THE INFLUENCE OF DEMONETIZATION AND INTERNAL DETERMINANTS ON BANKS' PROFITABILITY: A COMPARATIVE STUDY OF PRIVATE AND PUBLIC BANKS' GOVERNANCE

Mohammed Hussein Alfify *

* Department of Accounting and Finance, College of Business, Jazan University, Jazan, Saudi Arabia
Contact details: Department of Accounting and Finance, College of Business, Jazan University, Knowledge Road, P. O. Box 6809, Jazan 82817-2820, Saudi Arabia

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Abstract

The purpose of the current research is to assess the effect of demonetization and internal determinants of private and public listed commercial banks' profitability in India from 2008 to 2017. Many banks suffered massive losses as a result of subprime mortgages in the United States, as well as the existing economic slump, which resulted in the bankruptcy of many institutions, while banks' profitability is measured using return on assets (ROA), return on equity (ROE), and net interest margin (NIM), internal determinants that function against the bank's profitability are operational efficiency, capital adequacy, liquidity, asset quality, asset management, and deposits. The study uses panel data with a two-way random effect model and generalized method of moments. The present study uses a sample of Indian commercial banks listed on the Bombay Stock Exchange. The results indicate that demonetization has a significant negative influence on ROA, ROE, and NIM. In addition, there is a significant difference and variation between private and public banks in the impact of internal determinants on banks' profitability. The current study adds significant contributions to the body of knowledge in the field of demonetization and internal drivers of private and public banks' profitability in India, which is important to bankers and other stakeholders. The study was limited to India's banking sector and its specific social and cultural context during a specific time period, meaning the results do not apply to other sectors.

Keywords: Demonetization, Internal Determinants, Banks' Profitability, Private and Public Banks, Governance

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1. INTRODUCTION

The banking sector of any economy serves as the life support system for the economy by contributing significantly to its growth and development. Banks are the pioneers in the financial system (Kandpal & Kavidayal, 2015). Banks assist in bolstering the economy by way of the provision of funds, creating employment opportunities, and fostering innovation. As a result, it is critical to assess their financial performance to identify their strengths and shortcomings, which can then be used to improve

the quality of services they provide. Banks must adhere to service standards that support the country's balanced economic and technical development. Banks serve as intermediaries, mobilizing funds from surplus areas to deficit areas, and act as facilitators and supporters as well (Tesfaye, 2012). The economic reforms that took place in India in 1991 influenced the banking sector by increasing productivity and efficiency (Ghosh, 2016). The Indian banking sector includes 95,642 financial institutions, which are distributed among different types and forms such as public, private, foreign, regional rural, urban cooperatives, and rural cooperative banks (27, 26, 46, 56, 1,574, and 93,913, respectively) (Shrivastava et al., 2018). Public banks have a dominance over the other types of banks with 70% representation (Shrivastava et al., 2018). With the economic reforms in 1991, the banking industry in India has prospered and has been instrumental in the growth of other industries and sectors as well (Singh & Sharma, 2016).

In the aftermath of the global financial crisis, India's banking sector has seen a significant decline in operating and financial performance. Many banks suffered massive losses as a result of subprime mortgages in the United States, as well as the existing economic slump, which resulted in the bankruptcy of many institutions, including Lehman Brothers, which came as a shock to everyone (Hidayat et al., 2012). For any banking system to be considered effective, it is expected that it earns substantial profits while providing a high-quality service to the customers, and at the same time, has adequate funds to lend to the borrowers. However, banks' profit is declining when using the moratorium strategy for their clients (Begum et al., 2023). Financial analysis evaluates a bank's financial position in order to produce indicators that accurately reflect areas in need of improvement, allowing management to improve the bank's performance (Mondal & Ghosh, 2012). Such analysis enables banks to examine their past judgments and, if necessary, amend them in the future, resulting in better decision-making (Darškuvienė, 2010).

Indian public banks have high total assets, about 73% of the total assets, as compared to all other banks (Ghosh, 2016; Shrivastava et al., 2018). As of March 2013, 93% of the deposits are reported by both public and private banks among the scheduled commercial banks (Bapat, 2017). The Reserve Bank of India (RBI) indicated in its annual report for 2016–2017 that the asset quality of public bank non-performing assets (NPAs) has deteriorated significantly. A substantial increase in NPAs provisions had a detrimental impact on bank profitability at the same time. Further, the report addresses different issues that have influenced the profitability of banks in India. The report indicated that 12.1% of the advances of banks were stressed. Furthermore, the report stated that there is an increase in bad loans and bank fraud. Almaqtari et al. (2018) stated that there are different fraud cases in the banking sector in India. The most recent example is the Punjab National Bank scandal, which involved the country's second-largest state bank. As a result of this fraud, the banking industry could take a hit of more than U.S. $ 3 billion, as estimated by the tax department in February 2018. In addition, some of the new policies and procedures of the Indian government are, for example, the demonetization, which started in November 2016, that may impact the Indian banks' profitability (Al-Homaidi et al., 2018).

This study mainly attempts to examine the influence of demonetization and internal factors on the profitability of private and public commercial banks' governance in India. The research question raised is:

RQ: How did demonetization and internal determinants influence the profitability of private and public banks' governance in India?

Furthermore, the present study addressed the profitability of the banks in India with special reference to their type and the responsible factors that may affect their profitability, which is becoming a very important research problem. Moreover, this study contributes to understanding Indian banks' profitability in two ways. First, it attempts to fill an existing literature gap with respect to the banks' profitability, making a comparison between private and public banks. Second, as a methodological addition, it provides empirical data on the impact of demonetization using several profit measurements and panel data with a two-way random effect model and generalized method of moments (GMM). These various perspectives provide a structured approach to understanding and analyzing the complex interactions between demonetization, internal determinants, and bank profitability.

The paper is structured in the following manner. Section 1 provides a general introduction. Section 2 presents the literature review of the study. Section 3 presents the research methodology. Section 4 provides an insight into the results and the analysis done. Section 5 discusses the main findings. Section 6 lays down the conclusion and recommendations of the study.

2. LITERATURE REVIEW

Several studies across various countries around the world have tried to explore the factors that impact the bank's profitability (Bougatef, 2017; Curak et al., 2012; Al-Homaidi et al., 2019; Singh & Sharma, 2016). Extensive research has been done to examine the bank's profitability determinants (Mashamba & Chikutuma, 2023; Mashamba et al., 2023; Mdandalaza & Jeke, 2025).

Most of the prior studies used return on assets (ROA) and return on equity (ROE) for measuring profitability (Zampara et al., 2017; Al-ahdal et al., 2018). The majority of previous studies examined the effect of internal factors on banks' profitability. Usually, determinants that have a direct impact on managerial decisions of a bank are called bank-specific determinants (Singh & Sharma, 2016). Variables such as asset quality ratio, operating efficiency ratio, deposits ratio, capital adequacy ratio, liquidity ratio, and bank size were taken into consideration in numerous studies (Bougatef, 2017; Garcia & Guerreiro, 2016; Rani & Zergaw, 2017; Zampara et al., 2017) as determinants specific to banks.

Different studies have reported that the profitability of banks is negatively influenced by size (Eyceyurt Batir et al., 2017; Singh & Sharma, 2016). In terms of capital ratio, some studies found that it significantly and positively impacted the banks' profitability (Bougatef, 2017; Francis, 2013; Menicucci & Paolucci, 2016; Saona, 2016; Salike & Ao, 2017). Bank profitability is strongly and favorably related to larger loan ratios, according to Menicucci and Paolucci (2016), although it may also be insignificantly associated with other

circumstances. They also indicated that while bigger deposits do not always imply better profitability, banks with higher deposits are more likely to generate profits. Bougatef (2017) and Yahya et al. (2017) found a positive association between liquidity ratio and profitability of banks. Some researchers (Yahya et al., 2017) advocate that asset management has a positive and significant effect on ROE, whereas the effect of operating efficiency on ROA and ROE is negative (Masood & Ashraf, 2012; Akhtar et al., 2011).

Rao et al. (2009) advocated that foreign banks have higher ROA as compared to public sector banks. However, Singh and Sharma (2016) stated that bank ownership affects banks' liquidity. Bank-specific (except cost of funding) factors significantly affect banks' liquidity. Al-Homaidi et al. (2018) found that bank-specific determinants have a significant impact on profitability net interest margin (NIM), except for the number of branches, which has no significant impact.

Reddy (2011) advocated that the bank's profitability is not only influenced by its own specific factors but also by the industry-specific and macroeconomic determinants. Bapat (2017) stated that the profitability of banks is significantly affected by the cost-to-income ratio and non-performing loans, while diversification measures are found to have no significant effect. Badola (2006) reported that Indian banks' profitability is significantly influenced by operating expenses, non-interest income, provision, and contingencies. Maiti and Jana (2017) also advocate that banks' profitability is significantly influenced by NIM, non-interest income, profit per employee, and the net non-performing assets ratio. Further, Almaqtari et al. (2018) reported that the ROA of Indian commercial banks has a significant relationship with bank-specific determinants such as leverage ratio, bank size, operational efficiency, asset management ratio, and the number of branches. Some of the above studies and other studies are summarized in Table 1.

The current study examines the impact of demonetization and the internal determinants of profitability for private and publicly traded commercial banks in India. Internal drivers such as operational efficiency (OPEF), capital adequacy (CAD), liquidity (LIQ), asset quality (AQ), asset management (AM), and deposits all influence bank profitability, which is assessed using ROA, ROE, and NIM deposits (DEP). According to Chodorow-Reich et al. (2020), more demonetized districts saw slower growth in bank credit, greater adoption of alternative payment methods, and relative declines in economic activity. The financial and social objectives must be balanced by microfinance institutions (Wu et al., 2022).

In light of the above-mentioned issues and problems, examining the profitability of the banks in India with special reference to their type and the responsible factors that may affect their profitability became a very important research problem. Moreover, the present study contributes to Indian banks' profitability in two ways. First, it attempts to fill an existing literature gap with respect to the banks' profitability by making a comparison between private and public banks. Second, as a methodological addition, it provides empirical data on the impact of demonetization using several profit measurements and analytical techniques.

Table 1. Review of some related literature

No.	*Studies by*	*Variables*		*Sample*		*Tools*
		Independent variables	*Dependent variables*	*Size*	*Time limit*	
1	Rao et al. (2009)	Asset's utilization, equity multiplier, net profit margin, ROA, and ROE.		55	1998–2003	Descriptive analysis
2	Ahamed (2017)	Diversification, fee, trade, log of total assets, loan loss provision over assets, ratio of equity to assets, ratio of loans to assets, and asset growth, ROA, ROE, and net interest income.		107	1998–2014	Descriptive regressions, GMM
3	Singh and Sharma (2016)	Bank-specific factors: bank size, profitability, DEP, cost of funding, capital adequacy. macroeconomic factors: gross domestic product (GDP), inflation, unemployment, LIQ.		59	2000–2013	Ordinary least squares (OLS), panel analysis
4	Seenaiah et al. (2015)	Operating profits, cost of deposits, ratio of wage bills to total expenditure, proportion of priority sector lending, provisioning for NPAs, NIM, ROA, ROE.		72	1995–2012	Descriptive correlations, regressions
5	Al-Homaidi et al. (2018)	Bank size, AQ, CAD, LIQ, OPEF, DEP, leverage, AM, and the number of branches, GDP, inflation rate, interest rate, and exchange rate, ROA, ROE, and net interest income.		69	2008–2017	Descriptive correlations, regressions, GMM
6	Reddy (2011)	Cost efficiency, ratio of capital to assets, ratio of non-interest income to assets, ratio of loans to assets, ratio of overhead to assets. Industry-specific variables: ratio of assets to GDP, Herfindahl-Hirschman Index, market, inflation, rate of interest, growth rate of economy, NIM, and ROA.		87	1992–2006	Regression, GMM
7	Bapat (2017)	Non-performing loans (NPL), income diversification (other income to operating income, credit deposit ratio, cost to income ratio, banking industry ownership, bank size, financial crisis, GDP growth, and inflation rate, return on average assets, and ROE.		42	2006–2007 to 2012–2013	Descriptive statistics, correlation, GMM
8	Badola (2006)	Non-interest income, credit/deposit ratio, NPA as a percentage to net advances, provision and contingencies, operating expenses, business per employee, profit per employee, and profit after tax.		19	1991–1992 to 2003–2004	Regression analysis
9	Maiti and Jana (2017)	Business per employee, profit per employee, NIM, capital to risk weighted assets ratio, NPAs, advance to deposit ratio, operating expenses ratio, non-interest income ratio, return on average assets, and ROE.		75	2008–2009 to 2012–2013	Multiple regression, descriptive statistics
10	Almaqtari et al. (2018)	Bank size, AQ, CAD, LIQ, OPEF, DEP, leverage, AM, the number of branches, GDP, inflation rate, interest rate, exchange rate, financial crisis, and demonetization, return on average assets, ROA, and ROE.		69	2008–2017	Multiple regression, descriptive correlation, panel-corrected standard error

3. RESEARCH METHODOLOGY

3.1. Sample size

The present study uses a sample of Indian commercial banks listed on the Bombay Stock Exchange. The primary goal of this research is to determine the internal drivers of profit for the 37 commercial banks that were chosen from 2008 to 2017. The data for bank-specific variables is retrieved from the Prowess Quarterly Investment database, whereas macroeconomic data has been extracted from RBI publications. The sample includes both private and public sector banks. The sample size of the present research accounts for 88% of the total number of commercial listed banks in India.

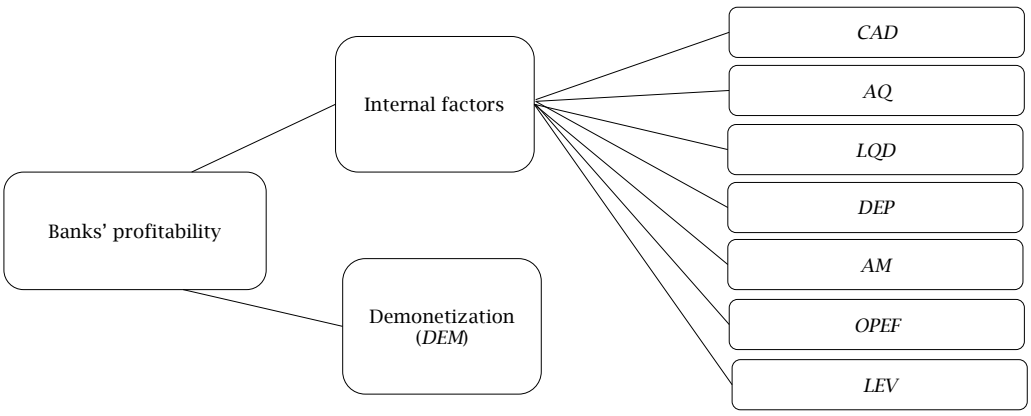
3.2. Operational definition of variables

Table 2 shows the variables' definition. Banks' profitability is treated as the dependent variable, which is measured by *ROA*, *ROE*, and *NIM*. Banks' profitability has been statistically functioned against internal and bank-specific determinants. Internal determinants include *asset size*, *CAD*, *AQ*, *LIQ*, *DEP*, *AM*, and *OPEF*. Table 2 demonstrates the variables' definition.

Table 2. Operational definitions of the variables

Variables	*Notation*	*Measure*	*Evidence*
Dependent variables			
Profitability	*ROA*	$ROA_{it} = \frac{Net\ prof_{it}}{Total\ assets_{it}}$	Masood et al. (2012), Menicucci and Paolucci (2016), Gul et al. (2011), Prusty and Al-ahdal (2018), Rani and Zergaw (2017), Tabash (2018)
	ROE	$ROE_{it} = \frac{Net\ prof_{it}}{Total\ equity_{it}}$	Garcia and Guerreiro (2016), Masood and Ashraf (2012), Yahya et al. (2017), Zampara et al. (2017)
	NIM	$NIM_{it} = \frac{Net\ interest\ income_{it}}{Total\ assets_{it}}$	Al-Homaidi et al. (2018)
Independent variables			
Capital adequacy	*CAD*	$ROA_{it} = \frac{Equity_{it}}{Total\ assets_{it}}$	Ongore and Kusa (2013)
Asset quality	*AQ*	$AQ_{it} = \frac{Loan_{it}}{Total\ assets_{it}}$	Anbar and Alper (2011), Gul et al. (2011), Ongore and Kusa (2013)
Liquidity	*LIQ*	$LIQ_{it} = \frac{Liquid\ assets_{it}}{Total\ assets_{it}}$	Anbar and Alper (2011), Bougatef (2017), Francis (2013), Rani and Zergaw (2017)
Deposit	*DEP*	$DEP_{it} = \frac{Deposits_{it}}{Total\ assets_{it}}$	Menicucci and Paolucci (2016), Gul et al. (2011)
Asset management	*AM*	$AM_{it} = \frac{Operating\ income_{it}}{Total\ assets_{it}}$	Yahya et al. (2017)
Operating efficiency	*OPEF*	$OPEF_{it} = \frac{Total\ operating\ expense_{it}}{Total\ assets_{it}}$	Rashid and Jabeen (2016)
Leverage	*LEV*	$LEV_{it} = \frac{Total\ liabilities_{it}}{Total\ assets_{it}}$	Yahya et al. (2017)
Demonetization	*DEM*	A dummy variable	A variable of 0 for the years from 2008 to 2016 and 1 for the year 2017.

Figure 1. Study variables



3.3. Model specification

The present study uses a balanced panel data comprising 37 Indian banks. The panel data encompasses a 10-year period that starts from 2008 to 2017. The present study uses a random effect model panel analysis. The reason for this model is motivated by some preliminary analysis, such as the Redundant and Husman analysis, which supported this model. Further, the GMM was conducted for more reliable analysis and to account for some issues in panel analysis. This research follows the statistical model that has been proposed by Chowdhury and Rasid (2017) and Masood and Ashraf (2012). The following is the proposed model:

$$\gamma_{nt} = \alpha + \beta x_{nt} + \varepsilon_{nt} \quad (1)$$

where γ_{nt} represents the banks' profitability. This model can be expressed as follows:

$$Profitability = f(Bank - specific\ variables;\ macroeconomic\ variables) \quad (2)$$

This model assumes that the profitability of banks is a function of bank-specific and macroeconomic determinants. Accordingly, the study has proposed the following models to examine the effect of internal and macroeconomic factors on Indian banks' profitability:

$$Profitability_{it} = \alpha_i + \beta_1 AM_{it} + \beta_2 AQ_{it} + \beta_3 CAD_{it} + \beta_4 DEP_{it} + \beta_5 LEV_{it} + \beta_6 LIQ_{it} + \beta_7 OPEF_{it} + \varepsilon_{it} \quad (3)$$

$$ROA_{it} = \alpha_i + \beta_1 AM_{it} + \beta_2 AQ_{it} + \beta_3 CAD_{it} + \beta_4 DEP_{it} + \beta_5 LEV_{it} + \beta_6 LIQ_{it} + \beta_7 OPEF_{it} + \varepsilon_{it} \quad (3a)$$

$$ROE_{it} = \alpha_i + \beta_1 AM_{it} + \beta_2 AQ_{it} + \beta_3 CAD_{it} + \beta_4 DEP_{it} + \beta_5 LEV_{it} + \beta_6 LIQ_{it} + \beta_7 OPEF_{it} + \varepsilon_{it} \quad (3b)$$

$$NIM_{it} = \alpha_i + \beta_1 AM_{it} + \beta_2 AQ_{it} + \beta_3 CAD_{it} + \beta_4 DEP_{it} + \beta_5 LEV_{it} + \beta_6 LIQ_{it} + \beta_7 OPEF_{it} + + \varepsilon_{it} \quad (3c)$$

where, profitability = *ROA, ROE,* and *NIM;* α_i is a constant term; i = 1,…, *N,* and t = 1,…, *T*. All other variables are as defined in Table 2.

The study uses the Hausman test to choose whether fixed effects or random effects is the appropriate estimation method. The random effect regression model is more appropriate than the fixed effects as per the Hausman test because of the (p-value < 0.05%) less than 0.05% in the three models.

4. RESULTS

4.1. Descriptive statistics

Table 3 presents descriptive statistics for private and public banks in India for the period from 2008 to 2017. While Panel A exhibits descriptive statistics for private banks, Panel B presents descriptive statistics for public banks. The findings show that private banks have higher maximum values of profitability measures (*ROA* = 10.23, *ROE* = 31.37, *NIM* = 7.34) than public banks (*ROA* = 1.67, *ROE* = 27.15, *NIM* = 3.62). Public banks, on the other hand, have lower minimal profitability metrics (*ROA* = -1.37, *ROE* = -23.23, *NIM* = 0.58) than private banks (*ROA* = -4.21, *ROE* = -34.01, *NIM* = 0.22). Overall, the average earnings and profitability of private banks (*ROA* = 1.54, *ROE* = 10.20, *NIM* = 3.42) are higher than public banks (*ROA* = 0.58, *ROE* = 9.86, *NIM* = 2.32).

Concerning internal determinants, the findings reveal that the average values of *AM* of public banks (1.72) are higher than the average value of private banks (1.54). Importantly, while private banks have a higher maximum value of *AM* (10.23) than public banks (2.96), private banks have a negative minimum value (-4.21) against a positive value in the case of public banks (0.61).

The results also show that *AQ* and *LEV* of public banks are higher than private banks. Public banks have a mean value of 61.36 for *AQ,* with a maximum value of 69.05 and a minimum value of 41.81, against a mean value of 49.39 for private banks with a maximum value of 83.43 and a minimum value of 0.71. Similarly, public banks have an average *LEV* value of 89.36 (max = 94.37 and min = 84.01) against 73.08 for private banks (max = 93.27 and min = -14.90). Contradictorily, private banks have an average *OPEF* value of 0.82 (max = 9.39 and min = 0.18), which is higher than public banks 0.27 (max = 0.46 and min = 0.13).

Private banks have a higher mean value in terms of *CAD* (23.70) and *LIQ* (34.53) than public banks (*CAD* = 12.19 and *LIQ* = 34.87). In the same context, the maximum values for *CAD* (277.45) and *LIQ* (95.39) of private banks are higher than public banks (*CAD* = 15.38 and *LIQ* = 51.25). However, private banks have lower minimum values of *CAD* (7.51) and *LIQ* (14.17) than public banks (*CAD* = 9.39 and *LIQ* = 27.06).

Public banks recorded an average value of 85.15 for *DEP* with a maximum value of 90.64 and a minimum value of 55.85, which are higher (except for the maximum value) than private banks (mean = 63.52, max = 92.25, and min = 9.98).

Table 3. Descriptive statistics for variables

	Mean	*Median*	*Maximum*	*Minimum*	*Std. dev.*	*Observations*
Panel A: Private						
Dependent variables (profitability)						
ROA	1.540907	1.5	10.23	-4.21	1.415573	430
ROE	10.20172	10.455	31.37	-34.01	8.18712	430
NIM	3.416814	3.285	7.34	0.22	1.08967	430
Independent variables (internal determinants and demonetization)						
AM	3.120395	2.765	12.98	-0.68	1.951056	430
AQ	49.39205	54.295	83.43	0.71	15.92574	430
CAD	23.69947	16.045	277.45	7.51	20.30577	430
DEP	63.51802	63.775	92.25	9.98	19.41622	430
LEV	73.07809	77.85	93.27	-14.9	17.3614	430
LIQ	43.52474	39.39	95.39	14.17	15.1891	430
OPEF	0.817628	0.66	9.39	0.18	0.809992	430
DEM	0.2	0	1	0	0.400466	430
Panel B: Public						
Dependent variables (profitability)						
ROA	0.577053	0.665	1.67	-1.37	0.613369	190
ROE	9.858053	11.525	27.15	-23.23	10.78768	190
NIM	2.323316	2.315	3.62	0.58	0.475533	190
Independent variables (internal determinants and demonetization)						
AM	1.715158	1.725	2.96	0.61	0.445497	190
AQ	61.36126	61.615	69.05	41.81	3.80981	190
CAD	12.19005	12.155	15.38	9.39	1.233383	190
DEP	85.145	86.205	90.64	55.85	4.381699	190
LEV	89.36174	89.355	94.37	84.01	1.871475	190
LIQ	34.86989	34.8	51.25	27.06	3.442394	190
OPEF	0.270316	0.27	0.46	0.13	0.061934	190
DEM	0.2	0	1	0	0.401057	190

Note: ROA is the ratio of bank net profit to total assets (%), ROE is net profit divided by shareholder equity (%), NIM is the net interest margin ratio (%), AM is the asset management ratio (%), AQ is the asset quality (%), CAD is the capital adequacy ratio (%), DEP is the deposits of the total assets (%), LIQ is the liquidity ratio (%), and OPEF is the operating efficiency ratio (%).

Public banks recorded an average value of 85.15 for *DEP* with a maximum value of 90.64 and a minimum value of 55.85, which are higher (except for the maximum value) than private banks (mean = 63.52, max = 92.25, and min = 9.98).

4.2. Correlation matrix and multicollinearity diagnostics

The correlation analysis for the variables is illustrated in Table 4 (Panel A1 and Panel B1). Profitability metrics have a positive and negative association with the independent factors, according to the findings. With regards to private banks, *ROA* exhibits a positive relationship with *OPEF, LIQ, CAD*, and *AM* but a negative relationship with *LEV, DEP, AQ,* and *DEM*. However, *OPEF, LIQ,* and *DEM* have a negative association with both *ROE* and *NIM; AQ* and *AM* show a positive relationship with *ROE* and *NIM*. Similarly, whereas *LEV* and *DEP* have a negative correlation with *NIM*, they have a positive correlation with *ROE*. Similarly, *CAD* indicates a positive relationship with *NIM* but a negative relationship with *ROE*. Concerning public banks, while *OPEF, DEP, CAD, AQ,* and *AM* have a positive association with *ROA, ROE*, and *NIM*. *LIQ, LEV*, and *DEM* exhibit a negative correlation across the three measures of profitability.

The correlation among all independent variables is low (less than 0.80), which implies that multicollinearity issues in the current study do not exist. Further, the variance inflation factor (VIF) test is employed to check the presence or absence of multicollinearity problems. Table 4 (Panel A2 and Panel B2) shows that *VIF* values do not exceed 3.00, indicating that there are no issues of multicollinearity among independent variables.

Table 4. Correlation matrix and multicollinearity diagnostics test

Panel A1: Correlation matrix of private banks											
Variables	***ROA***	***OPEF***	***LIQ***	***LEV***	***DEP***	***CAD***	***AQ***	***AM***	***DEM***	***NIM***	***ROE***
ROA	1										
OPEF	0.01	1									
LIQ	0.24	0.22	1								
LEV	-0.57	-0.09	-0.29	1							
DEP	-0.31	0.10	-0.17	0.61	1						
CAD	0.15	-0.05	0.30	-0.55	-0.34	1					
AQ	-0.24	-0.21	-0.92	0.26	0.32	-0.23	1				
AM	0.31	-0.10	-0.10	-0.01	0.01	-0.02	0.09	1			
DEM	-0.14	0.01	-0.08	0.02	0.10	-0.06	0.07	-0.02	1		
NIM		-0.30	-0.02	-0.48	-0.34	0.22	0.04	0.16	-0.14	1	
ROE		-0.11	-0.05	0.13	0.18	-0.21	0.07	0.24	-0.16		1
Panel A2: Multicollinearity diagnostics											
VIF		1.16	1.11	2.14	1.85	1.55	1.34	1.92	1.04		
Panel B1: Correlation matrix of public banks											
Variables	***ROA***	***OPEF***	***LIQ***	***LEV***	***DEP***	***CAD***	***AQ***	***AM***	***DEM***	***NIM***	***ROE***
ROA	1										
OPEF	0.20	1									
LIQ	-0.04	0.14	1								
LEV	-0.16	0.01	0.20	1							
DEP	0.03	0.29	0.16	0.27	1						
CAD	0.61	0.19	0.05	-0.23	-0.04	1					
AQ	0.31	-0.09	-0.90	-0.13	-0.07	0.12	1				
AM	0.65	0.26	-0.08	-0.41	-0.01	0.49	0.27	1			
DEM	-0.69	0.08	0.06	-0.08	0.06	-0.32	-0.31	-0.35	1		
NIM		0.57	-0.22	-0.27	0.26	0.34	0.39	0.76	-0.30	1	
ROE		0.17	-0.05	-0.01	0.06	0.58	0.33	0.60	-0.72		1
Panel B2: Multicollinearity diagnostics											
VIF		1.38	1.65	1.44	1.28	2.05	1.64	2.19	2.54		

4.3. Multiple regression analysis

Table 5 provides a two-way random effect regression model. The findings show that *AM* is statistically significant at the level of 1% (p-value < 0.01) for the three profitability measures of private as well as public banks. This suggests that *AM* has a considerable and positive influence on the profitability of both private and public banks. This is similar to the findings of Masood and Ashraf (2012) and Yahya et al. (2017), who reported that the bank's profitability is positively and significantly associated with *AM*.

AQ exhibits a stronger influence on the profitability of public banks than private banks. In the context of public banks, it has a positive and statistically significant effect at the level of 1% (p-value < 0.01) in the case of *ROA* and *NIM*. However, it exhibits a significant positive influence at the level of 10% (p-value < 0.10) in the case of *ROE*, while it has a statistically significant effect only in the case of *NIM* of private banks at the level of 1% (p-value < 0.001); it has a negative and insignificant effect on *ROA* and *ROE* of private banks. By contrast, Menicucci and Paolucci (2016) and Masood and Ashraf (2012) indicated that there is a positive significant relationship between a greater loan ratio and banks' profitability. They found a positive and significant effect of asset quality on the bank's profitability. Further, AL-Omar and AL-Mutairi (2008) concluded that *ROA* is explained by the loan-assets ratio to the extent of 67%.

CAD shows a significant positive effect only on *ROA* and *ROE* of public banks at the level of 0.01 (p-value < 0.01), but it exhibits an insignificant effect in all other cases of private as well as public banks. Several studies indicated that capital ratio is a significant positive determinant of a bank's profitability (Salike & Ao, 2017; Menicucci & Paolucci, 2016; Saona, 2016; Jara-Bertin et al., 2014;

Francis, 2013). However, Masood and Ashraf (2012), Yahya et al. (2017), and Gul et al. (2011) revealed that capital adequacy has a negative influence on the bank's profitability.

The effect of *DEP* in the case of private banks is statistically positive and significant in the case of *ROA* and *ROE*, but it is statistically negative and insignificant in the case of *NIM*. In the same context, *DEP* indicates a statistically significant positive effect at the level of 10% in the case of *ROE* of public banks and at the level of 1% in the case of *NIM,* but it has a statistically negative insignificant effect on *ROA*. Previous studies (Rashid & Jabeen, 2016; Yahya et al., 2017) found that increased deposits have a beneficial impact on bank profitability. Consistently, Menicucci and Paolucci (2016) revealed that higher deposits lead to greater profitability, but in some cases, the influence on profitability is insignificant. Contradictory this, Gul et al. (2011) reported a negative effect of *DEP* on the profitability of banks.

The *LEV* ratio exhibits the same effects on both types of banks. While it has a statistically significant positive influence at the level of 1% (p-value < 0.001) on *ROE*, it has a statistically negative influence on *NIM* at the same level of significance and an insignificant negative influence on *ROA* of both types of banks. Athanasoglou et al. (2008) indicated that banks with lower leverage (higher equity) generally exhibit lower *ROE* but higher *ROA*.

ROA of public banks and *NIM* of private banks are positively and significantly influenced at the level of 1% (p-value < 0.1) by *LIQ* ratio. However, it has an insignificant negative impact on *ROA* and *ROE* of private banks; it has an insignificant positive effect on *ROE* and *NIM* of public banks. Ebenezer et al. (2017) and Loh et al. (2017) reported mixed evidence on the impact of liquidity on banks' profitability. While Bougatef (2017) and Yahya et al. (2017) revealed that the liquidity ratio has a positive relationship with a bank's profitability, Curak et al. (2012) found a negative impact on *ROE*.

OPEF has a significant positive effect on the profitability of public banks. It is statistically significant at the levels of 5%, 10%, and 1% in the case of *ROA*, *ROE,* and *NIM*, respectively. Differently, it has a statistically significant negative effect on *ROE* on *NIM* of private banks at the levels of 10% and 1%, respectively, but it has an insignificant negative effect on *ROA*. Some studies indicated that *OPEF* has a negative relationship with *ROA* and *ROE* (Yahya et al., 2017; Masood & Ashraf, 2012). However, Salike and Ao (2017) reported that operating inefficiency is a significant factor in the bank's profitability.

Concerning demonetization, the results exhibit that demonetization has a significant negative effect on the three measures of profitability. It has a significant negative effect at the level of 1% across the three measures of profitability of both types of banks, except for *ROA* of private banks and *NIM* of public banks, which are statistically significant at the level of 5%. This is consistent with Almaqtari et al. (2018), who reported that demonetization exhibited a significant impact on the *ROA* of Indian banks.

Table 5. Results estimation

Dependent variables	***ROA***		***ROE***		***NIM***	
Variable/Type	***Pvt.***	***Pbc.***	***Pvt.***	***Pbc.***	***Pvt.***	***Pbc.***
C	1.108	-6.993	-15.177	-169.683	1.174	2.092
	0.889	2.121	7.200	37.760	0.740	1.373
	1.246	-3.297	-2.108	-4.494	1.587	1.523
AM	0.565	0.373	2.640	7.751	0.322	0.628
	0.033	0.076	0.270	1.374	0.027	0.045
	16.963	4.900	9.775	5.643	11.774	13.984
AQ	-0.013	0.060	-0.019	0.573	0.037	0.034
	0.008	0.019	0.068	0.345	0.007	0.011
	-1.586	3.150	-0.278	1.660	5.343	3.011
CAD	-0.002	0.120	-0.003	2.199	-0.002	-0.019
	0.002	0.022	0.019	0.401	0.002	0.013
	-0.891	5.420	-0.150	5.485	-1.205	-1.462
DEP	0.007	-0.001	0.083	0.076	-0.005	0.017
	0.004	0.007	0.033	0.128	0.004	0.005
	1.969	-0.158	2.516	0.598	-1.287	3.211
LEV	-0.008	-0.006	0.202	0.898	-0.015	-0.057
	0.005	0.019	0.042	0.328	0.004	0.013
	-1.541	-0.304	4.814	2.737	-3.384	-4.324
LIQ	-0.009	0.063	-0.013	0.460	0.027	0.004
	0.008	0.020	0.067	0.361	0.007	0.011
	-1.144	3.160	-0.191	1.276	4.104	0.352
OPEF	-0.092	1.273	-0.944*	14.626	-0.372	2.770
	0.062	0.464	0.519	8.280	0.057	0.291
	-1.502	2.744	-1.819	1.766	-6.584	9.522
DEM	-0.228	-0.655	-2.674	-12.521	-0.184	-0.094
	0.09	0.07	0.967	1.327	0.066	0.042
	-2.41	-8.99	-2.766	-9.438	-2.775	-2.254
Adj. R2	0.568	0.747	0.240	0.738	0.490	0.783
F-statistic	71.423	70.894	17.909	67.621	52.564	86.283
Prob.	0.000	0.000	0.000	0.000	0.000	0.000

4.4. Robust regression

Table 6 presents robust regression analysis, which provides a similar estimation to the two-way random effect regression analysis. The outputs of robust regression, specifically coefficient estimates and standard errors, are not substantially different from OLS regression outputs. The outputs of robust regression further show that the data is not contaminated with outliers, and the yielded results are not impacted by some influential observations.

Table 6. Robust regression

Dependent variables	*ROA*		*ROE*		*NIM*	
Variable/Type	*Pvt.*	*Pbc.*	*Pvt.*	*Pbc.*	*Pvt.*	*Pbc.*
C	0.108	-6.634	-26.067	-194.070	3.521	-0.257
	0.414	1.696	4.517	30.521	0.803	1.255
	0.260	-3.913	-5.771	-6.359	4.386	-0.204
AM	0.520	0.466	3.000	8.370	0.282	0.581
	0.016	0.065	0.174	1.166	0.031	0.048
	32.554	7.188	17.212	7.180	9.118	12.111
AQ	0.002	0.051	0.052	0.626	0.003	0.028
	0.004	0.017	0.040	0.303	0.007	0.012
	0.624	3.042	1.291	2.069	0.401	2.272
CAD	-0.003	0.094	-0.034	1.717	0.003	-0.026
	0.001	0.020	0.014	0.356	0.002	0.015
	-2.128	4.765	-2.498	4.828	1.032	-1.783
DEP	0.002	0.007	0.109	0.088	0.001	0.020
	0.002	0.005	0.017	0.093	0.003	0.004
	1.176	1.306	6.539	0.946	0.501	5.273
LEV	-0.005	-0.007	0.262	1.105	-0.012	-0.024
	0.002	0.014	0.026	0.244	0.005	0.010
	-2.207	-0.481	10.132	4.535	-2.593	-2.348
LIQ	0.005	0.060	0.021	0.703	-0.001	-0.008
	0.004	0.018	0.041	0.322	0.007	0.013
	1.352	3.365	0.506	2.181	-0.192	-0.628
OPEF	-0.069	0.662	-0.636	8.964	-0.420	3.203
	0.025	0.368	0.278	6.623	0.049	0.272
	-2.707	1.800	-2.288	1.353	-8.496	11.762
DEM	-0.117	-0.697	-2.444	-11.949	-0.189	-0.134
	0.049	0.066	0.539	1.185	0.096	0.049
	-2.372	-10.591	-4.537	-10.082	-1.973	-2.742
Adj. R2	0.535	0.585	0.434	0.534	0.343	0.704
Prob.	0.000	0.000	0.000	0.000	0.000	0.000

5. DISCUSSION

This section reveals the discussion of the current research. The present study examines the impact of demonetization and the internal determinants of profitability for private and publicly traded commercial banks in India from 2008 to 2017. The amount of money an institution generates in a year doesn't determine how profitable it is, nor its stockholders' return on investment; only operational and financial performance (ROA) and the market, which places limits on profits. This is in accordance with Reddy (2011), who reported that the profitability of banks is not only influenced by their own specific factors but also by the industry specific and macroeconomic determinants, and Badola (2006) and Bapat (2017), who stated that the profitability of banks is significantly affected by cost control and operating expenses.

An organization's profitability is also determined by operating and financial efficiency (ROA). This is similar to the findings of Almaqtari et al. (2018), who revealed that private banks have a significant relationship with bank-specific determinants such as operational efficiency. Further, banks' profitability is also determined by their liquidity (AQ). This is consistent with Bougatef (2017) and Yahya et al. (2017), who found a positive association between liquidity ratio and profitability. Moreover, banks' profitability is also determined by asset management (money quantity) (DEP). This is in accordance with Almaqtari et al. (2018) and Yahya et al. (2017), who advocated that bank-specific determinants such as asset management have a positive and significant effect on profitability.

In light of the findings of the present study, the influence of demonetization and internal determinants that may have an effect on the profitability of Indian banks is highlighted. Therefore, the results of the analysis in this study introduce essential insights for policy-making bodies and bankers. It is the right time for regulators and policymakers to draft and issue more viable policies with demonetization and internal determinants of profitability to improve the level of Indian banks' profitability. Bankers should try to reinforce the capital structure of banks and reduce the level of operating expenses.

6. CONCLUSION

The present research mainly attempts to examine the influence of demonetization and internal factors on the profitability of private and public commercial banks' governance in India over the period from 2008 to 2017. Bank profitability indicators such as ROA, ROE, and NIM were used to counteract both demonetization and internal drivers. While demonetization has been treated as a dummy variable with a value of 1 for the post-demonetization procedure and a value of 0 for the rest of the time, CAD, AQ, LIQ, DEP, AM, OPEF, and LEV are considered as internal determinants. Panel data with a two-way random effect model was employed to evaluate the data.

The findings of the study revealed that demonetization has a significant negative impact across all profitability measures (ROA, ROE, and NIM). It has been found that the impact of AM on the profitability of both private and public banks, as measured by ROA, ROE, and NIM, is significant and positive. The results also showed a significant positive impact of DEP on ROA and ROE of private banks. Further, the results demonstrated that the LEV has a positive influence, whereas the OPEF has a negative influence on the ROE of private banks. In the context of private banks, the results also declared that AQ and LIQ have a significant positive impact on NIM, whereas the impact of LEV and OPEF on NIM of private banks was found to be negative and significant. In the case of public banks, it has been discovered that AQ and OPEF have a large favorable impact on profitability, i.e., ROA, ROE, and NIM. While the impact of CAD on ROA and ROE is significant and positive, DEP exhibited the same effect on ROE and NIM. However, LEV revealed a significant positive impact on ROE; it had a negative impact on NIM.

The present research makes a substantial contribution to the existing literature on demonetization and the internal factors influencing the profitability of private and public banks' governance. In other words, the current research contributes to Indian banks' profitability in different ways. First, it attempts to bridge an existing gap in the profitability literature of Indian banks' governance by comparing private and public banks. Second, it introduces new insight by providing empirical evidence on the impact of demonetization using different measures of profitability and various tools of analysis as a methodological contribution. Finally, the current research brings important insights into the impact of demonetization and internal determinants of profitability of Indian private and public banks' governance, which are very important for bankers, regulators, policymakers, and other interested parties.

The findings of the study are expected to be useful to both academics and policymakers. Further, future studies could look into this topic by looking at external factors of bank profitability as well as demonetization. Future studies may also compare foreign banks and private banks using cluster analysis or any other research tool. The study was limited to a specific area, India, which may differ in social and cultural contexts. The study was also limited to the banking sector, which makes the results not necessarily applicable to other professional sectors that may face different challenges in profitability, demonetization, and internal determinants. In addition, the study was conducted during a specific time period, which may affect the results drawn due to the rapid changes in the banking system and government initiatives to enhance the role of the banking sector.

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