of the connection between bank credit and economic growth is not only of pedagogical concern but also of practical importance in policymaking.

This study mainly focusing on investigating the relation between the bank credit and industrial sector. The reason behind the choosing industrial sector is if globe is observed, the composition of their economies is the one factor that distinguishes an advanced and an underdeveloped country. This is also obvious in the gap between the two nations in per capita income. While advanced nations are mainly industrial economies, underdeveloped economies are predominantly backed by agriculture. Industrialization plays a significant role in an

underdeveloped country's economic development. There are exceptions to this rule, of course. By exploiting their blessed natural resource endowments, some nations have achieved comparatively increased per capita income. For instance, oil exporting nations such as Saudi Arabia, Kuwait, etc., took advantage of their powerful benefit in international trade and earned greater per capita income. Such instances, however, are not prevalent.

In Indian major portion of the Indian economy depending on the two extreme sectors namely Agriculture which is predominantly backed the Indian economy for the ages and second one is service sector which is newly developed in the Indian economy mostly post liberalization era. These two sectors which are largely sensitive to the external factors i.e in agriculture monsoon and in service sector global turmoil's. if the world economic history observed most of the developed countries have a strong industrial sector. A countries' economic development takes place in phase manner namely Agriculture to Industrialization, Industrialization to service sector. But in Indian case second phase was not taken place adequately hence almost industrializations was skipped In Indian case therefore, India couldn't build a robust industrial sector which is potential to generate huge employment opportunities to un-skilled labour to skilled labour. Current contribution of industrial sector 23.8% of the total employment in India and 31.46 % of share to the GDP. It is high time that India should develop a sustainable industrial sector as it is potential to generate national income more economic opportunities. Contemporary economists named Indian growth as a job less growth as it growing at desirable rate but failed to generate employment. in fact, India is blessed with potential of human capital but it is not being optimally utilised, possible reasons for this, large portion Indian work force is low-skilled or semi-skilled, industrial sector is adequately strengthened it can accommodate the huge work force in India.

To build a robust industrial sector investment takes a major role. Schumpeter also given the role to the bank credit in generating economic growth. It is obvious that generating investment

in an economy bank plays crucial role, this study also investigating the relationship between bank credit and industrial performance in India over the period.

Bank credit to the industrial sector can be considered bank loans and advances given to the industrial sector by financial institutions in attempt to improve industrial productivity, which contributes to economic development. However, some main factors that create sustained industrial finance need to be explored efficiently and effectively as the case of bank credit that is considered to be an economy's bloodstream to bridge the gap between the borrower and the lender, especially in a developing economy such as India. Credit management is therefore a sensitive variable to be handled by the monetary authority within the country's central bank's general framework. RBI in Indian case.

1.2. Objectives of the study.

A) To review the policy framework of industrial financing in India.

B) Empirical testing of bank credit on industrial performance.

To investigating the relationship, three major indicators of growth of an industry taken as variables for this study those are fixed capital, Employment, output.

1.3. Hypotheses

H_0: There is no significant impact of bank credit on fixed capital formation, employment, output,in industrial sector.

H_1: There is a significant impact of bank credit on fixed capital formation, employment, output value in industrial sector.

1.4. Relation among the Bank credit and variables

Before establishing the relation between the variables using econometric tools this study intended to look over the trends of variables over the period. Table 1.1 shows the absolute values of our variables from 1970-71 to 2015-16. Only for Net fixed capital formation time period is 6 years less than other variables as data is not available in the Annual survey of industries, yet it is believing that data doesn't create any inconsistency in subsequent chapters. Absolute values of the Table .1.1 converted in to simple values for convenience of observing the trend by using the Annual growth Rate . For, further studies the absolute values are converted in to Logs.

Table -1.1

Annual Growth rate of Bank credit, Total output value, Net Fixed Capital Formation and Employment

Years	Bank Credit	Employment	Total Output Value	Net Fixed Capital Formation
1970-71				NA
1971-72	10.3	4.2	9.5	NA
1973-74	20.7	7.1	31.4	NA
1974-75	10.9	4.0	28.0	NA
1975-76	14.8	5.4	6.1	NA
1976-77	10.8	4.2	14.2	NA
1977-78	22.0	6.7	11.4	
1978-79	17.1	2.2	18.1	19.1
1979-80	18.8	5.9	13.7	11.7
1980-81	14.6	0.5	10.4	9.4
1981-82	15.9	0.8	20.5	52.1
1982-83	15.0	3.0	14.7	6.3

1983-84	24.9	-2.3	22.9	15.1
1984-85	9.1	0.6	6.0	0.1
1985-86	18.3	-5.1	8.1	3.4
1986-87	12.9	-0.4	12.0	1.1
1987-88	13.3	4.6	14.5	24.8
1988-89	-17.6	-0.6	20.7	-0.7
1989-90	28.8	5.2	22.9	42.7
1990-91	24.0	0.2	20.0	23.7
1991-92	5.4	0.4	7.5	35.4
1992-93	46.4	6.2	29.5	12.2
1993-94	0.9	0.0	22.4	-50.2
1994-95	26.8	4.5	21.3	279.3
1995-96	19.7	10.4	28.2	11.4
1996-97	5.1	-5.9	13.4	15.3
1997-98	25.0	5.8	7.3	-22.8
1998-99	-29.7	-14.1	-12.4	0.8
1999-00	11.2	-4.8	8.5	-63.0
2000-01	1.6	-3.1	-5.4	-19.4
2001-02	4.4	-2.9	2.7	157.0
2002-03	-2.2	2.4	17.0	-82.6
2003-04	10.0	-0.9	15.6	134.6
2004-05	15.5	7.4	25.0	100.9
2005-06	5.0	7.8	17.8	186.8
2006-07	21.9	13.4	26.2	9.0
2007-08	5.9	1.2	20.1	33.5
2008-09	18.2	8.4	10.6	33.6
2009-10	23.6	4.2	14.0	14.6
2010-11	24.5	7.6	18.4	-0.1
2011-12	12.0	5.8	9.7	24.6

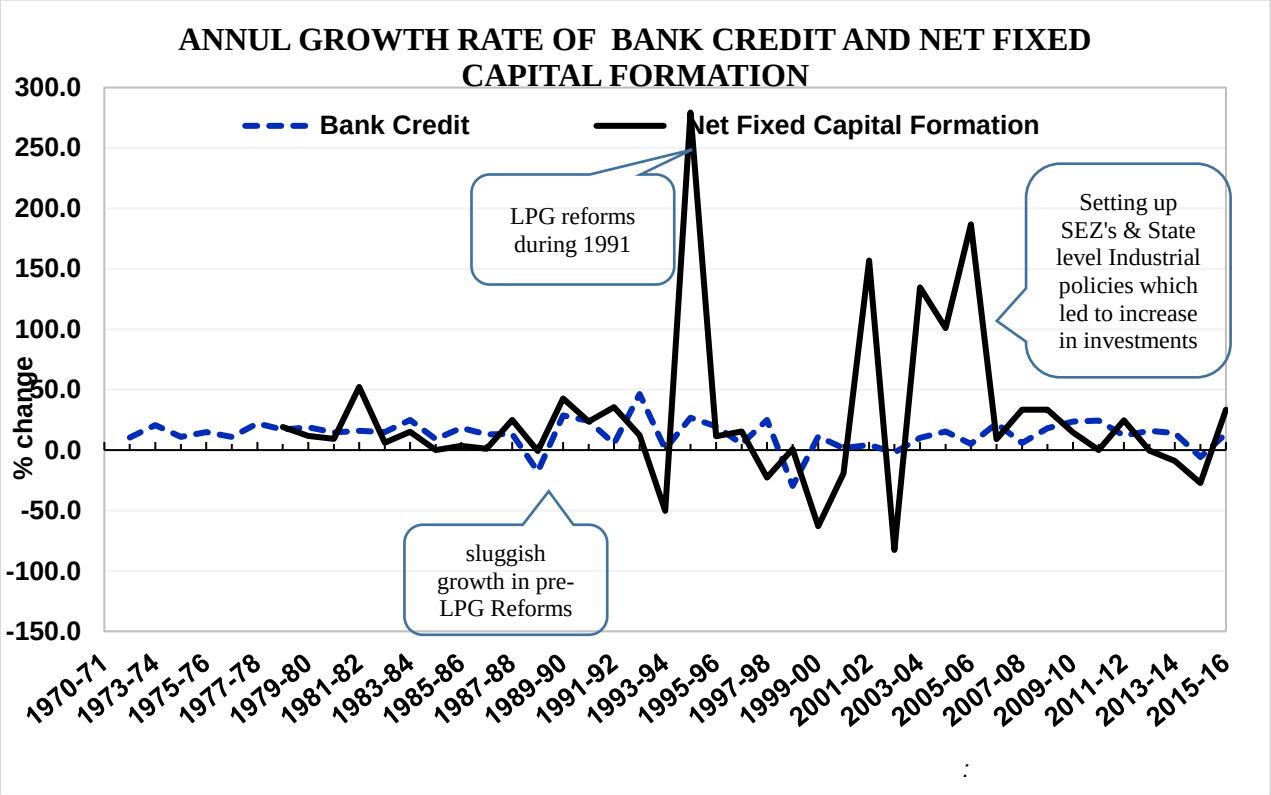
2012-13	16.0	-3.5	11.3	-0.5
2013-14	14.0	4.6	5.7	-9.0
2014-15	-5.7	2.6	9.3	-27.1
2015-16	13.6	3.0	9.4	33.4

Source: Annual survey of industries. Published by Ministry of Statistics and Programme Implementation

1.5. Graphical representation Annual Growth rate of Bank credit, Total output value, Net Fixed Capital Formation and Employment:

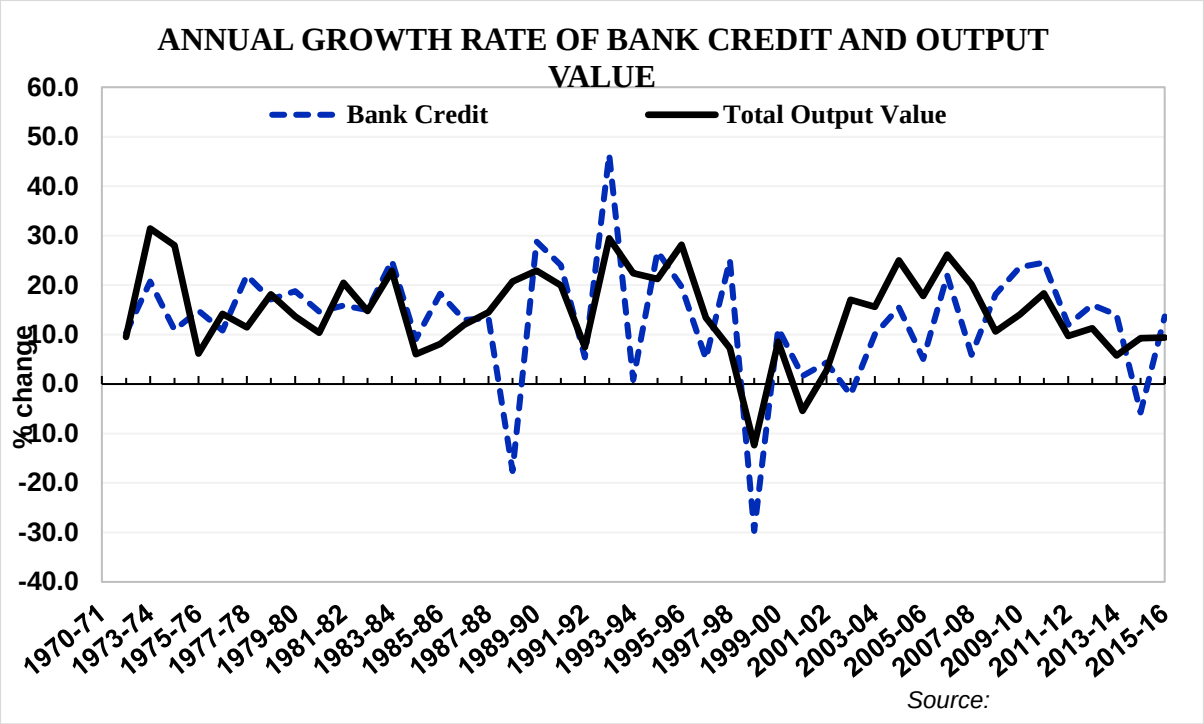
General trends of the variables are depicted below in the form of graphs. This graphical representation of the variables can produce the overall trend between them in the study period.

Figure.1.1



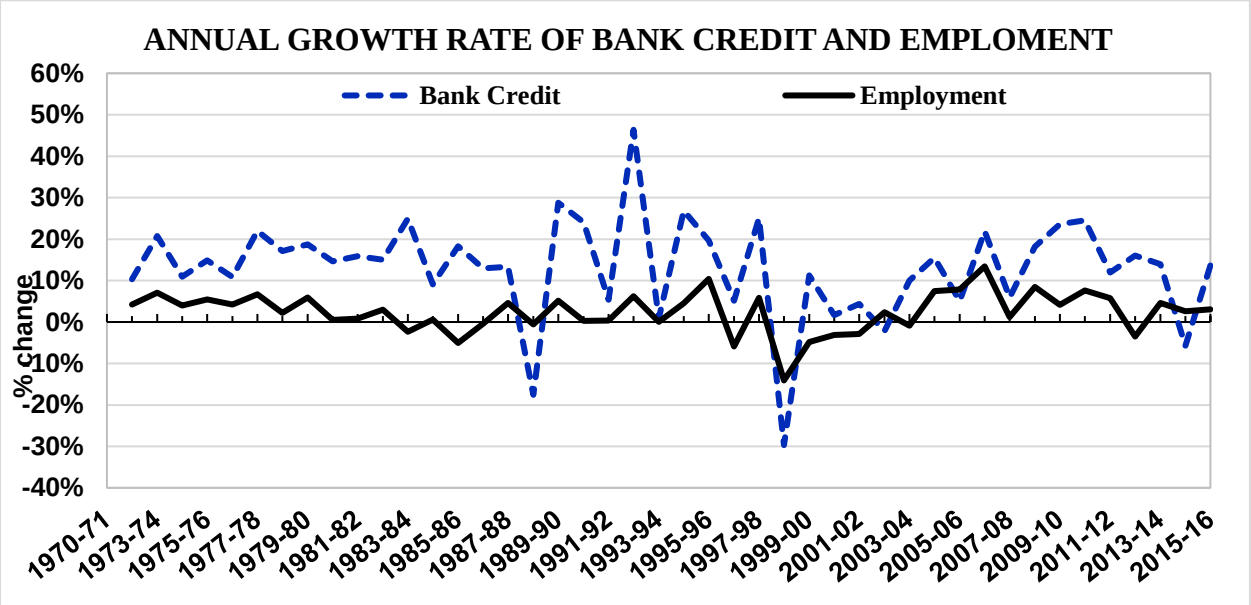
Source: Annual survey of industries. Published by Ministry of Statistics and Programme Implementation

Figure1.2



Source: Annual survey of industries. Published by Ministry of Statistics and Programme Implementation

Figure 1.3



Source: Annual survey of industries. Published by Ministry of Statistics and Programme Implementation

By observing the above graphs general trend can be observed except Net capital formation however it also followed some sharp trends with the Bank ccredit. During 1970's and 80's, India's output was completely dependent on the input growth specially led by the increase in capital (i.e Bank credit), however, the rate of increase in output was less than the rate of increase in capital. This can be seen the above graph which shows that Bank credit is positively co-related with output, Employment and Net capital formation. During 1988-89 for the first time negative bank credit has witnessed in the economy it was evident Indian economic history that pre LPG reforms low economic performance due to balance of payment crises of 1991 just begun, which pulled down all the dependent variables such as Capital formation, Output and Employment levels. In the beginning of 1990's, the introduction of LPG reforms by the Government of India, and opening up the Indian market to the world. Huge amounts of foreign investments came into the economy and led to sharp spikes in Net fixed capital formation and employment levels. Thereafter, during 2005-06 Indus's decision to setup Special Economic zones, High tech industries, reforms in power sector led to infusion of capital through Banking credit system leading to improvement in employment levels for few years.

Based on the above graphical observation it is believed that there is a relation existed. Based on this information the hypotheses are formed and it will be tested in the subsequent chapters by using advanced econometric tools.

1.6. Organization of study.

- The first chapter of this thesis involves an introduction of the topic, objectives of the study, overlooking the trends of the objects and the hypothesis.
- Second chapter deals with the first objective of the study which is theoretical framework of the study and end of the chapter previous works related to bank credit and economic growth are discussed which are believed to basic background of this study.

- Third chapter deals with the empirical model and methodology and tools and data sources that are used in this thesis.
- Forth chapter deals with empirical work that is second objective and,
- Fifth chapter summery, concludes the study and tries to gives policy suggestions if any.

CHAPTER 2

Policy Framework of Industrial Financing in India, Literature Review

2.1. Introduction

With the seminal work of Gerschenkron (1962), the role of finance in growth in general and industrial growth in specific has gained wider appreciation. Since then, in order to attain rapid industrialisation, financial policies have been intended and implemented according to countries ' requirements. Even before Gerschenkron, Schumpeter (1934) emphasized the significance of financial intermediaries and role in development and economic growth. In India, absence of appropriate financial credit was recognized as one of the main blocking factors on the route to industrial growth (Bhattacharjee and Chakrabarti, 2013; Khanna, 2013). It was considered that the underdeveloped financial sector was the cause behind inadequate financial funding in India for the industrial sector. Financial liberalization was argued to create structural changes and transform India's financial sector. With an extended market and several fresh competitors and instruments, the developed economic sector will be prepared to organize the much-needed finance for industry. It would not only tackle the problem of availability finance, but also remove constrains on access to finance in India. The structure of the Indian financial system has experienced important change following economic liberalization, although it remains an intermediate-based financial system (Das, 2011). On the one side, fresh sources of finance have appeared from the industrial financing perspective, but on the other side, due to absence of government funding, several public-sector financial institutions such as the Development Finance Institutions (DFI) have been transformed into universal banking systems (Ray, 2015).

Finance is regarded as the industry's life-force. Industrial growth is not possible without appropriate finance. Industrial development in India was unable to attain a significant position and due to the absence of appropriate finance. Industries involve both short-term, medium-term and long-term financing to satisfy their fixed capital expenditure demands as well as to satisfy their needs for working capital.

Before going to study the relation between the bank credit and industrial performance study would be easy if we familiarise with the banking structure and industries in India.

2.2. Banks in India.

The word ' bank ' is applied to a variety of institutions in India as well as other developing countries that provide funds for multiple purposes. Therefore, banks are of different types

We can now take a brief look at various kinds of banks in India. Figure 2.1 shows, Indian banks are segregated broadly two parts Scheduled Banks and Non- Scheduled Banks.

2.2.1Scheduled Banks

By definition, any bank listed under the second schedule of the Reserve Bank of India Act, 1934, is considered to be a scheduled bank. The list includes State Bank, all nationalized banks (Bank of Baroda, Bank of India, etc.), regional rural banks (RRBs), foreign banks (HSBC Holdings Plc, Citibank NA), and some cooperative banks. This list also includes both old (Karur Vysya Bank) and new (HDFC Bank Ltd) banks from the private sector.The bank's paid-up capital and collected funds must not be less than Rs5 lakh in order to qualify as a scheduled bank. Scheduled banks are eligible for loans at bank rate from Reserve Bank Indian, and are given membership to clearing houses

2.2.2Non-scheduled Banks

By definition, non-scheduled banks are those not mentioned in the RBI Act, 1934's 2nd schedule. Banks with less than 5 lakh rupees of reserve capital qualify as non-scheduled banks Unlike scheduled banks, except in emergency or "abnormal conditions," they are not permitted to borrow from the RBI for normal banking purposes. "Jammu & Kashmir Bank" is an example of a non-scheduled commercial bank.

Scheduled banks are further segregated as shown in the figure 2.1 below.

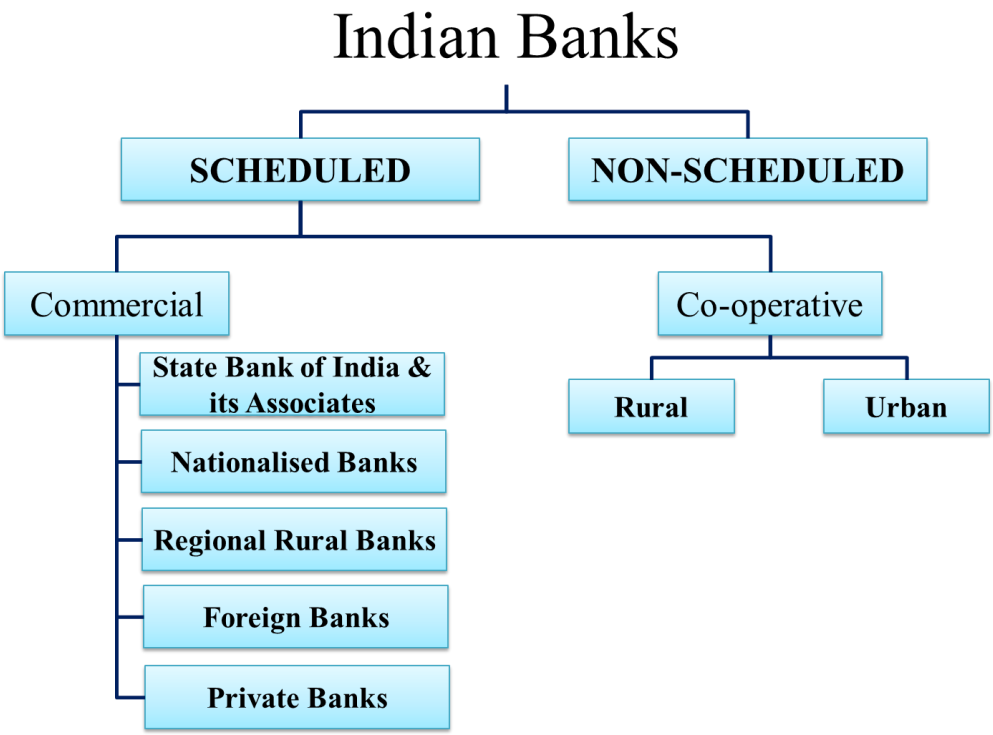
2.2.3. Commercial banks:

The most significant types of banks are commercial banks. The word "commercial" has the meaning that banking is like any other business. In other words, commercial banks are, in essence, organizations that make a profit. They collect deposits from the public and lend money to business firms (manufacturers), traders, farmers and consumers. Commercial banks normally meet the working capital needs of trade and industry and are a part of the money market. Commercial banks ' current account deposits are used as a medium of exchange, i.e. to make transactions. Other bank deposits are not used that much. These are specialized institutions that lend to particular sectors of the economy. So we usually refer to commercial banks using the word ' banks.

2.2.4 Co-operative Banks

In both urban and non-urban areas, cooperative banks operate. All banks registered as co-operative banks under the Cooperative Societies Act.1912. These are banks operate by an elected managing committee with provisions of members ' rights and a set of "communally developed and approved bylaws and amendments."

Tree chart: 2.1



2.3. Industrial Sector in India.

In brief Indian industrial activity is essentially categorized into the factory and non-factory sectors. Industrial units registered under the 1948 Factories Act fall under the factory sector category, and the sector is called as an organized or registered industrial sector. The non-factory sector comprises of household and non-household units not enrolled under the 1948 factory act and the industry is called as unorganized or unregistered industrial sector.

2.4. Industrial Finance in India: - Institutional Structure since Independence

Immediately after independence, industrial finances in India can be termed an independent nation's effort to reshape its financial resources,' to channelize them towards achieving the country's socially committed objectives of balanced industrial growth. At first, it was a strong response of all its vices and vicious motives of the British financial system in India in pre-indépendance. With new visions and dreams to accomplish and new responsibilities to take on,

India needed to develop its own vision, insights and financial policy to suit it. It thus aimed to reform its autonomous industrial policy and planning strategies and therefore to define its priorities and objectives. As a consequence of the varying priorities and goals in line with the Five Year Plan and the respective industrial policy resolutions, the industrial structure in India has experienced significant changes. In the course of time, it has also altered the structure of industrial finance.

In highlighting the absence of industrial finances, which has discouraged rapid industry growth and called for the establishment of financial institutions in India, the industrial commission (1916-18) and the Banking Enquiry Committee (1931) have acquired a fresh dimension. Numerous research on the multiple facets of this row was conducted. The trials carried out by P.P. in this regard. John Matthai (1924-25), John K.R.V. (1930-31) and N.G. Rao (1930-31). Das (1934) concentrated their views on establishing special banks to finance companies and creating unique machinery for business underwriting and business advancement. It would serve as an essential means of solving industrial finance problems.

The evolution of the Indian financial sector's institutional structure from the view of industrial financing can be segregated into three separate stages. These are the early years of post-independence (1947-1969), the period of nationalization of banks (1969-1991), and the era of financial liberalization (1991 onward). During the first era, that is, the period between early years of post-independence and bank nationalization in 1969, several long-term lending institutions (categorized as DFIs) were set up at both domestic and state level to provide long-term industrial financing. The second stage is the nationalization period of the bank and the credit plannng. This was the so-called financial repression era. During this era, bank loans became the main source of finance for sector and attempts were made from the point of view of social justice towards purposeful loan scheduling. As a source of industrial finance in India, the DFIs consolidated their role.The third stage is the era of financial liberalization that started

when the Chakravarty Committee submitted three important reports in 1985, the Vaghul Committee in 1987 and the Narasimham Committee in 1991. However, the suggestions of the Narasimham Committee were the basis for the reforms, particularly with regard to banks and financial institutions.

2.4.1. Early Post-Independence era

India's early years of post-independence experienced several specialized term lending institutions being created for industrial funding purposes. Most of the specialized term lending institutions or DFIs were established at both national and state level during this era. Set up in 1948, India's Industrial Financial Corporation (IFCI) was the first such financial institution. The IFCI was authorized to disburse loans above Rs 10 lakh during the early years of its establishment (Ray, 2015). In the following years, several states, with the assistance of the central government, set up their own specialized financial institutions recognized as the State Financial Corporation (SFC) to satisfy the long-term financial requirements of SMEs (Ray, 2015). The National Industrial Development Corporation (NIDC) was established by the central government in 1954 to provide the industrial sector with financing. But it became dysfunctional within a century of its inception. Several other financial institutions were established in 1955 and 1964, including India's Industrial Credit and Investment Corporation (ICICI) and India's Industrial Development Bank (IDBI). India's Industrial Credit and Investment Corporation (ICICI) was established by the Government of India with World Bank assistance and Indian Industry representatives with the objective of meeting the financial requirements of medium-and long-term company initiatives (Ray, 2015). Over moment, it has appeared as a significant source for Indian sector foreign currency lending. The IDBI arose as the apex organization that, by taking over the Refinance Corporation for Industry (RCI) companies, supplied medium-and long-term funding assistance to the enterprise. It also acquired control over IFCI from the central government. While the central government played

a major role in setting up and operating the ICICI, the IDBI became a wholly-owned subsidiary of the Reserve Bank India (RBI).

The concept behind the creation of several DFIs was to provide long-term financing to promote initial investment to industries that discovered it highly hard to develop and maintain themselves in the early years. Long-term finance difficulty is a issue typically connected with nations that are late in the industrialization process. Given that capital markets in these countries are comparatively underdeveloped and often fail to provide much-needed funding for industrialization; the DFIs play a main part in filling that gap during the initial phase. New companies discover it hard to access funding in order to promote initial investment and the losses incurred during the early stage or the learning period— it is called Learning Capital (Nayyar, 2015).

2.4.2, Era of Bank Nationalisation.

Bank nationalization period is also referred to as India's credit planning period. The banking sector and monetary policy have become credit policy period instruments. The four main characteristics of credit planning in India were: (I)the creation of an administrative interest rate centred on social needs, (ii) the creation of' priority sector' where commercial banks were permitted to allocate a fixed portion of credit to sectors such as agriculture and small-scale industries (SSI), (iii) the rise in the statutory liquidity ratio (SLR), and (iv) the establishment of lending norms for working capital loans.

The nationalization of banks took place in 1969 when 14 commercial banks were nationalized. One reason for nationalization was to mobilize funds for the five-year plans to be implemented. Using branch extension, banks were requested to mobilize funds. On the other hand, during the Fourth Five Year Plan, the directed credit program was launched with a significant emphasis on agrarian development. Priority Sector Lending Requirement (PSLR) were implemented in

1979. According to the PSLR, estimated 33% of the bank loan was allocated for key industries (agriculture and SSIs) and a minimum of 16% was fixed for agriculture (Sen and Vaidya, 1997). The PSLR was subsequently increased to 40% of the total bank credit. During this period, a majority of financial institutions were privately owned.

The post-nationalization era also witnessed the establishment of several specialized refinancing and sector-specific financial institutions such as National Bank for Agriculture and Rural Development (NABARD) 1981, the National Housing Bank (NHB) 1988, the Small Industries Development Bank of India (SIDBI) 1989, the Housing and Urban Development Corporation (HUDCO) in 1970, the Export-Import Bank (EXIM) 1981, the Shipping Credit and Investment Corporation of India (SCICI) 1986, the Power Finance Corporation (PFC) 1987, and the Indian Railways Finance Corporation (IRFC)1989.The two key institutions that continue to serve in the post-reform era include NABARD. In the post-reform era, NABARD and SIDBI are the two main organizations that continue to operate. While NABARD was established to provide credit for agricultural operations, rural industrialization, village industries and handicrafts, etc., SIDBI was established as an IDBI subsidiary to provide finance to small-scale industries.

2.4.3. Era of Financial Liberalisation.

Financial liberalization was introduced in India in 1991 as part of the comprehensive reform program. The essence of the liberalization program was to ensure a crucial role for the market in resource allocation. The program activities included interest rate reduction, a reduction of reserve requirements, deregulation of direct credit supply, and reduction of state control over banking operations while creating a regulatory framework for the market (Lawrence and Longjam, 2003). These financial sector reforms went in tandem with trade and industrial policy reforms and a series of fiscal reforms.

The significant shift from the perspective of industrial financing was the gradual demise of India's development in banking. Following suggestions from the Narasimham Committee II (1998) and the Khan Committee (1999), the role of development banking as a source of long-term credit gradually decreased. The RBI took several measures to officially transform DFIs into universal banking institutions based on the suggestions of the above two committees (Ray, 2015). While most DFIs have been transformed into universal banks, several other specialized financial institutions have been permitted to function until the liquidity and depth growth of the debt market (Ray, 2015). Increasing share of non-performing loans was recognized as the main cause behind this move, and given the RBI moving along with the National Industrial Credit Fund, discontinuing DFIs as perceived as an unsustainable funding model was essential (Mathur, 2003).

2.5. The Financial Sector and the Industrial Sector Linkages.

It becomes essential to explore the links between the financial sector and the industrial sector in India in order to comprehend industrial financing in the age of financial liberalization. Studying the connection between the above two industries will not only give an outline of the evolving framework of industrial finance in India but will also assist to comprehend why the economic industry in India was unable to organize the required financing for industrialization. As argued in the context of financial liberalization, from the view of industrial financing, financial sector liberalization would not only eliminate the Indian industry's financial constrains in terms of availability and access, but also decrease capital costs. Thus, the linkages between the above two industries were studied by examining three wide indices: access to finance, availability of finance and capital cost.

2.6. Access to Finance

Access to finance through financial institutions performs an important role both at the time of new company is established and during that company's working time or lifespan. However, the nature of finance or capital may differ. A firm typically needs access to long-term finance at the moment of its inception and may involve working capital for its expansion and development over the course of its lifetime. Access to finance is therefore essential for starting any project. While a few institutions may provide long-term financing facilities, business banks ' working capital is no longer evenly spread across locations, regions, and industry size. The number of bank branches in rural regions as a percentage of total branches approximately 38.% in 2017, about 55% in the early liberalization stage and almost 60% before liberalization.

Since the expiry of the branch extension program of 1990–95, there has been no branch expansion program. Many banks were either combined or closed as part of the banking reform; some were even recommended to convert their non-viable rural branches into satellite offices. Regional rural banks were permitted to relocate their branches making losses, with an alternative to pull out of rural regions (Shetty, 2005). The reduction of the bank branch network in rural regions is certainly a source of worry as it could leave a substantial percentage of the population unbanked, thus influencing the rural industry's development. The first Narasimham Committee Report (1991) suggested that' each public sector bank should establish one or more rural banking subsidiaries... to take over all its rural offices' and also stressed the need to match the commercial banks with the national rural banks ' facilities (Shetty, 2005).

With the narrowing of the branch network of rural banks, the share of agricultural credits decreased substantially. It has fallen from around 15% in 1990 to 9% in 2014. There was also a comparable trend in semi-urban regions as regards the share of total credit. The share of credit fell from around 17% in 1990 to around 9% in 2013 and 11.5% in 2014.On the other hand, the

credit percentage of urban regions increased from about 45% in 1990 to 69% in 2013, but fell to 60% in 2017 . Credit concentration in metropolitan areas indicates that financial activity tends to focus on extremely urbanized regions while depriving rural and semi-urban regions of financial activity. Thus, economic liberalization has definitely proved useful in terms of access to credit for the extremely urbanized metropolitan and rural regions.

2.7. Availability of finance.

In addition to access, the availability of adequate financing to satisfy the industrial sector's requirements is essential to effective industrialization. As mentioned previously, the core argument for financial liberalization in India was to resolve financing or credit constraints on India's industrial sector, as in several other developing countries. Therefore, it was anticipated that the constraints would be considerably lowered after financial liberalization by increasing the volume of investible funds. Contrary to the reality, however, financial liberalization did not alleviate financing constraints.

2.8. Bank Credit

In the subsequent years of the economic liberalization era, the share of industrial credit in total bank credit decreased. the percentage of industrial credit dropped from about 55% in the early reform stage to less than 40% in 2007–08 and around 45% in 2016–17. While the credit ratio in the medium and large industries has stagnated more or less since the 1980s with a decrease from 1999–00 to 2011–12, the SSI share has declined since 1997–98. SSI's credit share in total bank credit fell from about 14% in 1991–92 to about 7 % in 2016-17. The decrease over the last century has been severe. The declining credit flow to the SSI sector vis-à-vis the overall industry credit showed that lower (share) quantity of credit is available to the industrial sector in India, and credit availability has become increasingly difficult for SSIs in the post-reform era (Santhosh Kumar Das (2015).

2.9.Theoretical Framework.

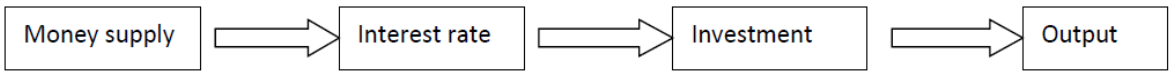
The widespread consensus in economic discussions is that at least in the short run,monetary policy can substantially influence the course of industrialization by transmitting monetary policy actions to the economy through financial intermediation, The credit channel is a significant mechanism through which monetary policy is transmitted on to the real sector as validated by many economic researchers. (Mckinnon, 1973, Shaw 1973). In modern economies, this channel occurs in the form of bank lending and advances to companies that make up a critical proportion of total borrowings in the financial market. This monetary policy channel is therefore referred to as the ' bank channel '. According to (Kashyap and Stein1994), there is a distinct lending channel for monetary policy transmission where there are three financial assets, namely money, publicly issued bonds and intermediated' loans,' which differ in meaningful ways from each other and must be clearly distinguished when analyzing the impact of monetary policy shocks. The banking sector can now be special in two relevant ways in this nexus; in addition to creating money, it makes loans which, unlike buying bonds, the household sector cannot do.

According to Adegboye (2015), monetary turmoil can influence the level of economic activity by changing the availability of bank credit through interest rate modifications. Thus, a contractionary monetary policy leads to a fall in bank lending and, as a consequence, bank lending behaviour directly affects the relationship between monetary policy and economic activities

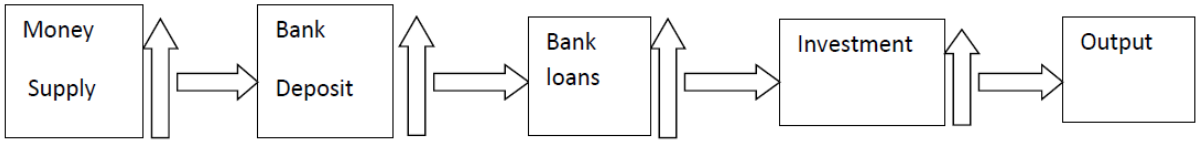
Direct theoretical foundation for the bank credit and industrial performance is not found, for this study Keynesian Monetary Transmission Mechanism is adopted as theoretical foundation.

2.9.1 The Monetary Transmission Mechanism.

In economic literature, the mechanism by which monetary policy is transmitted to the real economy is a vital subject matter. Monetary policy's transmission mechanism refers to monetary policy's ability to affect aggregate spending and real output. Using the Keynesian standard analysis, Iyoha (2003) claimed that the channel through which monetary policy affects the closed economy's domestic economy is aggregate demand through the interest rate. To this end, the number of theoretical formulations were designed to capture the transmission pattern, and the credit view of the mechanism is represented by the bank credit channel (loans and advances). The simple Keynesian monetary mechanism can be seen as a general form of monetary policy output function involving direct relations.



The transmission mechanism demonstrates that a contractionary monetary policy that raises the policy that increases the policy rate would result in a reduction in the financial market's ability to create money, thus reducing the money supply and aggregate expenditure. The impact would be a fall in the On the other hand, the credit view of monetary policy transmission suggests that monetary policy functions by affecting both bank assets (loans) and banks (liabilities). Monetary policy therefore not only changes the supply of deposits but also shifts the supply of bank loan. For example, an expansionary monetary policy that increases bank reserves and bank deposits increase the number of available bank loans. Where many borrowers rely on bank credit to finance their activities, the increase in bank lending will result in an increase in investment leading to an increase in aggregate output. The resulting monetary-policy effects are presented schematically below.



The above schematic representation shows that an expansionary monetary policy would lead to an increase in bank credit, thus increasing aggregate investment expenditure and aggregate demand and production. In this context, banks ' response to monetary policy is their response to lending and not their role as creators of deposits. The Keynesian The Monetary Transmission Mechanism.is shows the monetary policy and output relation Therefore, for this study analysis this model is used as increasing the bank loans to the industry further increase in the investment, employment, fixed capital, and output.

2.10. Literature review.

2.10.1. Theoretical Underpinnings.

Theoretical literature on bank credit and industrial performance is quite little but literature on bank credit and economic growth is helped to work on the objectives of this study and made me familiarise this area.

Schumpeter (1934) emphasized the significance of financial intermediaries in savings mobilization, project evaluation, risk diversification, debt management tracking, and enabling operations that are crucial for development and economic growth. He asserted that bank credit functions as money capital and therefore represents the required basis for creative procedures scheduled by entrepreneurs to be realized. Schumpeter (1970) describes banks ' role as "social accountants"–required to create personal decisions constrained and mutually consistent with those decisions.

Economic models relying on *Harrod-Domar* and *Robert Solow's* neo-classical traditions that arose after World War II overlooked the economic sector's importance. at best maintained that

when possibilities occur in an economy that requires funding, the economy will create the economies and organizations needed to finance these possibilities, i.e. as Robinson (1952) says "where business contributes, finance follows."

Tobin (1965) studied neo-classical economic development models and regarded financial resources as an alternative manner to accumulate wealth rather than productive resources. He discovered that post-World War II growth policies were predominantly motivated by immediate government interference to promote physical capital accumulation. As a result, financial markets were repressed and their contribution to economic growth was curtailed.

These opinions and practices were eventually questioned when McKinnon (1973) emphasized that complementarities between economic growth and capital accumulation may be more essential in the developing world than idle replacement of money-physical capital. Shaw (1973) highlighted the growing characteristics of deepening financial capital by impacting on market integration. Shaw and McKinnon both integrated money and finance into developing-country-relevant designs, emphasizing the growth-reducing and distorting impacts of financial repression. Their job affected the next two decades ' financial-policy changes.

Minsky (1992) argued that the financial system's correct function was to encourage the economy's "capital growth." In moments of elevated loan development, quality standards could be impaired in exuberance, which are seeds of a subsequent recession. This culminates in a "Minsky Point" or "Minsky Moment," which is the beginning stage of a financial crisis in which credit demand dries up, triggering financial system panic.

2.10.2. Empirical literature review.

Patrick (1966) defines two feasible causal relationships between economic growth and financial development. As the real economy expands, demand for financial services is increasing, according to the "demand-following" perspective. Financial establishments and

facilities are developed in advance of the demand for them, according to the "supply-leading" perspective. According to him, supply-leading perspective becomes crucial in the early phases of development. The demand-following reaction becomes more dominant as continuous macroeconomic development begins.

Jung (1986) used Granger Causality studies to study the causality connection between financial development and economic growth in 56 nations. He discovered some proof that less developed countries (LDCs) have predominantly a supply-leading model of causality, while developed countries (DCs) have the opposite path of causation. Levine et al. (2000), Calderon and Liu (2002) and Hassan et al. (2011) use panel data to investigate the multi-country connection between economic development and growth.

Khanna, S. (1999) This article attempts to identify the Finance-Growth relationship. Several indices of the degree of financial intermediation such as the pace of development of M1/GDP, M3/GDP and GDP. Time-series methodology such as Unit Root, Co-integration developed by Johansen and Juselius (1991) have been used to study this paper. he verified in the information the existence of Units Roots. ADF and Phillips Perron Tests were used for this. The variables Financial Development (i.e.) M3/GDP and Growth Rate are both integrated at the first difference level and significant at the 5 per cent level. Second, we used Johansen and Juselius (1991) for the purpose of co-integration. Our findings verify a co-integrating vector that informs of the relationship's long-term equilibrium. To promote our results, we also report the Finally, he finds the causality results of VECM model that promote the financial-led development hypothesis in India.

Khanna.S .in other study "*Financial Reforms and Industrial Sector in India''* published in 1999 concluded that reforms in the Indian financial sector was not able to accomplish their objective of making the sector efficient. Instead of the cheaper credit that had been pledged,

interest rates were hardened. These reforms have had catastrophic effects on the industrial sector, which have susceptible Indian firms to overseas competitors. While MNCs are licensed to fund, but long-term institutional financing has been reduced for Indian firms

Clive Bella, Peter L. Rousseau (2001) This article examined whether financial intermediaries have been instrumental in influencing the economic performance of India. After explaining the evolution and functions of the financial sector. they build a set of autoregressive vector VAR and vector error correction models VECM to evaluate the strength and direction of the connections between formal intermediation measures and various economic aggregates. The findings indicate that

- the financial sector has been active in promoting aggregate investment and output, but also in the continuous change towards the industry that has marked the growth of India
- The operating channel was one of accumulating debt rather than improving the overall productivity factor.
- Its contributions went beyond fiscal policy's passive support

Lawrence, P. and I. Longjam (2003) This paper gives details and analyzes aspects of Indian financial sector development especially after the beginning of financial liberalization in 1990, concentrating on private sector credit-to-GDP ratios, financial sector liabilities to GDP, commercial bank assets to entire banking sector assets, and stock market capitalization to GDP. In this study Indian evidence reveals that, although the developments of all financial indicators are generally increasing, liquid liabilities and private credit have been stagnating especially progressively after economic liberalisation, in the '80s. However, during the 1990s, bank assets and capitalization of the stock market showed significant growth. The cross-country assessment demonstrates that Indian financial sector performance is poor compared to high-income and rapidly growing nations.

Rakesh mohan (2004) Rakesh Mohan's initial literature concentrated on the development of comprehensive financial system which s capable of taping savings and then channelling the funds thus produced into a wide range of manufacturing operations. It has been gradually realized that the mode of supply of industrial finance is as essential to foster economic development as is quantum of funds Cross-country experience indicates that countries with advanced financial systems appear to develop quicker in order to effectively allocate resources among competing uses. financial intermediaries such as venture capital funds encourage technological innovation and industrial growth by offering risk capital and financing to those entrepreneurs who are most likely to develop new products, production processes and sustainable manufacturing facilities. The study describes the main goal of India's economic reforms to boost growth in the early 1990s. To do this, he first reviewed alternative approaches to funding patterns as they exist and have evolved in different countries. Then traced our own history and reviewed the financial sector reforms in India briefly. Subsequently, examines companies and financial institutions efficiency in recent periods. In this context, he suggested examining how the major contours of Indian industry's financing pattern have changed over time.

R. Nagaraju(2005) During the past half century, author tried to compare the performance of manufacturing sectors at a disintegrated level in China and India. Finds that Chinese industrial development is near to one and a half times that of India throughout the era, with the gap gradually widening. Author questioned whether there is a prospect of India catching up with China in the foreseeable future? The china seems to undergo from huge excess capacity, misallocation of resources and a gross wastage of capital - as evident from the persistently high capital-output ratio. The comparison seems to show that India's relatively strong foundations and domestic entrepreneurial capital, with a sounder macroeconomic environment, have the potential to improve performance. A strengthening of fixed investments to increase supply and

agriculture productivity in infrastructure, revitalizing long-term funding to boost industrialization, and facilitating easier credit to small and medium enterprises. The author uses Wu's estimates for China, India official GDP estimates, both measured at a constant local currency prices, derived from total manufacturing as provided in national accounting statistics.

Patha ray (2013) Looking at Indian industry's sources of finance, this article describes the transition from a state-owned and state-dictated financial sector to a a regime of financial liberalization system. This transformation still has a amount of rough edges. There are indications that the manufacturing industry is facing a credit crunch with the initiation of reforms in the financial industry and the demise of growth banking. While new forms of finance could have compensated for the shortage of bank financing, it worked out that exiting development banks before establishing a good corporate debt market was expensive for long-term financing. He suggested experience of the Brazilian Development Bank could be a best model for India.

Sankalpa Bhattacharjee and Debkumar Chakrabarti (2013). Authors begun with finding reasons for the low manufacturing performance last two decades' despite of financial liberalization. This paper tried to understand the reasons behind such dismal performance by concentrating on the role of financing factors in the manufacturing sector The research argues that the policies of liberalization were uncompetitive. This, together with the diminishing position of development of finance institutions, banks ' risk-averse behaviour, the lacklustre performance of the new issues market, concentration of stock market activity, and the tiny size of the corporate debt market, improved the cost effective debt. In the end authors gave some remedy measures that could generate finance flow in the manufacturing sector that reduces the financial constraints.

- devising suitable derivate instruments, increasing
- reliance on the corporate debt market, expanding the
- reach of the mutual funds industry and better corporate
- governance and accounting standards

Santhosh Kumar Das (2015) finds that Lack of appropriate financial resources was recognized as one of the main factors preventing India's path to industrial growth. It was considered that the underdeveloped financial sector was the reason behind insufficient industrial financing. It was asserted that the financial sector in India will be prepared to organize the much-needed finance for industry after financial liberalization. Not only would it solve the problem of financial unavailability for sector, it would also remove constrians on access to finance. While the current article plans to investigate the links between the industrial and financial sectors, it also examines the trend and structure of industrial finance in India, focusing more on the era following financial liberalization. It discusses the increasing asymmetries between the two industries mentioned above and their involvement in India's industrial finance. The article ends by suggesting suitable measures in the financial sector to tackle the problem of financial constraints regarding access to and availability of adequate funding for the industrial sector in India.

Subhamoy Das (2015) This article concentrated entirely on the age of pre-liberalization, the underpinning was primarily given by commercial banks in this regard. With this in view, this article tries to analyze in-depth their input from the infancy of modern day banking in India before the beginning of economic liberalization. The author describes India's banking background since the British Raj. And since Independence, he has been looking at Commercial Banking in India since its trends and progress. Paper concluded Modern commercial banking in India, created under the British businessmen's effort, pursued the British banking system in every feasible detail. However, in the lack of merchant capital for investment in industries or a

developed capital market capable of mobilizing society's savings for investment in industries, the banking system demonstrated inappropriate for the requirements of the Indian economy, in particular for the supply of finance for industrial development. State-owned commercial banks with a wide branch network were prepared to mobilize savings even in rural regions Commercial bank activities have also undergone substantial modifications. Type-wise, term loans alone accounted for about one-third of total investment and sector-wise sectors, composed of large, medium and small, obtained about 70% of complete business bank financing. Banks then not only supplied loans but also subscribed to corporate stocks and debentures and substantially subscribed to corporate securities issues. Indian commercial banks, close to the end of the pre-liberalization era, extended their area of operation to include merchant banking to serve the needs of the corporate sector more effectively.

Dr. Bello Ayuba, Mohammed Zubairu.(2015). This is Nigerian based study Though Nigerian economy and Indian economy are not comparable but both are developing countries where bank credit plays a crucial role in overall development of a country. The study's conclusion is that banks recognize that, irrespective of SMEs, banking sector credit is a significant factor in Nigeria's overall achievement and as a catalyst for Nigerian economic growth. The present priority attention given by the government to the banking credit sector is well deserved. This is because the sector has excellent potential to be the growth engine in Nigeria. Authors believed that this sector can generated growth in the midst of increasing unemployment and elevated rates of poverty. The sector can lift the large number of people above the poverty level. While attempts are being made to tackle the credit bottlenecks, complementary reforms are needed to provide the other vital components. These include enhancing power, transportation, water, and all other related issues that account for the sector's underperformance. There is a need for more studies into other factors as part of the suggestions for further studies that could similarly determine production that was not captured in the study.

It has been given suggestions that Further research on the impacts of development in the banking sector on SMEs in Nigeria and other possible factors that impede or boost the sector's development should be considered. Methodology part of this study started with descriptive statistics, error correction model and matrix correction and were used to evaluate formulated hypotheses revealing that credit in the banking sector has a significant effect on the development of small and medium-sized enterprises in Nigeria as it has a beneficial effect on some major macroeconomic development factors such as inflation, exchange rates, trade debt.

While particular findings on causation directionality and economic development proxy variables differ, these surveys suggest that there is a powerful relationship between economic development and growth. Demetrius's and Hussein (1996) research the causality path between financial development and growth for 16 nations individually and discover little proof that finance is the major economic development sector.

Multiple views have explored the connection between financial development and economic growth in the Indian framework. Bell and Rousseau (2001) researched post-independence India and the part played in industrialization by the financial system. Using a collection of Vector Autoregressive (VAR) and Vector Error Correction Models (VECM), they suggest that the economic sector not only promoted aggregate investment and production but also allowed a continuous transition to industry. Several studies including those by, among others, Pradhan (2009), Chakraborty (2010), Singh (2011), Ray (2013) and Mahajan and Verma (2014) used multiple econometric techniques and a variety of financial development proxies to explore its effect on India's economic growth. The findings of this research have been combined in terms of causality orientation between economic development and growth.

Das and Khasnobis (2007) researched the transmission mechanism through the perpetuation of short-term and long-term savings from the degree of financial intermediation to economic growth.They discovered two long-term co-integrating interactions–one that links financial development and loan distribution to different reasons, and the other that links economic growth to short-term and long-term credit, i.e. the credit-market distribution system. The link between trade openness and Indian economic growth was researched by Pradhan et al. (2014). Using an ARDL strategy to co-integration and causality of Granger, they argue that open trade and financial development in the shape of the banking sector and the scope of the stock market are co-integrated with economic growth. Bi-directional is the causality between factors. The triangular relationship between finance, trade and economic growth for India was researched by Katircioglu and Benar (2007). Their research shows one-way causation from real income growth to trade growth and bi-directional causation between the development of the financial industry and economic growth.

During the era 1993-2012, *Sehrawat and Giri (2015)* researched the effect of economic development on the growth of the 28 Indian states. Using a panel strategy to co-integration and causality, the research finds that economic growth is caused by per capita credit and per capita deposits. In addition, the connection between per capita loan and payments is bi-directional.

Panigarola (2004) stated that the 1980s development was greater than the previous phases, but was brittle and culminated in a 1991 recession. In addition, he credits elevated development in the 1980s to development in the 1988-91 era, excluding which would be much smaller than the median development in the 1980s than in the 1990s. He further claims that the 1990s reforms were more systematic and from 1992 onwards gave rise to sustainable growth.

Singh (2005) also claims that a comparison with the change since 1991 may not be suitable given a change in development to a greater point during the 1980s. He is discussing a political economy element that has played a part in putting about a structural change. A series of non-congress regimes accompanied the introduction of a fresh economic paradigm after the 1975-77 crisis. Changes such as rural sector concentrate, energy decentralization, cooperative development and priority industry loans have been launched. This culminated in a 1991 crisis. The economy had reported continuously elevated growth levels since 1992 only after the structural changes of 1991. The year 1992 is regarded as the structural breakpoint for GDP development in the framework of this research.

2.11. Research gap

It is clear from above studies that financial liberalization could not provide anticipated boost to the industrialization. Though Banks could not provide desired credit to the industrial sector we cannot deny the role of the bank credit completely. Therefore, this study intended to investigate any positive relation existed between the variables.

CHAPTER 3

Empirical model, Data and Methodology

3.1. Empirical model

This study posits a 3-multi-equations VAR model in which, Industrial output and credit, employment and credit and fixed capital and credit are simultaneously interrelated. In order to obtain more meaningful results, logarithmic transformations of the variables were utilized.

Three equations

$$Y_t = \alpha_0+\alpha_1(C)+ \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.1$$

$$Nt = \beta_0+\beta_1(C)+ \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.2$$

$$K_t = \delta_0 +\delta_1(C)+\varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.3$$

Where, Y_t refers to output, N_t denotes employment Kt refers to fixed capital C indicates credit. α_0 ,β_0 , δ_0 , are constants variable. $\alpha_1, \beta_1, \delta_1$ are the parameters , ε_t, undistributed error term.

3.2. Period of the Study.

As the aim of our study is to investigate the impact of bank credit on Net fixed capital, Number of Employers, Total output value in registered industries in India. The study period was selected having into account the data availability constrains and the sufficiency of data for evaluation purposes. For credit, employment. and total output value data taken for the period of 1970-71 and 2015-. And for the Net fixed capital data taken from the 1977-78 and 2015-16 The primary focus on this study is to verify whether any relation is existed among the variables. It is therefore believed that the study period selected would be sufficient.

3.3. Data Sources.

The present research emphasizes the empirical analysis of data relating to the 1971-2016 period, which represents the last 46 years of financial and industrial activity in India. India's biggest and most formal industrial database, the Annual Industry Survey (ASI), provides statistical data on registered industrial activity but not on unregistered industrial activity. ASI survey published by Ministry Of Statistics And Programme Implementation. Using the ASI data role of bank credit on employment, net fixed capital formation and output will be analysed. Data supplement the data, The Reserve Bank of India, EPW Research Foundation's India Time Series database (EPWRFITS) has been used.

3.4. Variables.

3.4.1 Bank credit (C): The annual Bank credit data for industrial sector are taken from the Annual Survey of Industries. The main purpose is to investigate whether bank credit has any impact on the industrial performance. Hence, bank credit is independent variable. Bank credit is taken in this study is aggregate bank credit that is available from all banks in India to the industrial sector. Outstanding loans to the total industrial sector taken proxy as Bank Credit (C) for this study.

3.4.2 Employment(N): The number of employees engaged in the registered industries are taken from the Annual Survey of Industries this variable used to represent the employment generation registered industries therefore it is dependent variable. The reason behind taking this particular variable is generating employment is a major goal for any sector therefore

employment taken as a variable. Number of employees is taken proxy as Employment(N) industry.

3.4.3. Fixed Capital formation (K): Expansion of any sector is an important aspect in the development of process. This variable taken to investigate whether bank credit can have any relation in the installing new fixed capital that expands the industry. Grass capital formation is cumulative in nature hence net fixed capital is taken over grass capital formation to serve our purpose as a dependent variable. As consolidated data available in the ASI for the period of 1977-2016. Therefore, for this variable data taken 6 years less than the other variables. Yet, it is believed that data that is available is sufficient for our analysis. Net fixed Capital formation taken proxy as fixed capital formation of industry.

3.4.4. Output (Y): Growth of any sector is measured in terms of its value produced therefore output value taken as a dependent value. Output is true indication of the performance of any industry hence to analyse the relation between. Total Output Value taken proxy as output(Y) of industry.

To analyse the relation between credit and variable our investigation starts with the simple descriptive statistics.

3.5. Descriptive statistics

Descriptive statistics are brief descriptive coefficients summarizing a given collection of data that can either be a representation of the overall population or a sample of a population. Descriptive statistics are divided into central tendency measures and measures variability. Measures of central tendency include mean, mean and mode, whereas measures of variability include standard deviation, variance, minimum and maximum variables, and kurtosis and skewedness. All descriptive statistics are either measures of central tendency or measures of

variability. These two measurements use graphs, tables and overall discussions to assist individuals to know the significance of the data being processed.

Central portion of a distribution of a data set described by measures of central tendency. A person analyses and describes the frequency of each data point in the distribution using the mean, median, or mode that measures the most common patterns of the data set being analysed.

Measures of variability, or measures of spread, helps to analyse how a set of data is spread-out the distribution. For example, while central tendency estimations may give a person the average of a set of data, they do not describe how the data is distributed within the set. So, while the average of the data may be 65 out of 100, both 1 and 100 data points may still be available. Variability measures assist to communicate this by describing the shape and spread of the data set. Examples of are range, quartiles, absolute deviation, and variance.

This study attempt to investigate the relationship between Bank credit and variables. Using Co-integration and short run implosive test , this has been achieved. The current study used the natural logarithm of the level series.

3.6 Unit Root Test.

The credit and variables time series stationarity have been tested using the unit root test of Augmented Dickey-Fuller (ADF), Phillips Perron (PP).

3.7. Augmented Dickey-Fuller (ADF)

Named for American statisticians David Dickey and Wayne Fuller who developed the test in 1979, the Dickey-Fuller test is being used to evaluate whether a unit root is present in an autoregressive model, a feature which can cause issues in statistical inference.

The AD test carries out the following time-series regression:

$$\Delta y = \alpha + \beta t + \gamma y_{t=1} + \Sigma_{j=1}^{p} + \delta \Delta y_{t-j} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (3.4)$$

The variables α and β are to take into account in the time series the possibility of a drift and a stochastic trend. The test for unit root is conducted on γ the coefficient of $Y_{t=1}$. The null hypothesis H_0 tests for $\gamma = 0$ versus alternate hypothesis of $H_1, \gamma < 0$. Rejection of the null hypothesis indicates that the series does not have a unit root. In case the null hypothesis is not rejected, the series will be further differenced and the ADF test is conducted until the null hypothesis is rejected. In case the series has an AR structure, then the higher order lag variables capture the AR structure. If the series has an MA structure however, the ADF regression falls short in modelling the MA structure and is an approximation at best. In situations s, the Phillips Perron (PP) Unit root test is an alternative. The PP test unlike the ADF test does not consider lagged difference variables to account for autocorrelation but uses a non-parametric correction for any serial correlation and heteroscedasticity in the error terms.

3.8. Phillips Perron (PP) Unit root test.

In statistics, the Phillips–Perron test (named after Peter C. B. Phillips and Pierre Perron) is a unit root test. In time series analysis it is used to test the null hypothesis that a time series is integrated of order (1). It develops on the null hypothesis of the Dickey-Fuller test P=1, in $\Delta y_t = (p-1)\, y_t + u_t$, where Δ is the first difference operation. Similar to the augmented Dickey–Fuller test, the Phillips–Perron test addresses the problem that the process generating data for y_t might have a higher order of autocorrelation than is admitted in the test equation—making y_{t-1} endogenous and therefore invalidating the Dickey–Fuller t-test. Whilst the augmented

Dickey-Fuller test addresses this issue by introducing lags of Δy_t as repressors in the test equation, the Phillips–Perron test makes a non-parametric correction to the t-test statistic. The test is robust with respect to unspecified autocorrelation and heteroscedasticity in the disturbance process of the test equation.

3.9. Johansen – co-integration test

Johansen (1988) and Johansen and Juselius (1990) constructed a multivariate technique that offers maximum likelihood estimates of all the distinct co-integrating vectors that could exist between a set of variables. This technique is superior to the Engle and Granger (1987) regression-based method because it fully captures the underlying properties of the data, gives estimates of all possible distinct cointegrating vectors, and generates accurate distribution test statistics for the number of cointegrating vectors.

Johansen (1988) starts with the following vector autoregressive representation (VAR)of n variables

$$X_t = \Pi_1 X_{t-1} + \Pi_2 X_{t-2} + \cdots + \Pi_k X_{t-k} + \varepsilon_t \quad \text{…….. (3.5)}$$

where Xt is an n ×1 vector of I (1) Variables, $\Pi_1 \ldots\ldots \Pi_K$ are matrices of unknown parameters and $\varepsilon_t$is a vector of Gaussian error terms. The model can be re-parameterized to produce a generalized model for error correction:

$$\Delta X_t = \Gamma_1 \Delta X_{t-1} + \Gamma_2 \Delta X_{t-2} + \cdots + \Gamma_{k-1} \Delta X_{t-k+1} + \Pi X_{t-k} + \varepsilon_t \quad \text{….. (3.6)}$$

Where,

$$\Gamma_j = -I + \Pi_1 + \Pi_2 + \cdots + \Pi_j$$

$$\Pi = I - \Pi_1 - \Pi_2 - \cdots - \Pi_k$$

The co-efficienti matrix, Π , defines the long-run solution to Equation 2 such that ΠX=0 represents long-run equilibrium. It is the rank of this matrix that determines whether the variables contain any significant cointegrating vectors. Since the ΔX_t and ΔX_{t-k} variables are I(0) , the final term on the right side of Equation 2 must also be I(0) in order to estimate the system. However, since the ΔXt-k terms are I (1) the integrability of the last term clearly depends on the matrix.

If 0 < rank (Π) ˆ r < p, then the matrix, Π, can be decomposed into two N ×r matrices such that:

$$\Pi=\alpha\beta' \qquad (3.7)$$

where α is a matrix of error-correction coeficients such that its columns reflect the speed of convergence to long run equilibrium, and is referred to as the adjustment matrix. The rows of β' form the r distinct cointegrating vectors such that:

$$\beta' X_t \sim I(0) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.8)$$

It is not possible to estimate α and β straight using conventional estimation methods, but Johansen (1988) has established a maximum likelihood method for estimating these matrices and also a range of likelihood ratio statistics to determine the number of distinct cointegrating vectors. The first test, is trace test, is for the null hypothesis that there are, at most, r ≤ j cointegrating vectors, the second test, called the maximum Eigen value test, is for the null hypothesis of r distinct cointegrating vectors against the alternative of r +1 vectors.

3.10. Impulse Response function

To see the short run effect of endogenous variable on the other variable in the long run relationship, Impulse response function in the VEC framework is generated. For each variable from each equation, a unit shock is applied to the error. The response to a one-time shock in innovation is traced by an impulse response function like that the Cholesky one standard deviation response function of output value, net capital formation and the employment of industry to Credit over 10-year period is generated. The accumulated sum of the impulse responses is an accumulated response. It can be interpreted as the response to the step impulse in which the same shock occurs from the first in each period.

An Impulse Response Function (IRF) encapsulates and measures the time profile of a one-time shock effect to one of the innovations on the current and future values of a dynamic system's endogenous variables. In the incident that the innovations ε_ts are uncorrelated at the same time, IRF interpretation is simple. In general, however, the inventions are correlated. As innovations are correlated, they can, therefore, be regarded as having a common component and can not be considered as being uniquely associated to a variable.

CHAPTER 4

Empirical Findings of Impact of Bank Credit And Industrial Performance

4.1. Descriptive statistics

In brief, descriptive statistics assist defines and comprehend the characteristics of a specific data set by providing brief summaries of the sample and measures of the data. Mean, median, and mode are the most known types of descriptive statistics that are used at almost all math and statistics levels. There are less common types of descriptive statistics, however, which are still very important.

Table -4.1: Descriptive statistics for credit, total output value, employment, net fixed capital formation

	Y	N	C	K
Mean	12.84863	9.055627	11.72577	10.03542
Median	12.96159	9.004914	11.99974	9.866253
Maximum	15.74505	9.562897	14.08502	12.22179
Minimum	9.530102	8.559486	8.975757	7.737616
Std. Dev.	1.874848	0.243121	1.488343	1.402964
Skewness	-0.067827	0.371916	-0.238087	0.154233
Kurtosis	1.848248	2.815541	1.978119	1.745278
Jarque-Bera	2.521751	1.101207	2.383090	2.712904
Probability	0.283406	0.576602	0.303752	0.257573
Sum	578.1885	407.5032	527.6597	391.3814
Sum Sq. Dev.	154.6624	2.600747	97.46722	74.79574
Observations	45	45	45	39

The main descriptive statistics provided for period 1970 to 2016 in the table 1 for natural logarithms of industrial output value, Bank credit, net fixed capital formation and number of employment of industry in India.They are mean and median, standard deviation, skewness and kurtosis. These explain the primary characteristics of sample data where mean and median are the measures of average change of given random variable for given sample period data. Standard deviations are one that measures of variability around the mean. Further, kurtosis and skewedness are the measurements of tailedness of probability distribution of random variable. Further, Jarque-Bera statistics is also reported for testing the null hypothesis of normal distribution of each variable. It is seen in the table 1 that mean and median of each series are similar. The mean and median of industrial output value and outstanding credit are similar with slight difference that is around 12 and 11 whereas the number of employment and net fixed capital formation are around 9 and 10 respectively. The mean of industrial output value is higher than any other series in the data and among the variable, average change over the given period are higher with slight difference. Standard deviation is smaller than mean value of any series that suggest less changes of variable around their mean and lesser volatility of data. Probability distribution of all series is not negatively skewed much and Kurtosis also is less than three for all series considered in the table. Therefore, each series is normally distributed. This is further confirmed by Jarque – Bera statistics by not rejecting null hypothesis of normal distribution of each variable.

4.2. Stationarity test

The Bank credit and selected variables are tested for stationarity using ADF test, PP test. The results of the tests are shown (Table 3).

Table -4.2 List of variables and their descriptions

Variable Name	Description
LC	Log of industrial credit
LY	Log of industrial output .
LK	Log of industrial fixed capital
LN	Log of industrial employment.
D(Variable name)	First difference of variable under study

Table -4.3 Stationarity tests for variables under consideration

Variable	ADF		PP Test	
	C	CT	C	CT
LC	1.170219	-1.982472	-1.199411	-2.032672
LY	-1.742716	-3.030928	-1.517033	-2.150942
LK	1.289743	-2.921837	1.171299	-2.940719
LN	-0.615327	-2.583226	-0.881884	-1.987262
D LC	-7.929399***	-8.049205***	2.032672***	7.888685***
D LY	-4.626658***	-4.915924***	-4.737126***	-5.037468***
D LK	-7.763446***	-7.655458***	-7.769752***	-7.661372***
D LN	-2.713149	-2.690648	-5.858830***	-5.797477***

(*) Stationary Variables; Level of Significance: *** - 1%, ** - 5%, * - 10%

4.3 Empirical findings

4.3.1. Long run relation between the variable

Next the examinations of time series properties of all variables are pursued. Towards this Augmented Dicky Fuller test (ADF) and Phillips Perren test (pp) are applied on each variable considered in the study with constant (c) and constant plus trend (C+T) and results of which are given in the Table.3. It is observed that variables series are not stationary at level that means that null hypothesis of unit root is not rejected at conventional 5 % significant level by either unit root test. However, both tests are able to reject the unit root in the all series when they are first differenced with constant and constant plus trend at 1 level significance level. This indicates the application of Johnsen co-integration (1988) on variables is apt to avoid any spurious regression. Therefore, since this study objective is to see the banking credit impact on the performance manufacturing sector, the sole impact of total industrial credit on each industrial performance indicating variable such total industrial output value, industrial net fixed capital and total number of employee are examined. For this purpose, alternately Johensen co-integration test is applied on total industrial credit on total industrial output value, industrial net fixed capital and total number of employee. The results of co-integration are is shown in the Table 4.4 -4.6.

Table -4.4 Co-integration with Fixed Capital formation and Credit

Trace test				Eigen max test		
Hypothesis	Trace statistic	5% critical Value	p-value	Max- Eigen value	5% critical Value	p-value
r =0	32.81610	20.26184	0.0006	26.86431	15.89210	0.0007
r ≤ 1 *	5.951789	9.164546	0.1945	5.951789	9.164546	0.1945
N.C.V: Long Run Co-efficient	K=1.24-6.2 (0.137) (1.690) [-9.037] [3.678] LM(2)=3.75 (0.23) white hetro test = 15.48(0.01) JB =5.92 (0.05) LM(2) is a Lagrange Multiplier test of serial correlation up to lag 2 p values are reported in square brackets, values of chi-X^2 with dof 4 and 6 for LM and white respectively are reported.in parenthesis.					

Table -4.5 Co-integration with total output and Credit

Trace test				Eigen max test		
Hypothesis	Trace statistic	5% critical value	p-value	Max- Eigen value	5% critical value	p-value
r =0	23.18767	20.26184	0.0192	20.39944	15.89210	0.0091
r ≤ 1 *	2.788225	9.164546	0.6210	2.788225	9.164546	0.6210
N.C.V: - Long Run Co-efficient	Y=1.46-5.95 Long Run Co-efficient (0.100) (1.276) [-14.608] [4.667] LM(2)=(6.04) [0.19] white hetro = (10.32) [0.11] JB =0.19 (0.90) LM(2) is a Lagrange Multiplier test of serial correlation up to lag 2 p values are reported in square brackets, values of chi-X^2 with dof 4 and 6 for LM and white respectively are reported.in parenthesis					

Table -4.6 Co-integration with Employment and Credit

Trace test				Eigen max test		
Hypothesis	Trace statistic	5% critical value	p-value	Max- Eigen value	5% critical value	p-value
r =0	34.89686	20.26184	0.0003	32.57063	32.57063	0.0001
r ≤ 1 *	2.326237	9.164546	0.7123	2.326237	9.164546	0.7123
N.C.V: - Long Run Co-efficient	N=0.19+6.42- Long Run Co-efficient (0.029) (0.354) [-6.508] [18.092] LM(2)=8.23 (0.08) white hetro = 3.77(0.70) JB =13.45 (00) LM(2) is a Lagrange Multiplier test of serial correlation up to lag 2 p values are reported in square brackets, values of chi-X^2 with dof 4 and 6 for LM and white respectively are reported.in parenthesis					

Optimum lag 2 is chosen according to AIC and SBC criteria to avoid any misspecification of model while estimating. The Lagranger multiplier test for the presence of serial correlation, and white heteroscedasticity test along with the Jarque Bera test for non –normality are presented in the last row of table for each co-integration relation. There is no any misspefication for output and credit which confirmed by insignificance of calculated values of these test statistics. For other co-intgrations, partially these misspecification test for model are passed. It is seen that with alternative industrial performance variables, total industrial credit has co-integrated. Because both trace and Eigen max test are able to reject at least once null hypothesis of the absence of co-integration between each pair variables at 5% level of significance. It is evident from these results that the industrial total credit individually has one unique long relationship with total industrial output value, net fixed capital formation and employment and further, it impacts the same variable in the long run. Normalized co-integrated vector (N.C.V) with each industrial performance variable in the respective co-integration tests between two variables are given below. Their significance and signs of these long run coefficients deserves

some interpretation in order to effectively establish the long run relationship between tha variable. In all normalized co-integration vector, these estimated long run coefficients of credit has positive sign which is in line with theory and these co-officiants are statistically significant because generally calculated t values is more than 2 critical value in the all estimated co-integration relation. This implies that the rise in the total industrial credit leads to a rise of industrial output, fixed capital formation and employments in the long run. This is also consistent with the Keynesian Monetary Transmission Mechanism. Through Lending channel increasing more credit availability to the industry it enhances the investment further it expands the industry through installing new fixed capital it further generate employment and output Thus, the increase in the banking credit enhances the industrial performance in the India. Therefore, the more allocation of banking credit to industry is advisable.

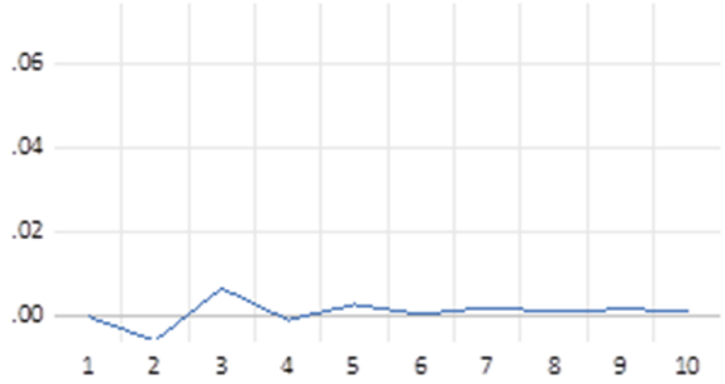
4.3.1. Short run relation between the variable.

Having establishing the long run relationship between credit and industrial performance, it is required to see short run dynamics in the relation. Using the Cholesky one standard deviation Impulse responses function of output, net fixed capital and employments over the period of 10 years in the VEC framework generated are plotted in the figures (4.1 to 4.3) to analyse the short effect of credit on industrial performance.

Figure .4.1

Short Run Responsive Function

Response of (Y) to D(C)

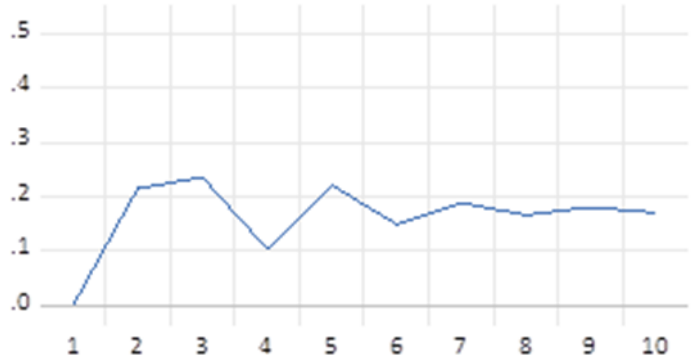


In the figure1, output response of impulse to credit is immediately gone down up to two months thereafter turning to positive and over the rest of the periods, become fixed. This suggests the though credit affects industrial output negatively in the first two years, over in the short span it has effect on industrial output positively. This is consistent with theory that banking credit increases the industrial output in the short run.

Figure .4.2

Short Run Responsive Function of

Response of D (K) to D(C)

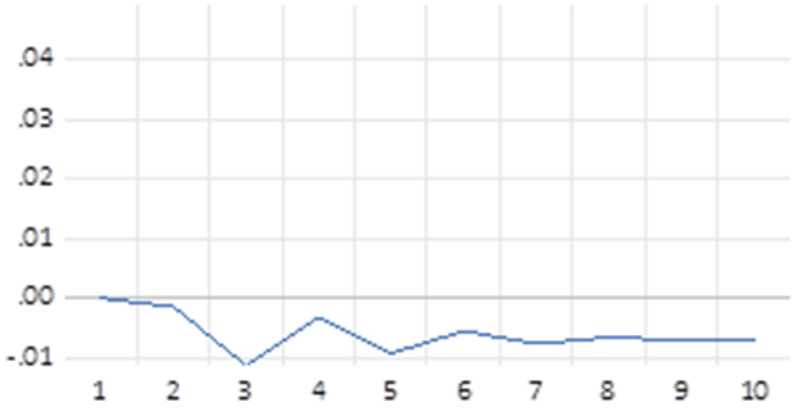


In the figure 2, Impulse response of net fixed capital formation to credit is very immediate and positive in sign from which it clears theoretically that banking credit improves the net fixed capital formation in the short run though it swings ups and down positively over time.

Figure .4.3

Short Run Responsive Function

Response of D (N) to D(C)



However, the impulse response of industrial employments in the figure 3 is ambiguous and negative in sign immediate in the first two years. But its response is increasers in negative to one standard deviation of credit shock. This reflects scenario of employment in India which experience less job growth in industry despite that there is a significance output growth over time after the 1991 reforms. Thus, from this short run analysis, it is evident that banking credit improves the industrial performance in terms of its output, net fixed capital formation except employments. Macro-economic theories also advocated that employment is long run phenomenon.

Over all, from this empirical analysis it is confirmed that positive effect of banking credit on the industry in India in terms of its output, net fixed capital formation and employments in

short and long run except its less impact on employment in the short run. These finding are consistent with (Ray.P (2013))

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Chapter 5

Summary, Conclusion and Policy Recommendations

5.1. Summary

The study pertaining to the impact of bank credit into industry sector in India between the period 1971-72 and 2015-16 involved theoretical and empirical review of literature on bank credit and industrial performance. The analysis of relation between bank credit and various economic variable tested with econometric tools. The results of analysis of variables in

the short run relation and long run relation summarised as follows:

- Results are established long run relation between the bank credit to the Fixed Capital Formation it implies that credit to the industries expanding the capital formation which is evident in co-integration test. This positive relation also existed in the short run which is evident in short run impulsive response function test. By looking at above analysis it can be inferred that bank credit can create more capital formation which is essential for the scaling up any industry.
- Another relation between the bank credit and industrial output also given same results as above. Long run and short run relationship evident between the two variables. hence, it can be understood that increasing in the bank credit it increases the Grass Value Added in the GDP.
- Co-integration between credit and employment is consistent in the long run but short run relation is not existed which is evident in the short run impulsive response function. As many theories suggested in macroeconomics employment is a long run phenomenon it cannot be adjusted in the short run. The reason could be major portion of the credit is

using the establishment of the new capital to scaling up the industry which might causing no relation in the short run. However, the long run relation is found in the empirical study which imply steady increase in the credit can cause the steady increase in the employment.

5.2. Conclusion

Bank credit alone is not sufficient to influence the industrial performance, however other form of industrial finance through FDI, FII and other financial sources have a considerable account. However, it cannot be denied the role of bank credit. It is evident from the empirical studies that financial liberalization couldn't fill the industrial credit crunch completely but could established positive result with the output, fixed capital formation and employment. however, bank credit was not sufficient to boost the industrialization in India, but, these positive results providing a insight that accessing the more bank credit to the industrial sector it can give positive results in the economy.

5.3. Policy Recommendation.

As we discussed earlier credit is the fuel to any sector in the economy. Mobilizing the credit mostly done by the banks, However the financial liberalization failed to provide the desired result. In spite of the absolute results that are evident in the various studies, in our analysis results enabled me to give some policy suggestions based on theoretical analysis and empirical analysis. Based on the study few policy suggestions to the government of India

- Easing the bank norms and reducing interstate, setting up the new financial institutions that are specific to the industrial finance increases the access to the industrial finance.

- Based on our findings of positive relationship of the variables with the more credit can stimulate economic growth. Its advised that more credit is channelized to the industrial sector.

5.4. Study limitations.

This study depends on the Annual Survey of Industries it only provides the data of organised industries therefore, this study effectively studied organised industrial sector. It is recommended for the future studies that it would it complete study on industry performance if it includes un organised sector for further research.

Appendix

1) Annual Growth rate of Bank credit, Total output value, Net Fixed Capital Formation and Employment

	Bank credit	Number of Employees	Total output value	Net Fixed Capital Formation
Year	(Rs Crore)	(in '000)	(Rs Crore)	(Rs Crore)
1970 - 1971	7,909	5,216	3,753	Na
1971 - 1972	8,723	5,436	4,110	Na
1973 - 1974	10,529	5,820	5,402	Na
1974 - 1975	11,679	6,053	6,917	Na
1975 - 1976	13,412	6,381	7,341	Na
1976 - 1977	14,867	6,649	8,380	Na
1977 - 1978	18,131	7,093	9,339	2,293
1978 - 1979	21,234	7,248	11,031	2,732
1979 - 1980	25,217	7,678	12,542	3,052
1980 - 1981	28,908	7,715	13,846	3,338
1981 - 1982	33,499	7,778	16,682	5,078
1982 - 1983	38,521	8,010	19,141	5,396
1983 - 1984	48,117	7,824	23,520	6,213
1984 - 1985	52,475	7,872	24,941	6,220
1985 - 1986	62,072	7,472	26,969	6,432
1986 - 1987	70,096	7,442	30,199	6,505
1987 - 1988	79,437	7,786	34,586	8,120
1988 - 1989	65,465	7,743	41,761	8,062
1989 - 1990	84,305	8,143	51,327	11,502
1990 - 1991	1,04,566	8,163	61,578	14,230
1991 - 1992	1,10,187	8,194	66,168	19,269
1992 - 1993	1,61,287	8,705	85,671	21,618
1993 - 1994	1,62,713	8,708	1,04,889	10,768

1994 - 1995	2,06,371	9,102	1,27,192	40,847
1995 - 1996	2,46,934	10,045	1,63,023	45,494
1996 - 1997	2,59,609	9,449	1,84,834	52,461
1997 - 1998	3,24,605	9,998	1,98,237	40,498
1998 - 1999	2,28,210	8,589	1,73,727	40,805
1999 - 2000	2,53,782	8,173	1,88,574	15,080
2000 - 2001	2,57,954	7,918	1,78,350	12,150
2001 - 2002	2,69,219	7,687	1,83,229	31,224
2002 - 2003	2,63,392	7,871	2,14,376	5,419
2003 - 2004	2,89,776	7,803	2,47,777	12,710
2004 - 2005	3,34,634	8,383	3,09,620	25,537
2005 - 2006	3,51,507	9,039	3,64,697	73,244
2006 - 2007	4,28,589	10,252	4,60,180	79,870
2007 - 2008	4,53,996	10,378	5,52,756	1,06,627
2008 - 2009	5,36,419	11,253	6,11,311	1,42,401
2009 - 2010	6,63,010	11,723	6,97,183	1,63,232
2010 - 2011	8,25,638	12,618	8,25,133	1,63,098
2011 - 2012	9,24,382	13,346	9,05,209	2,03,169
2012 - 2013	10,72,247	12,874	10,07,280	2,02,195
2013 - 2014	12,22,094	13,462	10,65,112	1,83,968
2014 - 2015	11,52,195	13,808	11,64,079	1,34,055
2015 - 2016	13,09,316	14,227	12,73,280	1,78,793

Source: Annual survey of industries. Published by Ministry of Statistics and Programme Implementation

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Imapact of Bank Credit On industrial sector in India (1971-2016)

by Rapaka Srinivas

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