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

Sahil Chopra*

This paper seeks to examine the relation between banks' profitability and ownership in India. The justification to measure the impact of ownership comes from the theory of government failure. An independently constructed dataset containing all commercial public and private sector banks in India as of April 2020 is used. The data ranges from 2004 to 2020. Banks' characteristics are collected from respective banks' websites, and the hypotheses are tested by estimating an econometric model, i.e., the pooled OLS model. In conclusion, the government owned banks' performance is inferior compared to private banks. This can be accredited to the huge amount of loans sanctioned in priority sectors and fraudulent cases 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

* Doctoral Candidate • Centre d'Economie de l'Université Paris Nord (CEPN), Paris, France Université Sorbonne Paris Nord • ✉ sahil.chopra@emle.eu • ORCID: 0000-0002-3589-4193

Introduction

For years many researchers 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, 1998). The 1950s–60s observed a great amount of support towards government intervention, whereas in the 1970s–80s academic researchers started questioning the broader role of government and discussions related to market failure versus government failure started (Stiglitz, 1998). 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 the 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 tends to fail (Coase, 1960). In India, banks were nationalised to strengthen the financial services and to provide the benefit of financial inclu-

sion to the deprived and disadvantaged groups of rural India (Singh, 2016).

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 of 1 April, 2021 as per RBI[1] guidelines. Macroeconomic indicators were collected from the Reserve Bank of India website.

This paper is divided into 4 sections, and it proceeds as follows: Section 2 provides a literature review on market failure, government failure, the Indian banking sector; and outlines the hypotheses to be tested; Section 3 describes the dataset and summarises the methodology adopted including the econometric model; Section 4 presents the summary statistics and unearths the main empirical findings with robustness checks, and finally, Section 5 contains conclusions.

Literature review and hypothesis development

Economic efficiency can be achieved in a perfectly competitive market which is based. on certain assumptions such as '*(i)* a *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. If any of the afore-mentioned assumptions are relaxed, the market fails to provide an efficient outcome and a deadweight loss of economic welfare occurs (Pindyck & Rubinfeld, 2013). When a perfectly defined 'price-market' fails to achieve the desired level of output from economic activities, that results in the loss of societal welfare because of inefficient allocation of resources (Bator, 1958). If any of the economic agents (buyers and sellers) perform opportunistically for personal gains, the situation results in market failure, and such behaviour generates a 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).

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 are inefficient in redistribution of resources (Fike & Gwartney, 2015).

Moving to Indian banking sector, in the 1970s, fourteen domestic private banks were nationalised followed by six more banks in 1980. The need for such a move became necessary from the government's perspective because at that time even less than 2% of the total credit was extended to the agriculture sector (Gauba, 2012). 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 crumbing performance of banks was insufficient competition (Almaqtari, et al., 2019) (Gauba, 2012). This research, hereby looks at the effect of government ownership on bank performance.

Dependant and Independent variables

In previous research related to the investigation of the determinants of bank profitability, *Return on Assets (ROA)* has been considered as a dependent variable to measure the performance of a bank.

[1] The Reserve Bank of India (RBI).

ROA is the net income to total assets; this ratio is popularly used to evaluate the bank's performance to generate returns from the available resources.

Independent Variables:

Bank-Specific 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). Roman and Dănuleţiu, (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 according to Doan and Bui (2020) and Kalluru and K (2008).

   H_1: Capital Adequacy Ratio (CAR) has a positive impact on bank performance.

2) *Bank Size (banksize)*: Total assets of a bank are treated as the measure for bank size. It is assumed that a large bank can well resist small crises because of more flexibility available due to larger asset base compared to a smaller bank (Kalluru & K, 2008). Doan and Bui (2020) and Roman and Dănuleţiu (2013) showed a positive impact of bank size on profitability.

   H_2: 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 (Doan & Bui, 2020).

   H_3: Liquidity Risk (liqratio) has a positive impact on bank performance

4) *Ownership (dumPSB2)*: Ownership of a 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 the registered effect of government intervention in the banking sector.

   A dummy variable is included to see if the ownership of a bank has any relation with the bank's performance. If dumPSB2 is '1' for public sector banks and 'o' 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. Earlier, Kalluru and 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. The sign is expected to be negative, aligned with the theoretical assumptions of the government failure.

Macroeconomic factors

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

   H_4: 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, allowing bankers to adjust the rate of interest accordingly to increases in the revenue (Kalluru & K, 2008; Roman & Dănuleţiu, 2013). Doan and Bui (2020), Roman and Dănuleţiu (2013)

and Seemule et al. (2017) found a positive impact on bank performance, whereas Kalluru and K (2008), Almaqtari et al. (2019) found a negative impact on performance.

H_5: Inflation (INF) has a positive impact on bank performance.

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 a bank (Kaur 2010) and net profit per employee also measures the productivity of the employees (Kumar & Sreeramulu, 2007). If this ratio is higher, it 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 banks as the main source of a 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. A higher asset quality ratio implies a comparatively higher portion of advances is turned into non-performing assets, which can directly affect the profitability of a bank.

Data and methodology

Data

Panel data is used for the analysis 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 and Bui (2020), Kalluru and K (2008). Macroeconomic indicators are compiled from the annual report of the Reserve Bank of India (RBI) website. Bank-specific variable data has been extracted from the 34 respective banks' websites using the annual report of each bank for the corresponding year. The sample includes all 12 public sector banks and all 22 domestic private sector banks for a period of 16 years, ranging from 2004 to 2020. Time period for each bank is not specific to sixteen years. The total number of observations available for analysis is 404, not 34*16 (N*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.

Methodology

In this research, 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.

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. This model translates to the following equations:

Equation 1

$$ROA_{it} = \beta_o + \beta_1 CAR_{it} + \beta_2 banksize_{it} + \beta 3\ liqratio_{it} + \beta_4 dumPSB2_{it} + \beta_5 GDP_t + \beta_6 INF_t + \varepsilon_{it}$$

where ROAit is return on assets (dependent variable) of a certain bank *i* at time *t*, respectively. CARit represents the capital adequacy ratio in percentage maintained by a certain bank *i* at time *t*, banksizeit represents the bank size in Indian Rupees

(INR) of a certain bank *i* at time *t*, and liqratio$_{it}$ represents the liquidity ratio in percentage maintained by a certain bank *i* at time *t*, dumPSB2it is a dummy variable representing the ownership of the bank, value '1' for public sector banks and 0 for private sector banks, 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 ε_{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 models 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.

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.

Descriptive Statistics

The mean values of the variables are presented in Table 1. The 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%, entailing that Indian commercial banks (private and public) are sufficiently capitalised and can resist economic stress. On 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 the 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 sector banks are performing better than the public sector banks. Management Quality, a proxy variable to measure the employee efficiency, shows that the private sector employees are performing much better than in the public sector banks, since the mean value for this indicator is negative for the public sector banks, representing the inefficiency of the public sector employees. The negative sign hints that each employee in the public sector banks attributes a loss of INR 834,000 (or € 9430). Employees in the public sector banks are less motivated compared to the private banks because of low salaries and low performance-oriented appraisals. The private sector banks' 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 the public sector banks have a higher tendency of default and become a non-

Table 1. Mean values of variables

Variable (in %)	Public	Private	Combine
Return on Assets(roa)	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

Note: Public = Public Sector Banks, Private = Domestic Private Sector Banks

Source: own work.

performing asset compared to the 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.

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

Pairwise correlation

Table 2 represents the Pearson correlation matrix of all the variables selected in the model. The numbers in the table are the coefficients of correlation which range from –1 to 1. The coefficients equal or closer to 1 (irrespective of sign) indicate a strong correlation. A negative sign represents an inverse and positive means direct relationship. If the coefficient of correlation between two independent variables is above 0.8, this signals the presence of multicollinearity (Roman & Dănuleţiu, 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 a low possibility of multicollinearity. CAR, liqratio, GDP, INF and MQ have a positive correlation with ROA but banksize and AQ have a negative correlation with the dependent variables. The coefficient of correlation between asset quality and return on assets is –0.714, which implies a negative high correlation between the variables. The correlation between the return on assets and capital adequacy ratio can be considered moderate.

Table 2. 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

Source: own work.

Regression results

The regression results for the eight specifications of the determinants of return on assets is presented in Table 3 and Table 4.

Table 3 shows the estimated regression for the original model specified in Equation 1. Column two (M1), three (M2) and four (M3) show an overview of the estimated coefficients using the pooled OLS model, random effect model and robust regression model, respectively.

Table 4 presents the number of various regressions (M4, M5, M6, M7, M8) model estimated using pooled OLS to determine if the additional variables 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 the 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, as in Table 3, the estimated coefficient of M3 is not distinctive from M1 in terms of positive or negative impact on the dependent variable and statistical significance. M3 specifications are estimated using robust regression and 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 the pooled OLS model (M1) are not influenced by outliers and the results are robust. Also, M3 has higher adjusted R^2, which implies the model

Table 3. Determinants of Return on Assets

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

Standard errors in parentheses

* p < 0.05, ** p < 0.01, *** p < 0.001

Source: own work.

is explaining larger variations after dropping outliers. M2 specifications are the result from the random effect model. Under the random effect model, the coefficients are estimated by including the individual effects of the banks, which are randomly distributed across the units (Hiestand, 2005). In the given case, M2 results are almost the same as M1 except for ownership, though the impact of ownership is negative on bank performance in M2, but it is not statistically significant.

In Table 3 and Table 4, regression models show that the capital adequacy ratio is statistically significant at p-values less than 0.1% and has a positive impact on the return on assets. A higher CAR represents the financial stability of the banks, which allows banks to raise capital easily for the investors, in turn, this capital can be invested in profitable portfolios. This estimate supports the hypothesis that the higher capital adequacy ratio may result in higher profitability of the banks. Considering M1, *ceteris paribus*, as the capital adequacy ratio increases by 1%, it is expected that profitability will increase by 13% on average.

The results for banksize are mixed. In certain models, the coefficient is positive and in others, the coefficient is negative. Hence, they do not provide sufficient evidence to comment on the impact of bank size on profitability.

The predicted impact of liqratio is indecisive because of different signs from different models. For example, M1, M3, M4, M6, M8 show a negative impact of the liquidity ratio on bank profitability but M2 and M7 should have a positive impact on the performance of the bank. Notably, M2 is estimated using the random effect model and M7 has an additional variable.

This is the most critical determinant of bank profitability in this research is Ownership (dumPSB2). The dummy variable is used because only two types of commercial banks in India are looked at in this research and it allows comparing the average effect of the ownership on the banks' profitability. The dichotomous variable, also known as the dummy variable, can take values either 0 or 1 (Epstein & Martin, 2014). In the regression model, without the dummy variable, the intercept term represents the starting point of the estimated regression model keeping other independent variables equal to zero (Epstein & Martin, 2014). However, when the dummy variable is introduced and takes the 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 term 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 dumPSB2 measures the impact of the public sector banks on the banks' performance when the dummy takes value 1. The overall impact of the public sector banks, *ceteris paribus*, is measured by combining the intercept term with dummy coefficient.

In Table 3, ownership has a negative impact on ROA at a 1% significance level for M1 and M3, however, the impact of ownership is still negative for M2 but the coefficient is statistically insignificant. The negative intercept term at 0.1% significant level implies that the domestic private banks are not performing well, however, this negative impact is intensified for the 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 dumPSB2 and ROA is observed and the performance of the public sector banks is inferior to the private sector ones.

In Table 4, the models (4–8) are mainly run to check if the model correctly estimates the relationship between dumPSB2 and ROA after removing and introducing variables. M4 considers only the bank-specific variables including asset quality (aq) and management quality (mq), however, the coefficient for dumPSB2 is positive and insignificant, which is explained below. In M5, only macroeconomic variables are considered, and the coefficient of dumPSB2 is negative and statistically

Table 4. Determinants of Return on Assets

	Only Bank--Specific (4)	Only Macro-ecomic (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^2	0.585	0.159	0.574	0.377	0.592

Standard errors in parentheses

* p < 0.05, ** p < 0.01, *** p < 0.001

Source: own work.

significant at 0.01%. In M8, as per Equation 2, included the additional variables, the coefficient of dumPSB2 is positive but statistically insignificant.

GDP has a positive impact on ROA and is statistically significant in all the models (1–8). This is consistent with the expected relationship. Further, inf has a positive impact on ROA, since this allows banks to anticipate the inflation and adjust for the interest rate, thus reducing the banks' cost and improving profits. These findings are consistent with Doan and Bui (2020), Roman et al. (2013) and Seemule et al. (2017).

Additional independent variables:

Among other variables, aq & mq are considered especially because both the variables are affected by the ownership of the banks. Importantly, aq is calculated considering non-performing assets(NPAs). Arrawatia et al. (2019) reveal that public sector banks have higher NPAs compared to private banks. A higher NPAs means a larger part of the residual needs to be kept aside as provision for bad loans (Shabbir & Mujoo, 2014). NPAs in priority sector lending contributes to a significant share of the total NPAs 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 of lending in the 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 fraud 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). Such allegations are difficult to prove. Also Table 1 confirms aq is bad for the public sector banks compared to the private banks.

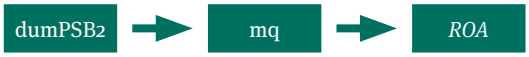
This afore-mentioned research point towards a link between ownership and aq, further aq has an impact of bank performance. The relation is shown in Figure 1.

Figure 1 Relationship between aq and ROA

Source: own work.

The productivity and the efficiency of the employees (mq) working in public organisations is comparatively low as compared to private sector employees because of low performance incentives (Kumar & Sreeramulu, 2007). The results in Table 1 emphasise this analysis. Figure 2 shows a link between ownership and management quality and management quality is used to analyse the bank performance under the *CAMEL* approach.

Figure 2 Relationship between mq and ROA



Source: own work.

For this analysis, the coefficient of dumPSB2 is considered as a *treatment variable* and aq & mq 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 4, aq is controlled in three models i.e., M4, M6, M8 and mq is controlled in M4, M7, and M8. The result reveals once we control for aq & mq explicitly in the model, the estimated coefficient of ownership is affected. The reason for such a change is due to *overcontrol bias* in these models (Cinelli, et al., 2021). Thus, when aq and mq are controlled in the model then the *total effect* of ownership on bank performance is not estimated, because the beta coefficient of dumPSB2 will be estimated considering aq & mq. So, the estimated beta for dumPSB2, in this case, is independent of the effect of aq and mq.

With the introduction of aq and mq, the total effect of ownership on bank performance is *blocked* by these two variables (Cinelli, et al., 2021). In the model specifications (1–3), the estimated coefficient of dumPSB2 is already inclusive of the effect of aq and mq but in the models where aq and mq are considered as a controlled variable, then the estimated models do not explain 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 for establishing the relation between ownership and bank performance and the model specifications of M4, 6, 7, 8 do not estimate the total effect between ownership and bank performance, hence, should be ignored.

Conclusion

In this paper I have tried to document a link between the government failure in the public sector banks in India using the empirical evidence by creating a new model. I have been able to establish a link between the performance of the bank and the ownership of the bank when controlling for certain bank-specific and macroeconomic variables. It is found that to analyse the total casual effect of ownership on bank performance, models 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. To analyse the effect of government intervention, specifically, I focussed on the policy which gives full control to the government and considered the example of the public sector banks in India. The methodology section illustrates a linear regression model that

was created by combining the variables from two different models used by earlier researchers to employ the given hierarchical structure of the data at hand, together with the noteworthy parameters, the explanatory variables, and control regressors. The results are consistently significant, confirming the negative impact of the public ownership on performance of the banks. This validates both hypotheses and supports the idea that the direct control of the government can reduce the productivity and performance of the sector. This may be due to the high non-performing assets which are influenced by priority sector lending, which the government tries to push through government sector banks to please its voters, maybe due to the presence of a lobby group of farmers, the 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. Further, this study only illustrates the inefficiency which arises if the government takes over a particular industry without considering the positive aspects. To deduce the actual impact and the more precise cost-benefit analysis, we have to look at the benefits achieved by government intervention.

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· CONTACT ·
analysesandstudies@sgh.waw.pl · analysesandstudies.sgh.waw.pl · casp.sgh.waw.pl