

**REM WORKING PAPER SERIES**

**Are Public Sector Banks in India a Government Failure?” –  
A Comparative Empirical Analysis of Public Sector and  
Private Sector Banks in India.**

**Sahil Chopra**

**REM Working Paper 0240-2022**

July 2022

**REM – Research in Economics and Mathematics**

Rua Miguel Lúpi 20,  
1249-078 Lisboa,  
Portugal

ISSN 2184-108X

Any opinions expressed are those of the authors and not those of REM. Short, up to two paragraphs can be cited provided that full credit is given to the authors.



**REM – Research in Economics and Mathematics**

Rua Miguel Lúpi, 20  
1249-078 LISBOA  
Portugal

Telephone: +351 - 213 925 912

E-mail: [rem@iseg.ulisboa.pt](mailto:rem@iseg.ulisboa.pt)

<https://rem.rc.iseg.ulisboa.pt/>



<https://twitter.com/ResearchRem>

<https://www.linkedin.com/company/researchrem/>

<https://www.facebook.com/researchrem/>

# **Are Public Sector Banks in India a Government Failure?” – A Comparative Empirical Analysis of Public Sector and Private Sector Banks in India.**

Written by Sahil Chopra

CEPN: Universitaire Sorbonne Paris Nord

[sahil.chopra@emle.eu](mailto:sahil.chopra@emle.eu)

## **Abstract**

To extend banking services to the Indian rural sector, an act was passed in 1976 and then in 1980 to nationalize the banks. Giving the name to such an approach as social banking. Banking sector in India, therefore, has been bifurcated into public sector banks, private sector banks, foreign banks, regional rural banks, urban cooperative banks and rural cooperative banks.

Many studies have assessed the performance of private and public sector banks. Such research has evaluated the performance of private and public sector banks by estimating bank-specific and macroeconomic parameters. However, not many quantitative literatures are available which have estimated the impact of ownership on bank performance by considering ownership as one of the bank-specific independent variables to evaluate the impact of ownership on bank profitability. This paper seeks to fill this gap by examining the determinants of profitability on the account of ownership, and it uses an independently constructed dataset containing all commercial public and private sector

banks in India as on April 2020. The data ranges from 2004 to 2020. The justification to measure the impact of ownership comes from the theory of Government failure, which mainly points out how government intervention can result in costly solutions. Therefore, by adding the independent variable in an already established model, we can assess the impact of ownership.

Banks' characteristics are collected from respective banks' websites, and the hypotheses are tested by estimating an econometric model, i.e. a pooled OLS model.

The results are promising: the banking industry as a whole is not performing well, however government owned banks are showcasing the worst performances. The reason for this can be the huge amount of loans sanctioned in priority sectors and fraudulent cases which may be due to the presence of interest groups, corruption and inefficiency of employees in public sectors.

***Keywords:*** *Government Failure, Empirical Analysis, Public Sector Banks, Panel Data, Pooled OLS model*

***JEL classification:*** *C30, H83, I38*

## Table of Contents

<b>1. Introduction .....</b>	<b>4</b>
<b>2. Literature review.....</b>	<b>6</b>
<b>2.1 Rationale for Government Intervention .....</b>	<b>6</b>
2.1.1 Market Power .....	7
2.1.2 Asymmetric information.....	7
2.1.3 Externalities .....	8
2.1.4 Public goods .....	8
<b>2.2 Relevance of Government interference in Banking Sector.....</b>	<b>9</b>
2.2.1 To ensure the Security .....	9
2.2.2 Existence of unbalanced information .....	9
2.2.3 Provision of Public goods (Social Projects) .....	10
2.2.4 Push banking services to remote areas .....	10
<b>2.3 Government Intervention .....</b>	<b>11</b>
2.3.1 Coasean Solution .....	11
2.3.2 Pigouvian Solution.....	12
<b>2.4 Government Failure .....</b>	<b>13</b>
2.4.1 Information Problem .....	13
2.4.2 Mix of Social and Economic goals.....	13
2.4.3 Weak Incentives .....	14
2.4.4 Regulatory Capture .....	14
2.4.5 Human Selfishness .....	14
<b>2.5 Different types of Government Failure .....</b>	<b>15</b>
<b>2.6 Importance of Banking Sector .....</b>	<b>18</b>
<b>2.7 Background of Indian Banking Sector.....</b>	<b>19</b>
<b>3. Hypothesis .....</b>	<b>26</b>
<b>4. Data and methodology .....</b>	<b>28</b>
<b>4.1 Data.....</b>	<b>28</b>
4.1.1 Sampling and Data collection .....	28
4.1.2 Dependent and Independent Variables .....	29
<b>4.2 Methodology.....</b>	<b>34</b>
<b>5. Results.....</b>	<b>38</b>
<b>5.1 Descriptive Statistics.....</b>	<b>38</b>
<b>5.2 Pairwise Correlation.....</b>	<b>40</b>
<b>5.3 Regression Results.....</b>	<b>41</b>
<b>6. Conclusion and Discussion .....</b>	<b>52</b>
<b>6.1 Conclusion.....</b>	<b>52</b>
<b>6.2 Discussion.....</b>	<b>53</b>
<b>Bibliography.....</b>	<b>55</b>
<b>Reference List .....</b>	<b>60</b>

## 1. Introduction

Many researchers for years have tried to answer the questions related to the role of Government intervention and its importance in fiscal policy making and for the welfare of the economy (Stiglitz, 1998c). 1950s-60s observed a great amount of support towards government intervention whereas in 1970s-80s academic researchers started questioning the broaden role of government and discussions related to market failure versus government failure started (Stiglitz, 1998c). Market power, externalities, provision of public goods and information asymmetries are among the dominant reasons for public spending and government intervention in domestic markets, creating scope for market improvements to attain general equilibrium (Pindyck & Rubinfeld, 2013). Yet, the increase in government regulation gave birth to the theory of Government Failure which argues that government interference can be more expensive and tend to fail (Coase, 1960).

The theory of government failure is more relevant particularly in the developing countries. Government interventions introduce the idea of social and economic development. In order to achieve a certain level of economic growth, countries try to include the social aspects as well. Many studies have assessed the efficiency of rules, regulations and policy making pertaining to climate change, government subsidies and taxes.

However, there is not sufficient amount of research done in the literature that specifies the inefficiency in the system if the government takes control of the strategic sectors such as banking. To the best of my knowledge, this is the first research which empirically examines the inefficiency of government ownership in the banking sector and links it to the theory of Government failure.

This paper tries to create a linear model specifying the relation of ownership on bank performance along with other bank-specific and macroeconomic determinants of bank profitability. The dataset, which I constructed by gathering information on relevant variables from different banks websites, covers the period from 2004 to 2020 and includes all commercial public sector and private sector banks which are functioning as on 1 April, 2021 as per RBI guidelines. Macroeconomic indicators were collected from the Reserve Bank of India website.

The results in Section 5 lead to a compelling finding: the role of bank ownership found to affect the bank performance in a negative way. This means that the public sector banks are comparatively less efficient than private sector banks, proving the reasons to be true in the theory of government failure.

The paper is further divided into 5 sections, and it proceeds as follows: Section 2 provides a review of the established literature on market failure, government interventions, importance of banking sector in economic growth and development, Indian banking sector; Section 3 outlines the hypotheses to be tested; Section 4 describes the dataset and summaries the methodology adopted including the econometric model; Section 5 presents the summary statistics and unearth the main empirical findings with robustness checks and Section 6 is conclusions and discussion.

## 2. Literature review

This section will draw on the literature on market failure, government intervention and government failure in order to present the rationale for government intervention in the economy, then how many researchers have looked at government failure. Further, a brief introduction about banking sector is provided.

The economic efficiency can be achieved in a perfectly competitive market. The idea of a perfect market is based on certain assumptions such as '*(i) large number of perfectly informed buyers and sellers, (ii) homogenous products, (iii) free entry and exit in the market*' (Pindyck & Rubinfeld, 2013). Under these assumptions, a market will operate at the equilibrium level of output where producer and consumer surplus is maximum. The allocation of resources in a perfectly competitive market is Pareto efficient, therefore, markets are considered to be self-regulatory. If any of the aforementioned assumptions are relaxed, the market fails to provide an efficient outcome and a deadweight loss of economic welfare (Pindyck & Rubinfeld, 2013).

### 2.1 Rationale for Government Intervention

When a perfectly defined '*price-market*' fails to achieve the desired level of output from the economic activities, that results in the loss of societal welfare because of inefficient allocation of resources (Bator, 1958). Furthermore, if any of the economic agents (buyers and sellers) perform opportunistically for personal gains, the situation results in market failure, and such behaviour generates deadweight loss which is a social welfare loss (Fike & Gwartney, 2015). The four basic reasons for market failure are market power, asymmetric information, externalities and public goods (Andrew, 2008):

### 2.1.1 Market Power

As per the assumptions, a competitive market has a large number of buyers and sellers. If the number of buyers or sellers are not large enough, either buyer or seller has the power to control the price and quantity demanded. Sufficient number of buyers and sellers stimulate the competitive price and quantity in the market. Any economic agent posing the market influence can appropriate more profit in its favour, which results in inappropriate allocation for resources (Andrew, 2008). To curb the monopolistic power, government intervention is required. Government has the ability to create such rules and regulations that will either increase competition or control prices. Antitrust laws in the US to protect consumers and price regulation by the government in certain industries to enrich competition are examples of government intervention (Cooter & Ulen, 2012).

### 2.1.2 Asymmetric information

Information is not equally distributed among the market participants. This imbalance in information gives rise to principal-agent problems and adverse selection (Cooter & Ulen, 2012). When the welfare of the principal is dependent on the action of the agent and such actions are difficult to monitor. Thus, the principal-agent problem occurs. The problem of asymmetric information can be solved by introducing appreciated incentives and market signalling, but in severe asymmetric cases, government intervention is required to encourage the dissemination of the relevant information among the market participants. Moreover, information asymmetry escalate the problem of moral hazard (Cooter & Ulen, 2012).

### 2.1.3 Externalities

When an economic activity has an indirect impact on the market outcome, this impact can be positive or negative. Generally, it is assumed that in a voluntary market, transaction parties fully incorporate the costs and benefits, in situations where costs and benefits are not fully included that results in negative and positive externalities, respectively (Cooter & Ulen, 2012). If a manufacturer fails to absorb the social cost of production in the cost function of the product, this induces the manufacturer to produce more compared to the desired level of output as the cost has been externalised, this externalisation of cost reduce the selling price which in turn increase the demand of the product (Cooter & Ulen, 2012). Therefore, a product which has negative externality has higher level of production and consumption compared to equilibrium level. Externality can be solved by internalising the cost and benefit through government intervention using taxes and subsidies (2.3.2 Pigouvian Solution).

### 2.1.4 Public goods

Goods with '*nonexclusive*' and '*nonrival*' attributes are qualified as public goods. This implies once the good is provided, then it is difficult to exclude consumers, who haven't paid for it, from its consumption. Consumption by one doesn't reduce the availability of the goods for the other goods (Pindyck & Rubinfeld, 2013). These characteristics induce the problem of free ridership, if public goods are provided through private entities, it results in market failure (Cooter & Ulen, 2012). Market fails because it is very difficult for the private entity to identify the free rides. This increases the cost of services provided and rising the price. Alternatively, provision of public goods through government intervention is advised.

## 2.2 Relevance of Government interference in Banking Sector

In banking sector, government intervention is required because of four reasons which are (Yeyati, et al 2004):

### 2.2.1 To ensure the Security

Banks from its very nature are delicate because they work on deposits and loans. Deposits are considered as the liabilities for the banks and loan are assets of the bank. Banks' assets like loans and advances are not easily liquidated (Yeyati, et al 2004). Further, banks, as a financial institution, can induce the management to undertake high risk investment to earn higher profits. This give rise to the problem of principal-agent because it is troublesome and costly for depositors to monitor the bank management (Yeyati, et al 2004). However, a bank failure has a trickle-down effect on the economy resulting in a negative externality. Banks' collapse affects the liquidity in the economy and reduces the confidence in the banking system among depositors and investors. Additionally, banks execute the monetary policies prescribed by the government. These conditions compel for government interference (Yeyati, et al 2004).

### 2.2.2 Existence of unbalanced information

Banks have the financial information of the depositors, investors and borrowers, this information is pertinent to endue savings in banks which can be further stimulated in prosperous investment opportunities (Yeyati, et al 2004). One of the consequences of bank failure is credit rationing, where it may be difficult for the customers of the failed bank to raise

credit for investment opportunities because of lack of information available with other financial institutions about the credibility of the customers (Yeyati, et al 2004). Another problem is pertaining to the relationship between the depositors and the banks, depositors are not fully aware of the performance of the bank in the market. Depositors do not have much information about the bank-specific performance indicators (Yeyati, et al 2004).

### 2.2.3 Provision of Public goods (Social Projects)

Private banks have a motive of profit maximisation, therefore private banks may be reluctant in lending loans to those projects which are not very profitable but have high social utility (Yeyati, et al 2004). State intervention in banks will assure sponsorship of such projects because it will have a positive impact on overall social welfare. Nevertheless, it has been argued that at the time of economic crises, privately owned financial institutions act conservatively for giving loans due to the fear of low rate of recovery and repayments (Yeyati, et al 2004). During a crisis, governments generally opt for expansionary monetary policy to increase money supply in the economy which will eventually move the economy on the path of economic upturn. However, state interference will confirm the full implementation of expansionary monetary policy (Yeyati, et al 2004).

### 2.2.4 Push banking services to remote areas

Financial inclusion is considered as an efficient tool to eradicate poverty. To increase the influx of finance in rural or isolated parts of the country,

banking services are required (Yeyati, et al 2004). It may be very expensive for a private bank to open its branches in the secluded parts of the countries. State intervention can force banks to open branches in the rural part of the country. This is mainly done to promote financial inclusion in the rural parts of the country (Yeyati, et al 2004). The recent of example of such policy in India is *Jan Dhan Yojana* and *MUDRA (Micro Units Development & Refinance Agency)* scheme (Sengupta & Vardhan, 2019).

## 2.3 Government Intervention

The problem of market failure can be solved through the Coasean approach and Pigouvian approach (Slaev, 2017):

### 2.3.1 Coasean Solution

Coase Theorem states that if the transaction cost is zero, the optimal level of resource allocation will be achieved through market negotiations and bargains in free market irrespective of how the property rights are defined, nevertheless if transaction costs are very high, efficiently defined property rights play a significant role to attain the equilibrium level of output (Slaev, 2017). In reality, transaction costs are rarely zero, therefore institutions are required for the entitlement of property rights. Coase recommends, government should establish efficient institutions and authorise property rights. Moreover, the installation of an institute is dependent on the cost of externality and the cost of installing an institute. However, the implementation of Coasean solution requires a developed market, which is not present in developing countries (Slaev, 2017).

### *2.3.2 Pigouvian Solution*

Pigou argues that to internalize the externality direct intervention from the government is required. Having the marginal social benefit to be higher than the marginal private benefit, it implies that a particular economic activity has positive externality (UKEssays, 2018). In such cases, the government should encourage such activities by providing subsidies. On the contrary, if an economic activity has higher marginal social cost compared to marginal private cost because of negative externality, economic activities should be discouraged by levying tax. Pigouvian subsidies and Pigouvian tax internalise the positive and negative externality, respectively in the cost function of the production process (UKEssays, 2018). Pigou has been criticised by many economists because such solutions are not market driven and result in rent seeking behaviour. The problem of Government failure predominantly arises when government policies are created considering the Pigouvian solution (UKEssays, 2018).

Yeyati, et al 2004 in their paper affirms that government intervention in the banking sector is possible either through regulation and creating contractual agreements with the private banks or through state ownership. They argue that those economic activities which are completely and clearly contractible, implementing regulation and contracting with a private provider is a better option compared to direct ownership. On the other hand, state ownership and direct control are efficient if objectives are not clearly monitored and have added positive externalities. Consequently, the idea of state ownership of banks was conceived in India. (Yeyati, et al 2004)

## 2.4 Government Failure

In a democracy, interference of the government in the market can be seen as a composition of voter appeasement and rules because representatives of the elected government decide what good to be provided, at what cost and to whom (Furton & Martin, 2019). When political decision-makers make decisions, which are more favourable for their personal gains than society, this presents the problem of Government Failure. Political decision-makers are seeking votes, this creates an incentive for them to take decisions which is inefficient in redistribution of resources (Fike & Gwartney, 2015). The main reasons for government failure are as follows:

### 2.4.1 *Information Problem*

Government has limited access to the information about the market. This lack of information related to the market functions creates hindrance in efficient formation and implementation of policies to curb market failure. Asymmetric information also leads to government failure because information is essential for market stability (Andrew, 2008) (Gabriela, 2013).

### 2.4.2 *Mix of Social and Economic goals*

When social and economic objectives are mixed by the government then it may result in government failure. Resources are efficiently allocated in a free market, however, to prevent insider trading or another opportunistic behaviour, governments introduce regulations. This acts as a cluster of social and economic goals (Andrew, 2008). Resource allocation is an economic goal which is mixed with the protection of market participants who does not possess important or critical information. Such policies require a lot of regulatory and supervision costs. Andrew, (2008) considered the

example of ETS, for which the government became the guarantor for the exchange of securities, without being able to fully monitor sellers. These loopholes allow sellers to sell credits which are not properly audited.

#### *2.4.3 Weak Incentives*

Public sector organisations are not able to pay higher salaries to the employees and the management because these organisations are not based on profit-maximisation objectives. Low salaries don't give sufficient incentives to the employees to give their best performance, also not able to retain the highly skilled employees (Andrew, 2008). Lack of motivation and ability to perform complicated tasks attribute to government failure.

#### *2.4.4 Regulatory Capture*

The problem of regulatory capture arises when the regulated industries start having the influence on the regulators, who are the government representatives (Andrew, 2008). When the lobby groups in the regulated industry influence the decision that will be advantageous for the regulated industry and the cost of such policies will be move to the society. This increase the social cost because the benefit of such policies is confined to certain groups, resulting in government failure. This influence in decision is due to regulatory capture (Andrew, 2008).

#### *2.4.5 Human Selfishness*

Ordinary people are self-centred and take decisions which maximise their self-interest. Governments are composed of these ordinary individuals who become politicians or civil servants. If such an individual takes decisions, keeping in mind their individual

self-interest then such decisions can reduce the total social welfare (Gabriela, 2013). Likewise, if politicians in a democracy act opportunistically by increasing government spending on those projects which will help them to win the election without assimilating the total social cost, providing “*pork barrel*” instead of genuine public good (Voigt, 2020). The selfish behaviour of humans results in misallocation of resource that leads to government failure.

## 2.5 Different types of Government Failure

Helm (2010), considers the two main type of government failure are vote capturing and rent seeking especially in policy related to climate change.

*Vote Capturing:* In a majority-rule democracy politicians promises certain policies to secure the votes from the swing voters. These swing voters represent the minority group. This analysis is based on the median voter theory (Helm, 2010). Promises pertaining to minority interest are considered as vote capturing. According to Helm renewable policy and renewable target as government failure because such policies are mainly being adopted to capture green votes, which are the median voters in many cases (Helm, 2010).

*Rent Seeking:* Government tries to solve the problem of market failure by adopting certain policies such as taxes, permits and subsidies. These policies act as caveats and affect the supply side of the market (Helm, 2010). This affect in supply is reflected in price rise which further decrease the demand. However, firms already operating in the market can generate economic rents to increase the price (Helm, 2010). These rents encourage the firms to influence the policy decisions taken by governments. This can be done directly or indirectly. Organisations can offer bribery, political donations, and an eminent position to control the decision maker directly. Indirect measure to influence

are related to asymmetrical information. Governments are not fully aware about the market conditions and production process, therefore, corporates can influence the third-party or agencies which help governments in analysing the markets (Helm, 2010). Helm (2010), gives the example of major energy firms allocating resources in ‘*influencing strategies*’ related to emission trading and renewables.

Furthermore, Dolfsma (2011) discusses the role of government as a rule maker of the economy. Rules are important for uninterrupted functioning of the society.

Governments tend to change the given set of rules to reduce externalities, redistribute income, and provide information. Basically, rules are altered to correct the market failure. These rule amendments by the governments are costly for certain members of the society and benefit others (Dolfsma, 2011). “*When formulating rules, the government can be (i) too specific, (ii) too broad, (iii) arbitrary (iv) conflicting rules*”. (Dolfsma, 2011). This role of government intervention tends to accelerate lobbying and rent seeking behaviour. If rules are too specific, too broad, arbitrary and conflicting, then governments try to revise or transform these rules . This process incurs cost to the society by increasing uncertainty (Dolfsma, 2011). Further, he explains policy conflicts on Innovation and competition. Governments try to promote competition and innovation using anti-trust laws and intellectual property right protections (IPRs). Antitrust laws are adopted to break the monopoly, however intellectual property right protection allows some monopolistic power to the pioneer. These two sets of rules affect the level of competition, therefore seen as conflicting rules (Dolfsma, 2011).

Moving on to an example of government takeover can be seen in USA given by Winston, (2000), where Urban transit system came under, state and local governments by passing a legislation in 1960’s by congress and allowing for subsidies from federal

government in the following decade (Winston, 2000). Urban transit system mainly consisting of bus & rail services along with construction and maintenance of highways. It was argued that government intervenes to improve the commuting services for the aged people, economically challenged individuals and to encourage commuters in using public transportation, however, the incompetency in policy making from regulators and public officers resulted in a compromised, biased urban transportation system and a decline in number of commuters using public transit and increase in highway congestions (Winston, 2000).

Policies focusing to increase the capacity of the system (due to overestimation of ridership) combined with falling number of passengers resulted in a huge deficit for public transit system such that the operational expenses became almost twice the operating revenue. These deficits were further enlarged by cities, due to increase in spending on expansion or building new rail systems, since it was aided by federal government (Winston, 2000). Moreover, constant increase in the use of motor vehicles, contributed to traffic congestion in urban areas. The estimated total annual cost borne by commuters was around \$40 billion, this includes the depreciation cost of vehicle, travel time cost and over-consumption of gas due to traffic jams (Winston, 2000). Winston, (2000) points out the government incompetency to decide on toll price and transit fare led to the problem of government failure. The traveller's ticket price and toll price charged on highways should be equal to the marginal cost of their trips but government was unable to realize this pricing (Winston, 2000). Also, high labour wages at all the levels in federal contracts related to transit system, along with several '*pork barrel*' projects which were passed at the federal level for highway construction contribute to high debt in transportation system. Therefore, the urban transportation has been embodied in such a way that specific group of people are being benefited out of it and it is being sponsored by the taxpayer (Winston, 2000).

Dolfsma(2011), Andrew(2008) and Helm(2010) consider the role of government mainly as the policy maker and regulatory, to assess the government failure and Winston (2000) talks about the government failure when a sector is undertaken by the government. In this research government failure is assessed if government intervention is not only confined to a regulatory body but as an owner and a controller of an economic sector.

## 2.6 Importance of Banking Sector

A strong banking system of a country secures a higher level of economic growth. Banks are the financial intermediaries between the depositors and the borrower of funds (Singh, 2016). Banks accumulate funds from the savers and distribute it to different borrowers, this function of the banking sector results in many productive economic activities. An enduring banking sector encourages entrepreneurship and innovation by providing loans (Singh, 2016). Banks act as a social accountant by restricting the unreasonable choices of the firms and the individuals, not sanctioning loans which are not appropriate as per the individual's or firm's credit worth (Singh, 2016). Banking system performs many other functions such as providing information about investment and capital, managing credit markets etc., attributing towards economic growth.

Consistently, banks are the main source of capital in the Indian economy. Financial services play a vital role to reduce poverty. A society can be uplifted from poverty with a developed banking sector. Financial services help in economic growth as well as financial inclusion is critical to elevate people out of poverty (Sehrawat & Giri, 2016). Firstly, economic growth has a trickle-down effect on poverty, since with the expansion of the economy, more and more people find jobs. Secondly, financial inclusion implies providing financial services to the poverty-stricken people. Financial inclusion allows

them to invest in the untapped business opportunities. Financial inclusion has a direct effect on poverty alleviation (Singh, 2016).

## 2.7 Background of Indian Banking Sector

Banking in India has been defined under *Section 5(A)* and the directions of banking business are defined under *Section 5(B)* whereas other sections of Banking Regulation Act 1949 allows banks to perform value added customers services, such as communication, issue of cheque books, debit card and credit card etc (Chaudhary & Sharma, 2011) (The Banking Regulation Act, 2017).

Historically, three Banks were opened in Bengal (1809), Bombay (1840) and Madras (1843). These banks had the power to issue currency notes (Chaudhary & Sharma, 2011). In the year 1921, these three Banks were merged into one and formed the Imperial Bank of India. After the Independence of India, the essential target of the government of India was to reach to the underdeveloped and neglected areas of the country, therefore, Imperial Bank of India was nationalized and started functioning under a new name 'State Bank of India (SBI)'. After nationalisation, 400 new branches were opened catering to rural population (Chaudhary & Sharma, 2011).

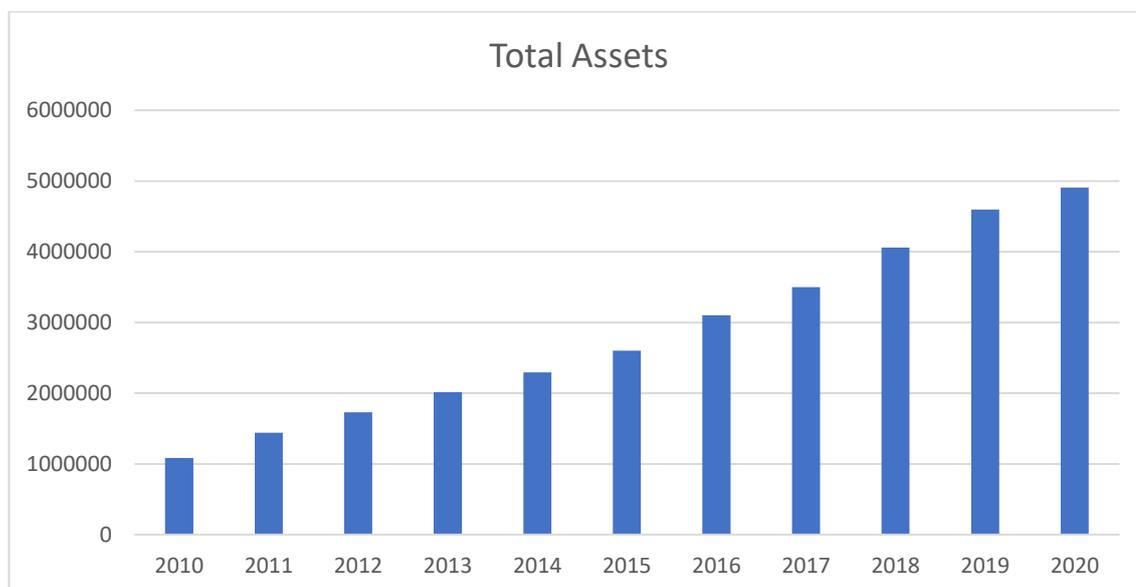
The State took over the ownership of the banks by introducing an ordinance, according to which privately owned banks were transferred to the government of India. A bank is called a public sector bank when the ownership of the government is at least 50% (Singh, 2016). In 1967 and in 1969, fourteen domestic private banks were nationalized followed by six more banks in 1980, the need for such a move became necessary from government's perspective because at that time even less than 2% of the total credit was extended to the agriculture sector (Gaubha, 2012). The justification of this takeover given

by the government was mainly poverty reduction. This objective can be achieved by encouraging priority sector lending especially in the agriculture sector, financial inclusion of the rural population, averting the misappropriation of banking assets. The idea of priority sector lending emerged from social banking to expand the financial services to underprivileged groups of people (Singh, 2016).

During the economic reforms of 1991, the private sector banks were allowed along with foreign banks to enter the banking industry with a motive to establish a competitive banking sector because one of the main reasons for the crumbling performance of banks was insufficient competition (Almaqtari, et al. (2019)) (Gaubha, 2012). Currently, Indian banking sector comprises of 12 public sector banks, 22 private sector banks, 46 foreign banks, 56 regional rural banks, 1485 urban cooperative banks and 96,000 rural cooperative banks, these banks are providing financial services to Indian population and contributing towards economic growth (RBI, 2021).

Commercial banks in India are increasing in size which can be seen in Figure 1, where an increase in the total combine assets of banks (public and private) can be observed, this increase in size signifies the importance of banks in economic development. Also, 70% of the total bank advances are given by the public sector banks in India (Sengupta & Vardhan, 2019).

Figure 1. Combine Assets of Public and Private Banks



Furthermore, to attain the government objective of financial inclusion, the Reserve Bank of India gives targets to banks, such as lending 40% of bank's adjusted net bank credit in the Priority sector, in case of deficiency public sector banks are levied with penalties (Kalluru & K, 2008), (RBI, 2021). Priority sector lending includes loans given to the agricultural sector, small and medium enterprises, housing for poor, students and weaker sections of the society (Singh, 2016). However, it has been argued that Priority sector lending contributes to the rising problem of non-performing assets in Indian banking system (Mishra, 2016). Karnik & Lalvani, (1996) in their paper try to establish the presence and the influence of the interest group (*farmers lobby*) on the government of India for the provision of public goods and subsidies in agriculture sector. They found the evidence, using parametric and non-parametric approach, that the farmers lobby has a huge influence on government in forming policies for agricultural sector (Karnik & Lalvani, 1996). We can argue that the government pressure to push advance and loans from banks to the agriculture sector may be due to the presence of strong lobby group which in turn influence such agriculture centric policies.

Non-performing assets, as per Reserve Bank of India guidelines characterised as those loan and advances, where

- *Interest and/or instalment of principal remain overdue for more than 90 days in respect of a term loan,*
- *The account remains out of order for more than 90 days in respect of an overdraft/cash credit,*
- *The bills remain overdue for more than 90 days in respect of bills purchased and discounted,*
- *The instalment of principal or interest remains overdue for two crop seasons for short duration crops and one crop season for long duration crops,*
- *The amount of liquidity facility remains outstanding for more than 90 days in respect securitization transaction as per guidelines on securitization dated Feb. 01, 2006,*
- *The overdue receivables representing positive mark-to-market value of derivative contract, remain unpaid for a period of 90 days from the specified due date for payment in respect of derivative transaction.'*

(RBI, 2021)

The high level of non-performing assets affect the performance of the banks, public sector banks have been recapitalised by the Indian government for many years. This recapitalisation doesn't insure the improvement in bank performance, however, it gives rise to the problem of moral hazard (Singh, et al., 2016). Banks understand that if they fail they will be saved by the central government by infusing capital into the banks. This recapitalization does not create much of an incentive for banks to improve their performance. The recapitalization affects the fiscal budget, thus intensifying the problem of fiscal deficit. In past, from 1984-85 till 1998-99, INR 20,446 crore (or € 2318 million ) has been provided by the central government to the public sector banks

for recapitalisation (Mathur, 2002). In 2017, Indian government announced a recapitalisation plan of domestic public sector banks amounting a total of INR 2.1 trillion (or € 23 billion or 1.3% of GDP) (Garg, 2019). This huge influx of finances in the banking services are sponsored by the taxpayer, thereby raising the question of the efficiency of the public sector banks.

Singh, et al., (2016) in their research points out that one of the reasons of rising non-performing assets is attributing from the rising fraud cases in Indian banking sector. From 2013 to 2015, the public sector banks have registered a loss of INR 22,743 crore (or €2.6 billion approx) accruing to banking frauds. However, the number of fraud cases are more in private and foreign banks but the contribution towards the absolute amount is highest from the public sector. In their research, evidence has been found the involvement of mid-level employees to senior level employees in the fraud cases implying lack of standard of corporate governance. Further, study reveals the main reasons for increasing fraud in Indian public banks compared to private banks are (Singh, et al., 2016):

- 1) Approximately 70% of the loans and advances from the public sector banks are given to infrastructure, power and mining sector. These projects require enormous amount of loans, and longer time for completion. On the contrary, only 30% of loans in such sector is given by Private sector banks. Importantly, investment in such activities is necessary for the development of a nation because such projects promotes social values as well (Singh, et al., 2016). Therefore, one can conclude that public sector banks are forced to lend and sanction loan in these sectors. This can be seen as an example of social projects mentioned acima.

- 2) Public sector banks have weaker mechanism to monitor the loans once the loans have been sanctioned. This inefficiency indicates the incompetence of public sector due to lack of expertise and motivation among the employees. Employees in public sector banks are not given sufficient incentives to detect and prevent the frauds (Singh, et al., 2016).
- 3) Their study draw sufficient inferences to conclude that inadequate standard of corporate governance is due to appointment process of highest level of officials and poor remuneration structure. The compensation for the highest level employees in Public sector bank is substantially lower than the Private banks. Also, the reward system for bank employees is short term and sales driven (Singh, et al., 2016). According to this, the main target of the bank employees is to sanction loans and not much importance has been given to the due diligence. Such an incentive structure may encourage the unethical behaviour and there are examples where banks employees have colluded with corporate borrowers and auditors to commit frauds (Singh, et al., 2016).

To summarize, banks were nationalized to strength the financial services and to provide benefit of financial inclusion to the deprived and disadvantaged groups of rural India. Banking services, therefore in India can be qualified as a public good because such services will not be provided to non-wealthy individuals under private market but benefits many. Private banks fail to enter rural areas due to low profit margins and fear of high non-performing assets. Government intervention is required to provide such services for long-term economic development but the inefficiency of the public sector banks lead to the problem of recapitalisation which in turn is a burden over the taxpayer. This research, hereby looks at the effect of government ownership on bank performance. Is decision to own banks a government failure? To answer this question

we have to do a comparative analysis of the performance of the banks between private and public sector banks and how ownership of the banks impact the bank performance. Does public sectors banks perform bad compared to private sector banks? The most important hypothesis, therefore is the impact of ownership on bank performance.

### 3. Hypothesis

The main hypothesis is whether the ownership of the bank has an impact on the profitability of the bank. This is to study the potential influence of the direct government administration on the public sector banks. The sign is expected to be negative, aligned with the theoretical assumptions of the 2.4 Government Failure.

The government intrusion in the banking sector has led to the adverse performance of the banks. The negative sign signal the presence interest group in agriculture sector, lack of competence of employees in public sector banks, influence of government in sanctioning loans to corporates. The negative sign satisfy the reasons for government failure mentioned acima. However, if the government led banks have a positive impact on the profitability, then the sign is expected to be positive. This implies that government interference is better for the bank's performance. The government doesn't exhibit opportunistic behaviour by sanctioning unreasonable loans in priority sector lending.

Null Hypothesis,  $H_0$ : Ownership of the Bank has no impact on the bank performance.

Alternative Hypotheses,  $H_a$ : Ownership has an impact on the bank performance.

The second hypothesis is a cluster of the many hypothesis based on the results of prior researchers and analysis on the determinants of bank performance. The expected signs are mentioned in Table 1.

To establish the relation between banks' performances and ownerships, a model is created. Doan & Bui (2020) used a model explaining and establishing a relationship

between banks' performances, bank-specific indicators and macroeconomic indicators. Another bank-specific indicator has been added which is the ownership of the bank. Ownership has not been considered as an explanatory variable by many researchers, however Kalluru & K, (2008), used ownership as an independent variable to explain the variations in bank performances along with bank-specific and macroeconomic indicators. An attempt is made to create a model by combining these two.

## 4. Data and methodology

In the first part of this section, I will describe the dataset used in this paper for the estimation of the econometric model and describe in detail the choice of independent variables, the parameter of interest. In its second part, I will describe the econometric model and the methodology.

### 4.1 Data

Unbalanced panel data has been used for the analysis. The main reason for using panel data is to reduce endogenous bias, which may arise due to omitted variable bias. Beta estimators generated from panel data are more accurate compared to only cross-sectional and only time-series data, this is confirmed by Almaqtari, et al. (2019), Doan & Bui (2020), Kalluru & K, (2008). Prior studies on banks' profitability have employed panel data analysis such as Almaqtari, et al. (2019) analysed the performance of 69 Indian banks from 2008-2017, Doan & Bui (2020) studied the Vietnam banks during the period of 2013-2018, Kalluru & K, (2008) used data for the period 1992-2006 for Indian banks, Roman & Dănuleşiu, (2013) analysed the Romanian banks between 2003-2011 and Seemule, et al. (2017) for measuring the performance of banks in Botswana for the period 2004-2013.

#### 4.1.1 Sampling and Data collection

Macroeconomic indicators are compiled from the annual report of Reserve Bank of India(RBI) website. Bank-specific variable data has been extracted from the respective

banks' website using the annual report of each bank for the corresponding year. These reports are shared with the investors of the banks, hence, considered as an authentic data source. The sample consists of 34 banks which were considered as Public and domestic Private banks by Reserve Bank of India (RBI) on 1<sup>st</sup> April 2020. The sample includes all the 12 public sector banks and all the 22 domestic private sector banks for a period of 16 years, ranging from 2004 to 2020. This time period is considered as per the availability of the data. Consequently, an unbalanced panel data has been used with 34 panel subjects. Time period for each bank is not specific to sixteen years. The least number of years observed for any bank is five years and maximum is sixteen years. Hence, the total number of observations available for analysis is 404, not  $34 \times 16$  ( $N \times T$ ) = 544, making panel data unbalanced.

Additionally, during this period, Indian commercial banks experienced many challenges, such as demonetisation, increase in the non-performing assets, spill over of financial crises and many bank fraud cases.

#### *4.1.2 Dependent and Independent Variables*

The bank-specific and macroeconomic indicators are mainly adopted from the research paper of Doan & Bui (2020). The main reason for adopting this model is the number of independent variables. Model used by Doan includes only five independent variables which is sufficient pertaining to the number of observations. Large number of independent variables will decrease the degrees of freedom, hence affecting t-values.

In previous research related to the investigation of the determinants of bank profitability, *Return on Assets (ROA)* and *Return on Equity (ROE)* have been considered as dependent variables to measure the performance of the bank. *ROA* is the net income

to total assets and *ROE* is the net income to equity. These two ratios are popularly used to evaluate the bank's performance to generate returns from the available resources. These ratios, therefore, can be considered as a proxy for the profitability of the bank. Moreover, *ROA* is comparatively more popular among researchers and the model is inspired from Doan & Bui (2020) research, therefore only *ROA* is selected as the dependent variable.

#### *4.1.2.1 Bank-specific Independent Variables:*

1) *Capital Adequacy Ratio (CAR)*: It is capital to total assets, this ratio measures the stability of a bank, by monitoring the balance between the investment opportunities and expected risk (Kaur, 2010). *CAR* is calculated by assigning large weight to high-risk assets. A higher *CAR* is better because it implies that the Bank has adequate capital against risky assets to increase investors' confidence. Roman & Dănulețiu, (2013) and Seemule, et al. (2017) also included *CAR* as a determinant of bank performance while analysing the performance of banks in Romania and Botswana, respectively. *CAR* has a positive relation on bank profitability as per (Doan & Bui, 2020) and (Kalluru & K, 2008).

*H<sub>1</sub>: Capital Adequacy Ratio (CAR) has a positive impact on bank performance*

2) *Bank Size (banksize)*: Total assets of the bank are treated as the measure for bank size. The size of the bank appeals to many customers as well as the investors. It is assumed that a large bank can well resist the small crises because of more flexibility available due to larger asset base compared to a smaller bank (Kalluru

& K, 2008). (Doan & Bui, 2020) and (Roman & Dănulețiu, 2013) showed a positive impact of bank size on profitability.

*H<sub>2</sub>: Bank Size (banksize) has a positive impact on bank performance*

- 3) *Liquidity Risk (liqratio)*: It is measured as loan to deposits. This ratio expresses the efficiency in using bank deposits. Higher the liquidity ratio better the likelihood of improved profits. So, a positive relationship is expected. Doan & Bui, (2020), analysis shows that this variable has a positive relation with profit implies that deposits are efficiently channelised into loans and advances, this helps banks in earning more income and results in increasing profits.

*H<sub>3</sub>: Liquidity Risk (liqratio) has a positive impact on bank performance*

- 4) *Ownership(dumPSB2)*: Ownership of the bank is the most important variable for this analysis. This variable will capture the impact of government owned banks on the performance of the banks, hence register the effect of government intervention in the banking sector.

A dummy variable is included to see if the ownership of the bank has any relation with the bank's performance. If dumPSB2 is '1' for public sector banks and '0' for domestic private sector banks, it is expected that banks perform better under private ownership compared to public sector banks. A negative relation between the ownership of the bank and bank performance is expected. This hypothesis is based on the acima mentioned reasons pertaining to mixed social and economic goals of government, vote capturing and rent seeking. Earlier, Kalluru & K, (2008) had included ownership as an independent variable as a determinant of bank performance and found a negative relation at 5% significance level between the ownership of the bank and the bank performance. (Kumbhakar & Sarkar,

2004) considered ownership in the stochastic frontier analysis to assess the impact on the cost efficiency of the bank, but didn't find any big difference in the efficiency of the public and the private banks. However, there is not much empirical research available on Indian banks performance considering ownership as an independent variable.

Porta, et al. (2000) while analysing the government ownership of banks around the world, found that the public owned banks are not efficient to infuse the capital in the system. This may not result in the anticipated growth of the bank and have a higher share of non-performing assets compared to privately owned banks. Micco, et al. (2007) analysed the data of commercial public and private sector banks from 179 countries and found that public sector banks have lower probability compared to other privately owned banks, but there is no statistical evidence of relationship between ownership and bank performance.

#### *4.1.2.2 Macroeconomic Factors:*

*1) Gross Domestic Product (GDP):* GDP measures the total economic activity of the country and growth rate of GDP measures the increase in the economic activity and income of the country (Doan & Bui, (2020), Roman & Dănuleşiu, (2013)). With the increase in GDP, increase in the demand for loans and increase in supply of deposits are expected, accordingly creating new opportunities for banks to earn profit (Kalluru & K, 2008). Doan & Bui, (2020), Kalluru & K, (2008), Almaqtari et al (2019) and Roman & Dănuleşiu, (2013) studies show that GDP has a positive impact on bank performance, whereas Seemule et al (2017) results were inconsistent. The impact of GDP on bank performance is expected to be positive.

*H<sub>4</sub>: Gross Domestic Product (GDP) has a Positive impact on bank performance*

2) *Inflation (INF)*: If the rate of inflation is not very fluctuating, then this will help banks to anticipate the change in price. This allows bankers to adjust the rate of interest accordingly to increase the revenue (Kalluru & K, (2008), Roman & Dănuleşiu, (2013)). This can have a positive impact on the bank performance. Doan & Bui, (2020), Roman & Dănuleşiu, (2013) and Seemule et al (2017) found a positive impact on bank performance, whereas Kalluru & K, (2008), Almaqtari et al (2019) found a negative impact on performance.

*H<sub>5</sub>: Inflation (INF) has a Positive impact on bank performance*

*Table 1: Variable Definition and Expected Relationship*

<i>Variable</i>	<i>Definition</i>	<i>Measurement</i>	<i>Expected Relation</i>
<b>ROA (Dependent Variable)</b>	Returns on Assets	Net Profit/Total Assets	
<b>Independent Variables</b>			
CAR	Capital Adequacy Ratio	Capital/Weighted risk assets	+
banksize	Bank Size	Total Assets	+
liqratio	Liquidity Risk	Advance/Deposits	+
dumPSB2	Ownership	Dummy variable taking value 1 for each PSB	-
GDP	Economic Growth	Rate of growth in GDP	+
INF	Inflation	Wholesale Price Index	+

Additional Bank-Specific Independent Variables, the below mentioned two indicators have been adopted from CAMEL Approach (Kaur, 2010):

- 1) *Management Quality (MQ)*: Net Profit per employee is considered as the proxy to measure the management quality of the bank (Kaur 2010) and net profit per employee also measures the productivity of the employees (Kumar & Sreeramulu, 2007). This ratio tries to incorporate the management efficiency.

Higher this ratio signifies that each employee is efficiently working, which is better for bank performance.

- 2) *Asset Quality (AQ)*: It is calculated as net non-performing assets to net advances (Kaur, 2010). The non-performing assets hamper the income of the banks as the main source of bank's income is the interest from the advances (Kaur, 2010). The non-performing assets are those advances which are not generating any income for the bank, neither the interest income nor the principle amount. Higher asset quality ratio implies a comparatively higher portion of advances is turned into non-performing assets, this can directly affect the profitability of a bank.

## 4.2 Methodology

Many researchers have employed multiple linear regression models, such as pooled OLS regression model, fixed or random effect to establish the relationship between bank's profitability, bank-specific indicators and macroeconomic indicators Almaqtari et al (2019), Seemule et al (2017), Roman & Dănulețiu, (2013), Doan & Bui, (2020)). Fixed effect model has been given specific importance in most of the previous research. The reason for the popularity of the fixed effect model is due to its precision. Fixed effect model reduces the biasness in the estimation which arises due to the time invariant factors of the different banks by considering the time specific difference among the banks (Seemule, et al (2017)). The pooled OLS model is used when researchers assume that the performance of the different banks is almost the same and it is not affected by the bank specific factors. This assumption ignores the firm specific effects while estimating the performance of the banks (Kalluru & K, (2008)). Under pooled OLS models, beta

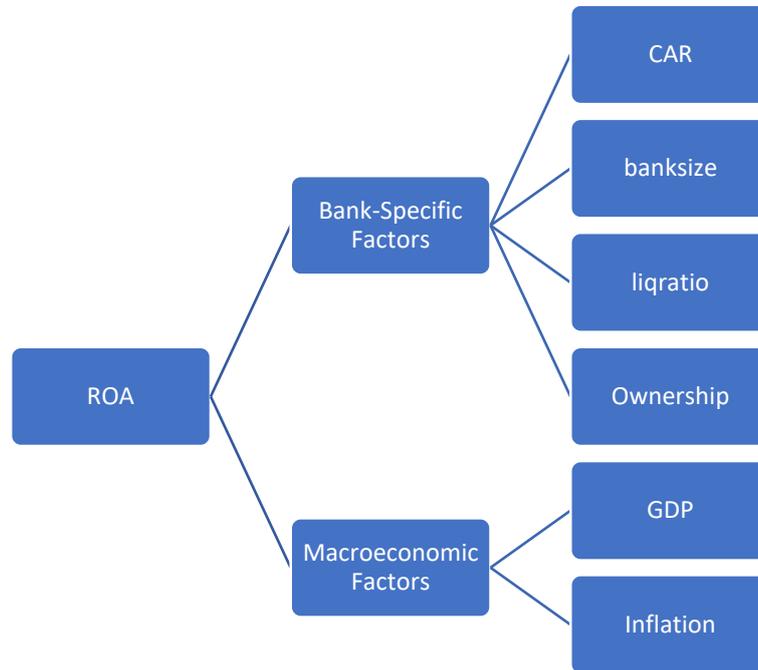
estimators are biased due to the presence of firm specific and time specific heterogeneity. Fixed effect model, however, solves this problem.

In this research, however, pooled OLS is used mainly due to the presence of a dummy variable i.e. the ownership of the bank. The bank's ownership has been consistent over the period of time, therefore, the beta estimate for the dummy variable of the ownership will be omitted if the model is estimated using a fixed effect model.

The base of the model is acknowledged from the research paper of Doan & Bui, (2020), they have analysed the impact of bank specific factors and macro-economic factors on the bank performance in the banks of Vietnam. Kalluru & K, (2008) model also analyses the impact on bank performance due to bank-specific and macroeconomic factors but only ownership of the bank as a bank specific factor is considered in this research. Reason for not considering Kalluru & K's model is due to its complexity and a multitude of independent variables. Kalluru & K, (2008), analysed the bank performance using data from 87 banks (public, private and foreign banks) for the period of 1992-2006. This gives them the liberty to consider more independent variables (15 independent variables) for model specification. If Kalluru & K, (2008) model specifications are replicated for this research, then with increase in controlled variables, error degrees of freedom will decrease which will result in increased standard error that will affect the t-values and make beta coefficient insignificant. Beta estimates become insignificant because the information related to unique variation will reduce (Walker, 1940).

To test the null hypothesis regarding the relationship between performance and ownership of a bank, the constructed model regresses the return on asset of banks while controlling for capital adequacy ratio, bank size, liquidity ratio, ownership, gross domestic product and inflation. A dummy variable (dumPSB2) is created to state if the bank is a public sector or a private sector one.

Figure 2: Model Structure



This model translates to the following equations:

*Equation 1*

$$\text{ROA}_{it} = \beta_0 + \beta_1 \text{CAR}_{it} + \beta_2 \text{banksize}_{it} + \beta_3 \text{liqratio}_{it} + \beta_4 \text{dumPSB2}_{it} \\ + \beta_5 \text{GDP}_t + \beta_6 \text{INF}_t + \varepsilon_{it}$$

Where  $\text{ROA}_{it}$  is return on assets (dependent variable) of a certain bank  $i$  at time  $t$ , respectively.  $\text{CAR}_{it}$  represents the capital adequacy ratio in percentage maintained by a certain bank  $i$  at time  $t$ ,  $\text{banksize}_{it}$  represents the bank size in Indian Rupees of a certain bank  $i$  at time  $t$ , and  $\text{liqratio}_{it}$  represents the liquidity ratio in percentage maintained by a certain bank  $i$  at time  $t$ ,  $\text{dumPSB2}_{it}$  is a dummy variable representing the ownership of the bank, value '1' for Public sector banks and 0 for private sector banks,  $\text{GDP}_t$  represents

the rate of economic growth of the country over a period of time,  $INF_t$  measures the inflation rate over the period and  $\varepsilon_{it}$  is the residual term.

The model specified in Equation 1 can be further developed by introducing two more bank-specific variables to check if these variables should be included for estimating the relationship between ownership and bank performance. The model elucidated into:

*Equation 2*

$$ROA_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 banksize_{it} + \beta_3 liqratio_{it} + \beta_4 dumPSB2_{it} \\ + \beta_5 GDP_t + \beta_6 INF_t + \beta_7 AQ_{it} + \beta_8 MQ_{it} + \varepsilon_{it}$$

Where,  $AQ_{it}$  represents the asset quality in percentage maintained by a certain bank  $i$  at time  $t$ ,  $MQ_{it}$  represents the quality of management of a certain bank  $i$  at time  $t$ .

The empirical approach is as follows:

Firstly, a baseline regression model shown in Equation 1 is estimated using Pooled OLS, random effect and to check the robustness of results, robust regression-estimator is used. Secondly, the model is estimated only with bank-specific indicators. Thirdly, coefficients are predicted taking into account ownership and macroeconomic indicators. Finally, additional control variables are added step-by-step to the baseline regression model. All these models are estimated using OLS.

## 5. Results

Based on the final dataset of 404 observations, seven multivariable pooled OLS regressions and one random effect model are performed to study the relationship between the bank performance and the ownership of the banks. In this section, the results of each of the models will be discussed in detail.

### 5.1 Descriptive Statistics

The mean values of the variables are presented in Table 2. Mean values of *ROA* implies the private sector banks are more profitable compared to public sector banks. The net income from total assets is higher for private banks which signifies that the quality of assets is better for private sector banks. The mean values of capital adequacy ratio are higher for the private sector banks, which implies that the private banks are more stable compared to public sector banks. The combined average of Capital adequacy ratio is 13.8% (approx.), whereas the prescribed total minimum capital adequacy ratio as per Basel III is 10.5%, entails that Indian commercial banks (Private and Public) are sufficiently capitalised and can resist economic stress. On an average, public sector banks are bigger than private sector ones. The average total size of public sector banks is INR 458,444 crores (or € 52 billion), this large size creates a sense of confidence among people and helps in attracting a sufficient number of new customers. The mean value for Liquidity ratio shows that the private sector banks are efficiently using their deposits compared to public sector banks. Private sector banks have sanctioned more loans considering the pool of deposits.

Other bank-specific indicators show that the private sectors are performing better than public sector banks. Management Quality, which is considered as the proxy variable to measure the employee efficiency, concludes that private sector employees are performing much better than public sector banks, since the mean value for this indicator is negative for public sector banks, representing the inefficiency of the public sector employees. The negative sign hints that each employee in public sector banks attributes a loss of INR 834,000 (or € 9430). Referring back to one of the main reasons for government failure is 2.4.3 Weak Incentives, employees in public sector banks are less motivated compared to private banks because of low salaries and low performance-oriented appraisals. Asset quality, that is net non-performing assets to net advances, has a direct impact on the profitability of the bank because non-performing assets directly hamper the main source of the income for the bank, lower the ratio the better it is. Private sector bank's asset quality ratio is half of the public sector banks on average. The high asset quality ratio suggests that the loans or advances given by public sector banks have a higher tendency of default and becoming a non-performing asset compared to private sector banks. This may be associated with the credits given by the public banks in the priority sector. The idea of priority sector lending is aligned with the government's vision of social banking.

Table 2: Mean Values of Variables

Variable (in %)	Public	Private	Combine
Return on Assets(roat)	0.29	0.912	0.67
Capital Adequacy Ratio(car)	12.254	14.797	13.808
Bank Size(banksize) (in INR Crores)	458,443.53	135,098.13	260,754.63
Liquidity Ratio(liqratio)	71.475	80.273	76.854
Economic Growth(gdp)	-	-	7.063
Inflation(inf)	-	-	4.177
Management Quality(mq) (in INR '000)	-834.8981	1616.271	663.7129
Asset Quality(aq)	3.672611	1.782186	2.516832
Number of Observations	157	247	404
<b>Note:</b> Public = Public Sector Banks, Private = Domestic Private Sector Banks			

Furthermore, mean values of economic growth and inflation are the macroeconomic indicators of the Indian economy for the given period of time. On an average, the rate of growth of gross domestic product is around 7% annually and rate of inflation at a wholesale price index is around 4% annually during the period of 2004 to 2020.

## 5.2 Pairwise Correlation

Table 3 represents the Pearson correlation matrix of all the variables selected in the model. Numbers in the table are the coefficients of correlation which range from -1 to 1. Coefficients equal or closer to 1 (irrespective of sign) indicate a strong correlation. Negative and positive signs demonstrate the nature of a relationship. A negative sign represents inverse and positive means direct. If the coefficient of correlation between two independent variables is above 0.8, this signals the presence of multicollinearity (Roman & Dănulețiu, 2013). The coefficient of correlation between all the independent variables is less than 0.8 referring to low pairwise correlation, so we can conclude that

there is low possibility of multicollinearity. CAR, liqratio, GDP, INF and MQ have a positive correlation with ROA but banksize and AQ have negative correlation with dependent variables. Coefficient of correlation between asset quality and return on assets is -0.714, which implies a negative high correlation between the variables. Correlation between return on assets and capital adequacy ratio can be considered moderate.

*Table 3: Pairwise correlations*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Return on Assets	1.000							
(2) Capital Adequacy Ratio (CAR)	0.491	1.000						
(3) Bank Size (banksize)	-0.110	-0.066	1.000					
(4) Liquidity Ratio (liqratio)	0.109	0.271	0.021	1.000				
(5) Economic Growth (GDP)	0.193	-0.012	-0.130	-0.018	1.000			
(6) Inflation (INF)	0.212	0.054	-0.105	-0.092	-0.018	1.000		
(7) Asset Quality (AQ)	-0.714	-0.373	0.171	-0.114	-0.152	-0.354	1.000	
(8) Management Quality (MQ)	0.320	0.112	0.026	-0.061	0.078	0.032	-0.242	1.000

### 5.3 Regression Results

The regression results for the eight specifications of the determinants of return on assets is presented in Table 4 and Table 5.

Table 4 shows the estimated regression for the original model specified in Equation 1.

Column two (M1), three (M2) and four (M3) of Table 4 show an overview of the

estimated coefficients using pooled OLS model, random effect model and robust regression model, respectively.

Table 5 presents the number of various regressions (M4, M5, M6, M7, M8) model estimated using Pooled OLS to determine if the additional variable are required to judge the impact between bank performance and the ownership of the banks.

### **Inferential Analysis**

The coefficient of determination adjusted  $R^2$ , of the different regression models is different. In M5 only 15% of the variations are explained by the estimated model whereas in M8, 59% of the variations are explained by the model because M5 is estimated using least number of controlled variables and M8 is estimated considering all the variables which are available in this research. Except for only two bank-specific variables, namely, *banksize* and *liqratio*, which have displayed no significant statistical link with the profitability in all the estimated models. It has been observed that, in Table 4, the estimated coefficient of M3 is not distinctive from M1 in terms of positive or negative impact on dependent variable and statistical significance. M3 specifications are estimated using robust regression. As per M3, the number of observations used to estimate the model is 403 whereas for M1 it is 404. Robust regression estimates the model by dropping the outliers which are present in the data because outliers have an influence on the estimated coefficients. Thus, it can be deduced that the estimated specifications of Pooled OLS model (M1) are not influence by outliers and the results are robust. Also, M3 has higher adjusted  $R^2$  which implies model is explaining larger variations after dropping outliers. M2 specifications are the result from random effect model. Under random effect model, the coefficients are estimated by including the individual effects of the banks which is randomly distributed across the units (Hiestand,

2005). In the given case, due to the presence of random effect the estimated results are not exactly same as pooled OLS. M2 results are almost same as M1 except for ownership, though the impact of ownership is negative on bank performance in M2, but it is not statistically significant.

**Capital Adequacy Ratio (CAR):** In Table 4 and Table 5, regression models show that Capital adequacy ratio is statistically significant at p-values less than 0.1% and has positive impact on the return on assets. A higher CAR represents the financial stability of the banks which allow banks to easily raise capital for the investors, in turn, this capital can be invested in profitable portfolios. This estimate supports the hypothesis that higher capital adequacy ratio may result in higher profitability of the banks. These findings are consistent with the findings of Doan & Bui, (2020), Roman & Dănuleşiu, (2013), Seemule et al (2017), Kalluru & K, (2008). Considering Model 1, *ceteris paribus*, as the capital adequacy ratio increases by 1%, it is expected that the profitability will increase by 13% on average.

Table 4: Determinants of Returns on Assets

Variable	Pooled Regression (1)	Random Effect (RE) (2)	Robust Regression (RR)(3)
Capital Adequacy Ratio(car)	0.131*** (0.0134)	0.0825*** (0.0135)	0.216*** (0.0113)
Bank Size(banksize)	0.0000000614 (0.000000118)	-0.000000166 (0.000000156)	-0.000000043 (0.0000000808)
Liquidity Ratio(liqratio)	-0.000461 (0.00173)	0.00204 (0.00170)	-0.00212 (0.00120)
Economic Growth(gdp)	0.163*** (0.0321)	0.143*** (0.0279)	0.131*** (0.0220)
Inflation(inf)	0.0645*** (0.0135)	0.0642*** (0.0116)	0.0580*** (0.00923)
1.dumPSB2	-0.357** (0.110)	-0.407 (0.211)	-0.226** (0.0764)
_constant	-2.398*** (0.320)	-1.716*** (0.328)	-3.060*** (0.239)
N	404	404	403
adj. R <sup>2</sup>	0.325		0.584

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Bank Size (banksize):** The results for this indicator are mixed. In certain models, the coefficient is positive and in certain models, the coefficient is negative. Hence, they do not provide sufficient evidence to comment on the impact of bank size on profitability. Furthermore, Seemule et al (2017) and Almaqtari et al (2019) used the natural logarithm value of the total assets to measure the impact on profitability (ROA), results were significant and positive coefficient which is aligned with the hypothesis. For further research, it is suggested to use logarithm values.

**Liquidity Ratio (*liqratio*):** The predicted impact of liquidity ratio is indecisive because of different signs from different models. For example, Model 1, 3, 4, 6, 8 show negative impact of liquidity ratio on bank profitability but Model 2 and 7 should have a positive impact on the performance of the bank. Notably, Model 2 is estimated using a random effect model and Model 7 has an additional variable.

**Ownership(*dumPSB2*):** This is the most critical determinant of bank profitability in this research. The dummy variable is used because only two types of commercial banks in India are looked for this research and it allows to compare the average effect of the ownership on the bank's profitability. Dichotomous variable, also known as dummy variable, can take values either 0 or 1 (Epstein & Martin, 2014). If in a regression model, without dummy variable, the intercept term represents the starting point of the estimated regression model keeping other independent variable equal to zero (Epstein & Martin, 2014). However, when a dummy variable is introduced and takes value equal to '0', then the intercept term captures the average impact of the baseline variable, keeping other independent variables equal to zero. Therefore, the intercept in Equation 1 and Equation 2, captures the average effect of private ownership on the bank performance (*ROA*), while other independent variables are considered to be zero.

Furthermore, the coefficient of the dummy variable measures the impact of public sector banks on the bank performance when dummy takes value 1. The overall impact of the public sector banks, *ceteris paribus*, is measured by combining the intercept with dummy coefficient.

Table 4, the ownership has a negative impact on the bank profitability at a 1% significance level for model 1 and model 3, however the impact of ownership is still

negative for model 2 but the coefficient is statistically insignificant. The negative intercept term at a 0.1% significant level implies that the domestic private banks are not performing well, however, this negative impact is intensified for public sector banks. Analysis shows that the banking sector as a whole is not performing well for the given period. The reasons may be as follows: the spill over of the financial crisis (2008), demonetisation (2016), implementation of GST (2017) and the rising number of fraud cases (especially in the public sector) in the banking sector. Finally, a strong relationship between ownership and bank performance is observed and the performance of public sector banks is inferior to the private sector ones.

Table 5, the models (4-8) are mainly run to check if the model correctly estimates the relationship between ownership and bank performance after removing and introducing variables. Model 4 considers only the bank specific variables including asset quality and management quality, however, the coefficient for the dummy variable is positive and insignificant, this is explained below. Model 5, only macroeconomic variables are considered, and the coefficient of ownership is negative and statistically significant at 0.01%. In Model 8, as per the Equation 2, included the additional variables, the coefficient of ownership is positive but statistically insignificant.

***Macroeconomic indicators:*** The economic growth has a positive impact on the bank profitability and is statistically significant in all the models (1-8). With the growth in the country's economy, the banking industry gets more opportunities to increase the profitability of the banks. This is consistent with the expected relationship. Further, the inflation rate has a positive impact on bank profitability, since this allows banks to anticipate the inflation and adjust for the interest rate, this will in turn reduce banks cost

and improve profits. These findings are consistent with Doan & Bui, (2020), Roman et al (2013) and Seemule et al (2017).

Table 5: Determinants of Returns on Assets

	Only Bank-Specific (4)	Only Macroeconomic (5)	With AQ (6)	With MQ (7)	Both (8)
Capital Adequacy Ratio(car)	0.0810***		0.0835***	0.124***	0.0823***
	(0.0109)		(0.0111)	(0.0129)	(0.0108)
Bank Size(banksize)	-2.65e-08		5.61e-08	-1.35e-08	1.06e-08
	(9.13e-08)		(9.37e-08)	(0.000000114)	(9.23e-08)
Liquidity Ratio(liqratio)	-0.000647		-0.00143	0.000603	-0.000732
	(0.00136)		(0.00138)	(0.00168)	(0.00136)
Management Quality(mq)	0.0000221**			0.0000345**	0.0000211**
	(0.00000488)			(0.00000589)	(0.00000486)
Asset Quality(aq)	-0.244***		-0.253***		-0.239***
	(0.0151)		(0.0166)		(0.0165)
1.dumPSB2	0.102	-0.668***	0.0288	-0.251*	0.0728
	(0.0877)	(0.107)	(0.0910)	(0.107)	(0.0896)
Economic Growth(gdp)		0.162***	0.0807**	0.145***	0.0737**
		(0.0353)	(0.0260)	(0.0310)	(0.0255)
Inflation(inf)		0.0737***	-0.00656	0.0615***	-0.00458
		(0.0148)	(0.0117)	(0.0130)	(0.0114)
_cons	0.167	-0.525*	-0.304	-2.295***	-0.354
	(0.189)	(0.264)	(0.289)	(0.308)	(0.283)
N	404	404	404	404	404
adj. R <sup>2</sup>	0.585	0.159	0.574	0.377	0.592

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Additional Independent Variables:**

The asset quality (aq) and management quality (mq) are considered especially because both the variables are affected by the ownership of the banks.

*Asset Quality(aq)*: Importantly, for the calculation of the asset quality, non-performing assets are considered. Arrawatia et al., 2019 reveal that the public sector banks have higher non-performing asset compared to private banks. A higher non-performing assets (NPAs) means a larger part of the residual needs to be kept aside as provision for bad loans (Shabbir & Mujoo, 2014). One of the reasons of high non-performing assets in public sector banks is considered to be priority sector lending. The non-performing assets in priority sector lending contributes to a significant share of the total non-performing assets portfolio (Gaur & Mohapatra, 2019)). Priority sector NPAs are higher in public sector banks compared to private sector banks because the government pushes public banks to meet the prescribed target to lend in priority sector, and there is no effective legal system for recoveries from such advances (Shabbir & Mujoo 2014). Another reason can be the large amount of frauds in public sector banks compared to private (Singh, et al., 2016). It has been assumed that the comparatively high NPAs in public sector banks is due to the unnecessary interference of unscrupulous politicians in sanctioning loans to corporate houses (Sengupta & Vardhan, 2019), because of high corruption. Such allegations are difficult to prove. This assumption is in line with 2.4.5 Human Selfishness. Also Table 2, confirms the asset quality is bad for public sector banks compared to private banks.

This aforementioned research point towards a link between ownership and asset quality, further asset quality has an impact of bank performance. The relation is shown in Figure 3.

Figure 3



**Management quality(mq):** The productivity and the efficiency of the employees working in public organisations is comparatively low from private sector employees (Kumar & Sreeramulu, 2007). This may be due to low performance incentives in public sector banks. The result in Table 2 emphasize on this analysis. Again, we can say there is a linkage between ownership and Management quality and Management quality is used to analysis the bank performance under *CAMEL* approach.

Figure 4



For this analysis, the coefficient of ownership is the key variable of interest, hence considered as a *treatment variable* and asset quality and management quality can be considered as *confounding variables* because the introduction of these two variables can change the interpretation of the model (Epstein & Martin, 2014).

Moving forward, in Table 5, Asset quality is controlled in three models i.e. Model 4, Model 6, Model 8 and Management quality is controlled Model 4, Model 7 and Model 8. The result reveals once we control for two variable(aq & mq) explicitly in the model the estimated coefficient of ownership is affect. The reason for such change is due to “*overcontrol bias*” in these models (Cinelli, et al., 2021). When asset quality and management quality are controlled in the model than the *total effect* of ownership on

bank performance is not estimated, because beta coefficient of ownership will be estimated considering asset quality and management quality constant. The estimated beta for ownership, in this case, is independent of the effect of asset quality and management quality.

In this research I am trying to establish a relationship between ownership and bank performance, with the introduction of these two variables the total effect of ownership on bank performance is *blocked* by these two variables (Cinelli, et al., 2021). In Model specifications (1-3), the estimated coefficient of ownership is already inclusive of the effect of asset quality and management quality but in models, where asset quality and management quality are considered as controlled variable then the estimated models are not explaining the total impact of ownership on bank performance. These two variables can be considered as *bad controls* (Cinelli et al, 2021) for this research. Moreover, the model in Equation 2, should not be considered to establish the relation between ownership and bank performance and models specification of M4, 6, 7, 8 are not estimating the total effect between ownership and bank performance, hence, should be ignored.

## 6. Conclusion and Discussion

### 6.1 Conclusion

In this research thesis, I have tried to document a link between the government failure in the public sector banking in India using the empirical evidence by creating a new model. I have been able to show the link between the performance of the bank and the ownership of the bank when controlling for certain bank-specific and macroeconomic variables. The results are statistically significant. It has been found that to establish this relationship to analyse total casual effect of ownership on bank performance model should not control for asset quality and management quality. Also, there is evidence that the performance of government owned banks is worse compared to private owned banks.

Firstly, I introduce the rationale of government intervention pointing out the problem that leads to market failure in a broader context. Moving forward by describing the established literature on the problem with Government Failure and different types of government failure. Specifically, I focus on the policy which gives full control to the government and consider the example of Public sector banks in India. Importance of banking for economic growth as well as reasons for social banking were discussed.

Thus, I discuss the hypotheses of interest in this research, the data collection process for different variables and present the limitations of the dataset, eventually introducing the dependent and independent variables for the model.

In the methodology section, I illustrate linear regression model that I created by combining the variables from two different models used by earlier researchers to employ

given the hierarchical structure of the data at hand, together with the noteworthy parameters, the explanatory variables and control regressors.

In Section 5 acima, I interpret my results pertaining to different variables and specific models.

I find consistently significant results confirming the negative impact of the public ownership on performance of the bank. This validates both the hypotheses and supports the idea that the direct control of government can reduce the productivity and performance of the sector. This may be due to the high non-performing assets which is influenced by priority sector lending, that the government tries to push through government sector banks to please its voters, which is maybe due to the presence of a lobby group of farmers, involvement of politicians in loan sanctioning procedure to corporate houses or by affecting the productivity of the employees due to low incentives or because of the combination of the factors.

## 6.2 Discussion

In this last section, the research is examined, and recommendations are provided on improving the limitations.

Firstly, this study only examines one side of the government intervention. Study only illustrates the inefficiency which arises if the government takes over a particular industry without considering the main reason for the takeover. To deduce the actual impact and the more precise cost-benefit analysis, we have to look at the benefits achieved by government intervention. This can be done by considering how well Indian government has been able to penetrate the financial services in rural India, by analysing the number of branches opened in the rural part of India, according to RBI's annual report of March 2020 public sector banks have 28,921 branches in rural area compared to only 7,232

branches of private sector banks. Along with this, what percentage of population has been able to reap the benefits of financial inclusion, by checking if people have been moved out of the vicious cycle of poverty. Sehrawat & Giri, (2016) established a causal link between financial development and reduction in poverty, showing that the increase in financial development results in poverty eradication. This will be a beneficial side of the spectrum.

Secondly, for the more precise result, a fixed effects model can be employed and this can be done if the ownership of the public sector banks can be changed over the period of time and the estimated results using fixed effect will be more precise. The main reason for not running a fixed effect model was because the dummy variable was not changing its value over the given period of time, hence omitting the coefficient from the estimated model. This can be achieved in future because Indian government is planning to privatize the public sector banks as per the focus plan to achieve the disinvestment target. According to the budget speech given by Finance Minister of India Nirmala Sitharaman, Government is planning to achieve this by bringing the legislative changes in Act 1970 (Acquisition and Transfer of Undertakings) and 1980 (nationalisation) (Sitharaman, 2021).

Thirdly, The link between ownership, asset quality and management quality on impact of bank performance is not fully established. (Gaur, et al., 2020) didn't find the negative impact of priority sector lending on non-performing assets while controlling for other variables. Therefore, further research can be conducting analysing these relationship.

Finally, a more rigorous econometric model can be created by including all commercial banks (foreign banks) and controlling for more variables which can affect the performance of the banks. Including the foreign banks help to analyse the impact of competitive pressure and a border scope of comparison.

## Bibliography

- Almaqtari, F. A., Al-Homaidi, E. A., Tabash, M. I., & Farhan, N. H. (2019). The determinants of profitability of Indian commercial banks: A panel data approach. *International Journal of Finance & Economics*, 168–185.
- ANDREW, B. (2008). *Public administration and development*. Retrieved from Wiley InterScience: [www.interscience.wiley.com](http://www.interscience.wiley.com)
- Arrawatia, R., Dawar, V., Maitra, D., & Dash, S. R. (2019). Asset quality determinants of Indian banks: Empirical evidence and policy issues. *Public Affairs*.
- Bator, F. M. (1958). The Anatomy of Market Failure. *The Quarterly Journal of Economics*, 351-379.
- Chaudhary, K., & Sharma, M. (2011). Performance of Indian Public Sector Banks and Private Sector Banks: A Comparative Study . *International Journal of Innovation, Management and Technology*, 249-256.
- Cinelli, C., Forney, A., & Pearl, J. (2021). *SSRN*. Retrieved from SSRN: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3689437](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3689437)
- Coase, R. H. (1960). THE PROBLEM OF SOCIAL COST. *The Journal of Law & Economics*, 1-44.
- COOTER, R., & ULEN, T. (2012). *Law & Economics*. Pearson Education, Inc.
- Doan, T.-T. T., & Bui, T. N. (2020). An empirical analysis of macroeconomic and bank-specific factors affecting profitability of Vietnam banks. *Accounting*, 1059-1064.
- Dolfsma, W. (2011). Government Failure — Four Types. *JOURNAL OF ECONOMIC ISSUES*, 593-604.
- Epstein, L., & Martin, A. D. (2014). *An Introduction to Empirical Legal Research*. Oxford University Press.

- Fike, \_\_, & Gwartney, J.. (2015). Public Choice, Market Failure, and Government Failure in Principles Textbooks. *The Journal of Economic Education*, 207-218.
- Furton, G., & Martin, A. (2019). Beyond market failure and government failure. *Public Choice*, 197–216.
- Gabriela, G. (2013). Government Failures in Regulating Markets. “*Ovidius*” *University Annals, Economic Sciences Series*, 299-304.
- Garg, N. (2019). Decoding the Great Indian Recapitalisation Plan: Restoring the Health of Public Sector Banks in India . *South Asian Survey*, 28-54.
- GAUBA, R. (2012). The Indian Banking Industry : Evolution, Transformation & The Road Ahead. *Pacific Business Review International*.
- Gaur, D., & Mohapatra, D. R. (2019, August). *ResearchGate*. Retrieved from ResearchGate: <https://www.researchgate.net/publication/341071819>
- Gaur, D., Mohapatra, D. R., & Jena, P. R. (2020). ASSET QUALITY OF INDIAN BANKING SECTOR AND THE ROLE OF GOVERNMENT DIRECTED CREDIT SCHEMES. *JOURNAL OF CRITICAL REVIEWS*.
- Helm, D. (2010). Government failure, rent-seeking, and capture: the design of climate change policy . *Oxford Review of Economic Policy*, 182–196.
- Hiestand, T. (2005). Using Pooled Model, Random Model And Fixed Model Multiple Regression To Measure Foreign Direct Investment In Taiwan. *International Business & Economics Research Journal*.
- Kalluru, S. R., & K, S. B. (2008). An Empirical Analysis of Profitability Determinants in Indian Commercial Banks During Post Reform Period. *The Icfai University Journal of Industrial Economics*.
- Karnik, A., & Lalvani, M. (1996, March 30). Interest Groups, Subsidies and Public Goods: Farm Lobby in Indian Agriculture. *Economic and Political Weekly*.

- Kaur, H. V. (2010). Analysis of Banks in India—A CAMEL Approach. *GLOBAL BUSINESS REVIEW*, 257–280.
- Kumar, S., & Sreeramulu, M. (2007, Winter). Employees' Productivity and Cost – A Comparative Study of Banks in India During 1997 to 2008. *Reserve Bank of India Occasional Papers*.
- Kumbhakar, S. C., & Sarkar, S. (2004). *Deregulation, Ownership, and Efficiency Change in Indian Banking: An Application of Stochastic Frontier Analysis*. Retrieved from IGIDR: <http://www.igidr.ac.in/conf/finwrk/workshop.pdf>
- Mathur, K. B. (2002, June 8). Public Sector Banks in India: Should They Be Privatised? *Economic and Political Weekly*.
- Micco, A., Panizza, U., & Yan˜ez, M. (2007). Bank ownership and performance. Does politics matter? *ScienceDirect Journal of Banking & Finance*, 219-241.
- Mishra, A. K. (2016). An Analysis of NPAs in Priority and Non-Priority Sectors with respect to Public Sector Banks in India. *IOSR Journal of Business and Management*.
- Pindyck, R. S., & Rubinfeld, D. L. (n.d.). *Microeconomics (8th Edition)*.
- Porta, R. L., Lopez-de-Silanes, F., & Shleifer, A. (2000, March). *GOVERNMENT OWNERSHIP OF BANKS*. Retrieved from NATIONAL BUREAU OF ECONOMIC RESEARCH: <http://www.nber.org/papers/w7620>
- RBI. (2021). *Reserve Bank of India*. Retrieved from Reserve Bank of India: <https://www.rbi.org.in/>
- Roman, A., & Dănulețiu, A. E. (2013). AN EMPIRICAL ANALYSIS OF THE DETERMINANTS OF BANK PROFITABILITY IN ROMANIA. *Annales Universitatis Apulensis Series Oeconomica*, 580-593.

- Seemule, M., Sinha, N., & Ndlovu, T. (2017). Determinants of Commercial Banks' Profitability in Botswana: An Empirical Analysis. *The IUP Journal of Bank Management*.
- Sehrawat, M., & Giri, A. (2016). Financial development and poverty reduction in India: an empirical investigation. *International Journal of Social Economics*, 106-122.
- Sengupta, R., & Vardhan, H. (2019, October 11). *IdeasforIndia*. Retrieved from Ideas for India: <https://www.ideasforindia.in/topics/money-finance/how-banking-crisis-is-impeding-india-s-economy.html>
- Shabbir, N., & Mujoo, R. (2014). Problem of Non Performing Assets in Priority Sector Advances in India. *Journal of Economics and Development Studies*.
- Singh, C. (2016). An Essay on Banking and Macroeconomics. *WORKING PAPER NO: 530*.
- Singh, C., Pattanayak, D., Dixit, D. S., Antony, K., Agarwala, M., Kant, R., . . . Mathur, V. (2016). Frauds in the Indian Banking Industry . *WORKING PAPER NO: 505*.
- Sitharaman, N. (2021, February 1). *indiabudget*. Retrieved from [indiabudget.gov.in](https://www.indiabudget.gov.in/): <https://www.indiabudget.gov.in/>
- Slaev, A. D. (2017). Coasean versus Pigovian solutions to the problem of social cost: the role of common entitlements. *International Journal of the Commons*, 950-968.
- Stiglitz, J. (1998c, March). Redefining the role of the state. 45-78. (B. Snowden, Interviewer)
- The Banking Regulation Act, 1. (2017). *rbidocs*. Retrieved from [rbidocs.rbi.org.in](https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/BANKI15122014.PDF): <https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/BANKI15122014.PDF>
- UKEssays. (2018, November). *UKEssays*. Retrieved from UKEssays.: <https://www.ukessays.com/essays/economics/difference-between-coasean-and-pigouvian-solution-to-an-environmental-problem-economics-essay.php?vref=1>

Voigt, S. (2020). *Constitutional Economics A Primer*. Hamburg: Cambridge University Press.

Walker, H. (1940). Degrees of freedom. *Journal of Educational Psychology*, 253–269.

WINSTON, C. (2000). Government Failure in Urban Transportation . *Fiscal Studies*, 403-425.

Yeyati, E. L., Micco, A., & Panizza, U. (2004). Should the Governemnt be in the banking business? The Role of State-Owned and Development Banks. *Working Paper, No. 517, Inter-American Development Bank, Research Department*, 5-47.

## Reference List

### **Books**

Cooter & Ulen(2012). Law and Economics (6th Edition)

Lee Epstein, Andrew D. Martin.(2014) - Introduction to Empirical Legal Research-  
Oxford University Press

Robert Pindyck, Daniel Rubinfeld (8<sup>th</sup> Edition). Microeconomics

Stefan Voigt (2020). Constitutional Economics: A Primer.

### **Consulted websites for data**

Macroeconomics Indicators, retrieved from:

<https://www.rbi.org.in/scripts/AnnualReportPublications.aspx?Id=166>

Bank-specific Indicators, retrieved from:

Public Sector Banks:

<https://punjabandsindbank.co.in/>

<https://www.bankofbaroda.in/>

<https://www.bankofindia.co.in/>

<https://www.bankofmaharashtra.in/>

<https://www.canarabank.com/>

<https://www.centralbankofindia.co.in/en>

<https://www.indianbank.net.in/jsp/startIBPreview.jsp>

<https://www.iob.in/>

<https://www.jkbank.com/>

<https://www.onlinesbi.com/>

<https://www.pnbindia.in/>

<https://www.ucobank.com/Hindi/homehindi.aspx>

<https://www.unionbankofindia.co.in/english/home.aspx>

Private Sector Banks:

<https://bandhanbank.com/>

<https://www.axisbank.com/>

<https://www.cityunionbank.com/>

<https://www.csb.co.in/>

<https://www.dcbbank.com/>

<https://www.dhanbank.com/>

<https://www.federalbank.co.in/>

<https://www.hdfcbank.com/>

<https://www.icicibank.com/>

<https://www.idbibank.in/index.asp#>

<https://www.idfcfirstbank.com/>

<https://www.indusind.com/in/en/personal.html>

<https://www.kotak.com/en/home.html>

<https://www.kvb.co.in/>

<https://www.nainitalbank.co.in/english/home.aspx>

<https://www.rblbank.com/>

<https://www.southindianbank.com/>

<https://www.tmb.in/>

<https://www.yesbank.in/>