Impact of Working Capital Management on Profitability: A comparative study of Public Sector Banks and Private Sector Banks listed in NSE Bank Nifty, India.

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Abstract.

Our study mainly aims to study the impact of working capital management on the profitability of both Public Sector banks and private sector banks listed in NSE Bank Nifty. Bank Nifty represents 12 highly liquid and high market capitalised stock that are traded in the National Stock Exchange through which investors get accurate information about the capital market performance of the Indian banking sector. The period of study spans from 2019 to 2021. Globally, the COVID-19 plague's effects have harmed many organisations' financial standing. We are dividing the period of study into three namely, pre pandemic period, during pandemic and post pandemic period to essentially understand whether pandemic plays any role on working capital management and profitability of public and private sector banks. For our study all the private sector banks and all public sector banks listed in Banknifty has been considered

The independent variable of our study is Working capital management which is measured using deposit to total assets ratio (DTTA), cash to assets ratio (CTA), Asset Turnover ratio(AT),Net Loans to Total Assets ratio (NLTTA), Loan to Deposit ratio(LTD), Cash conversion Cycle (CCC). The dependent variable of our study is profitability which is measured using Return on Assets (ROA) and Return on Capital Employed (ROCE). Pearson Correlation analysis will be used to assess the relationship between working capital management and profitability. The effect of working capital management on profitability will be made using Regression analysis.

The findings revealed that there is a positive relationship between working capital management and profitability.

Our study has filled the present gap of studying the impact of working capital management on profitability of both public and private sector banks listed in NSE Nifty Bank by considering 3 periods Pre, During and Post Covid 19 as none of the previous literature has investigated this fact. Also, this study will be important for academicians, regulatory bodies, policy makers, investors and analysts.

Keywords: Working Capital Management, Profitability, Public Sector Banks, private Sector Banks, Bank Nifty

1. Introduction

A nation's banking sector's performance has a significant impact on the economy of that nation. As per Menicucci & Paolucci 2016 there exists a broad agreement that banks play an essential and significant role in economic development and that a healthy banking system is required for sustained economic progress. Since the 1990s, India has undergone significant liberalisation with the goal of boosting production, competitiveness, and bank performance (Ghosh, 2016). After, liberalisation in 1991, the Indian banking industry grew quickly, spurring the expansion of other significant corporations (Singh et al., 2016). As the largest nation in South Asia, India has a robust financial system that is characterised by a variety of commercial organisations.

The most recent financial crisis and the 2008 recession were more heavily influenced by corporate investments in short-term assets and capital used for maturities of less than one year, which make up the majority of an organization's balance sheet products. The researchers are increasingly focusing on the impact of working capital in the business performance all around the world. Working capital management is a crucial component of managing an enterprise's finances for reasons like figuring out the makeup of the cash used for operating and investing in the business. A company with too many current assets may experience shortages and find it difficult to maintain smooth operations, whereas a company with too few current assets may experience a poor return on investment. In order to prevent the danger of being unable to satisfy short-term financial obligations, efficient working capital management comprises planning and controlling current assets and liabilities. (Eljelly,2004) It also avoids making excessive investments in current assets.

Joshi,1995 stated that making decisions about the quantity, make-up, and financing of current assets falls under the very delicate category of working capital management. Any company's primary goal in financial management is to maximise profit. However, the company should also have another crucial goal: maintaining liquidity. Here, there is a concern in that growing earnings at the expense of liquidity Raheman, Abdul. and Mohamed Naseer (2007) can cause the company major issues. Because of this, there must be a trade-off between the firm's profitability and liquidity. Profitability is a company's rate of return on investment. It demonstrates the management's effectiveness in making wise use of the company's resources to generate profit. It is desired, and every effort is being made to progressively improve it. It is stated that effective working capital has a favourable impact on profitability whereas excessive investment in current assets has a negative impact (Vishnani, 2007). The effective management of working capital, according to Nobance (2008), can enhance the liquidity and profitability of an organisation.

The main rationale behind this research is that working capital is not only necessary for the day-to-day activities of the business but also play a very pivotal role in the future security and stability of banks. Our research will be aiming in providing a connected path for managing the finance in a more effective manner and to help in the attainment of profit. As its been proved in many previous studies that firms ability to manage working capital not only helps in achieving profit but also promotes growth.

Working capital management has become more difficult for international businesses as a result of COVID 19. Less research has been done on the relationship between working capital management and performance of banks during the COVID 19 compared to studies on the financial crisis of 2008, especially in developing nations. According to studies (Akgün & Karataş, 2021; Simon et al., 2017; Zimon & Tarighi, 2021) economic downturns have boosted awareness and altered organisations' attitudes toward managing working capital to

improve firm performance. A devastating infectious disease known as COVID 19 began to spread over the world in late 2019 and started in China. Many economies consequently experienced financial turmoil (Gormsen & Koijen, 2020). The Covid 19 outbreak had a wide-ranging effect on economy.

Due to this, the COVID-19 disease will entail a loss of global GDP of more than $4 trillion between 2020 and 2021 (UNCTAD, 2021). Like the COVID-19 pandemic, the OECD research (2020) reveals that more than 60% of business organisations in affluent nations like the United States, the United Kingdom, Canada, Belgium, and the Netherlands are in danger of going extinct. The research also stated that a financial crisis has affected more than 80% of corporate organisations in emerging economies.

The main objective of this research is to study about the impact of working capital management on the profitability of public sector banks and private sector banks listed in BankNifty. We are analysing the impact during three time periods namely pre covid period, during covid period and post covid period. An index called NSE (National Stock Exchange) Nifty Bank, sometimes known as Bank Nifty, consists of the most liquid and highly capitalised Indian banking firms. Investors can use it as a benchmark to measure how Indian bank stocks have performed on the capital markets. There are 12 banking-related stocks in the index. Table 1 shows the banks listed in Bank Nifty with their Market Capitalisation (Rs cr). There are 9 private sector banks namely AU Small finance, Axis Bank, Bandhan Bank, Federal Bank, HDFC Bank, ICICI Bank, IDFC First Bank, IndusInd Bank, Kotak Mahindra Bank. There are 3 public sector banks namely State Bank of India, Punjab National Bank and Bank of Baroda. So, our sample includes 12 Banks listed in NSE BankNifty.

Table 1: List of Banks and Market Capitalisation

Banks	**Mkt Cap (Rs cr)**
AU Small Finance	41,710.33
Axis Bank	289,042.78
Bandhan Bank	39,038.52
Bank of Baroda	94,765.21
Federal Bank	28,458.28
HDFC Bank	889,157.88
ICICI Bank	607,107.92
IDFC First Bank	37,108.32
IndusInd Bank	91,646.30
Kotak Mahindra	354,873.77
PNB	62,102.13
SBI	536,056.80

Source: Money control

Our Study is contributing the Literature in the following ways. It aims to close the current performance disparity in the banks by introducing fresh empirical data to the working capital literature information from India that too more specifically about the banks listed in NSE BankNifty. Secondly academics, regulators, legislators, regulatory bodies, users, managers, investors, analysts, and professionals should all take note of this study. In addition, the study has a significant impact on emerging nations, the literature review, working capital determinants, and banks' performance.

2. Literature review

2.1. Working Capital Management of Banks

Regardless of the type of business or the size of the organisation, managing working capital is a crucial part of financial management since it directly affects the business's liquidity and profitability. The current asset level in relation to the current obligation level, which is a crucial component of working capital, determines working capital management (WCM).

Working capital management affects returns, profitability, and company value, according to Deloof (2003). Working capital management is crucial since it influences the company's profitability and risk, according to Smith (1980). Effective working capital management may enable prompt payment of short-term obligations (Peel et al., 2000); it also opens the door to more liquidity, which fosters business expansion and maximises profits. (Wignaraja and O'Neil, (1990).

For any business whether it is big or small,no matter whether they are sustaining in a developing or developed economy,the major goal of working capital is to ensure that they have adequate,regular and consistent cash flow to fund their business;especially for banks and other financial institutions.According to Agyei, S. K., & Yeboah, B. (2011) ,being profitable and liquid are not negotiable for banks at least for two reasons;to meet regulatory requirements and to guarantee enough liquidity to meet the unexpected and unannounced withdrawal of customers.Agyei, S. K., & Yeboah, B. (2011) also states that balanced working capital management would help banks in nourishing growth,which results in profitability and liquidity which helps the banks to serve its customers more effectively and efficiently.There is a large discrepancy that supports the study of banks working capital management. Banks in developing nations rely more heavily on internal savings than larger banks in industrialised economies because they have more difficulty obtaining external financing.

2.2. Profitability of Banks

In addition to allowing banks to earn more money to lend more credit to the economy, higher profitability is crucial for regulators since it ensures more flexible capital ratios even in a riskier economic climate. Furthermore, bank profitability ought to result in fair returns for its stakeholders.

The general drivers of bank profitability have received extensive study in the scientific literature, but the significance of these drivers as they relate to different bank business models and levels of systemic importance have received less attention(Bojāre & Romānova, 2017).In our study we are trying to find out the impact of working capital management on the profitability of both public sector and private sector banks listed in NSE BankNifty. We are trying to analyse the impact during three time periods namely pre pandemic , during pandemic and post pandemic. The Reserve Bank of India (RBI) claims that the banking industry in India is adequately capitalised and well-regulated. The nation has significantly better financial and economic circumstances than any other nation in the world. Studies on credit, market, and liquidity risk indicate that Indian banks are generally robust and have fared well during the global recession. (Maiti et al., 2017)Over the past few years, India's banks have faced significant problems as a result of the country's changing environment.(Bhanawat & Kothari, 2013) A bank is extremely important to a nation's economy. The backbone of any economy is a sound banking system. The performance of the banking system affects an economy's growth. In the literature on finance, a bank's

performance is typically gauged by its profitability. Better performance is indicated by the banks' increasing profits. The efficiency with which the financial sector operates has a significant impact on the banks' profitability, which in turn influences the nation's economy and GDP. For the efficient operation of the banks, the Reserve Bank of India and other regulatory authorities have established numerous laws and policies. The profitability of Indian scheduled commercial banks has been steadily declining in recent years(*Reserve Bank of India - Trend and Progress of Banking in India*, 2021).

Numerous studies have been done on the profitability of banks. Few research has taken into account a panel of countries while analysing the factors affecting profitability, and some studies are country specific. According to certain research, profitability can be measured by return on assets (ROA) and return on equity (ROE), and to determine these indicators' drivers, both internal and external component variables have been considered. In our study to measure profitability we have used ROA and ROCE (Return on Capital Employed). ROCE contrasts the company's capital investment with its earnings. It is comparable to Return on Assets (ROA) but includes financing sources. The non-markup income to capital employed ratio is known as the ROCE (Fogelberg, L and Griffith, J. M. ,2000)

3. Impact of Working Capital Management on profitability of banks

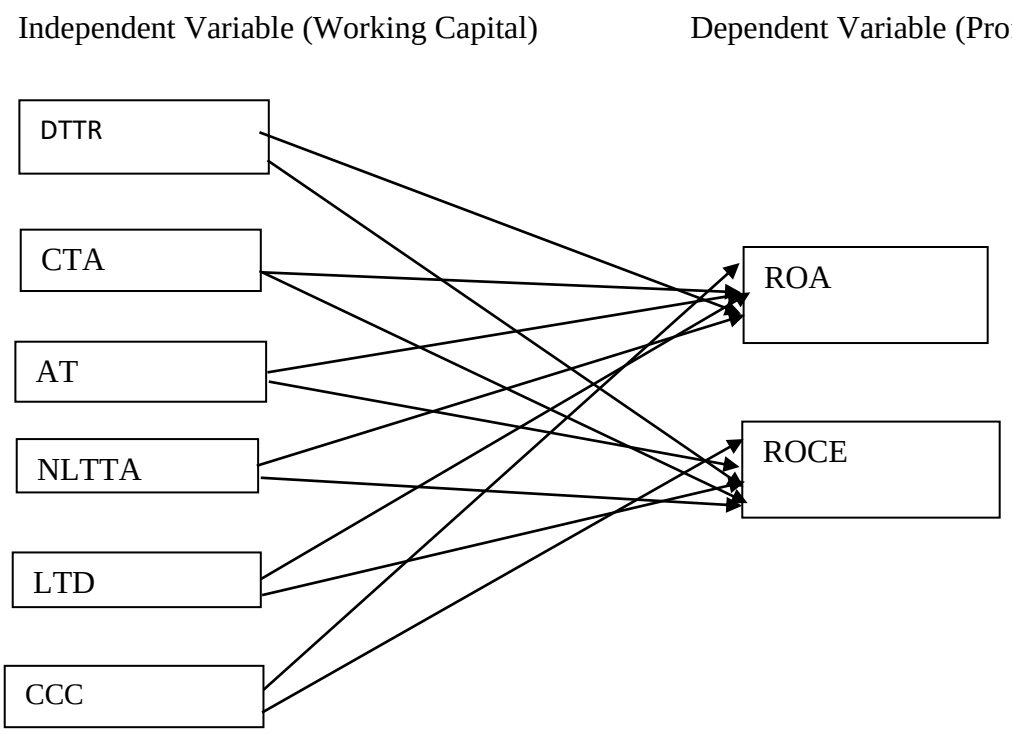
Working capital management is a crucial aspect of corporate financial management since it immediately impacts the profitability and liquidity of all businesses, regardless of their sizes.
Current assets and current liabilities are managed under working capital management. Working capital management, in general, has a direct impact on a company's profitability and liquidity, regardless of its size. Working capital management challenges have been addressed by researchers in a variety of methods. Working capital management appears to influence returns or profitability as well as the firm's worth (Deloof, 2013). As a result, effective working capital management is known to have numerous positive consequences on the general performance of the firms. It aids businesses in effectively allocating scarce resources and funds for the settlement of urgent obligations and claims (Peel & Wilson 2016).
In certain instances, working capital management could be based on the liquidity preference theory. The demand for money viewed as liquidity is what the Liquidity Preference theory is all about. Liquidity Preference Theory, according to Chen (2019), contends that investors favour cash or other highly liquid investments over securities with long-term maturities that pose higher risk because they require a higher interest rate or premium. The most liquid asset is money, or cash, according to the notion. Thus, liquidity is viewed as an asset, specifically a current asset. When an asset can be quickly changed into cash, it is considered to be liquid. When this happens, the asset gives the company the liquidity it needs to pay its short-term debts, continue its daily operations, and invest in other working capital components. Therefore, when a firm's liquidity level declines, it may produce a negative net working capital, which may very possibly result in insolvency.
Working capital management's main advantage is to increase a company's earnings and profitability by making optimum use of its resources. In this way, managing banks as businesses ensures that their operations run smoothly and shouldn't be interrupted by a lack of liquidity. Banks must maintain the lowest possible working capital requirement to ensure a smooth operating cycle. Favourable credit terms with accounts payable and receivables, excellent inventory management, and a quicker production cycle can all help achieve this goal (Padachi, 2006).
The banking industry is the backbone of the economy in both developed and developing nations. The nation's economic wheel is lubricated by oil. According to Huda, Saja, and

Mohammed (2020), the banking industry is the foundation of a country's financial and economic system. Banks are argued to play a particularly important role in reallocating funding for the small, medium, and non-formal sectors as financial intermediaries.
Since the banking industry accounts for around 60% of all financial assets in both developed and developing countries, banks represent the highest size or volume of total assets in the economic sector globally (Seelanatha, 2019). This demonstrates that a country's ability to prosper economically depends on the banking sector. According to Mishkin (2010), banks can use the data they get or produce to generate benefits for all other economic sectors. This is accomplished through giving loans to businesses and corporations that operate in different sectors of the national economy.

The management of working capital is one of the crucial elements of bank financial management, according to Sardar (2018). This is because the element frequently has a sizable impact on businesses, including banks' profitability, valuations, and dangers. The argument made by Qazi et al. (2011) that working capital management is one of the key elements affecting corporate organisations like banks' financial management supports this. Working capital management significantly influences how well-run, risky, and valuable businesses and financial institutions like banks function (Rizwan & Shah, 2015).

4. Conceptual Framework

Based on the objective and literature review the following conceptual framework has been developed. Working Capital which is the independent variable is measured through Deposit to Total Asset Ratio (DTTR), Cash to Asset Ratio (CTA), Asset Turnover Ratio (AT),Net loan to Total Assets (NLTTA), Loan to Deposit (LTD) and Cash Conversion Cycle (CCC) and profitability which is the dependent variable is measured through Return on Assets (ROA) and Return on Capital Employed (ROCE)



According to the above conceptual framework, the following research question and hypothesis have been formulated.

4.1. Research Question

Is there a relationship between the working capital management and profitability of public and private sector banks listed in NSE BankNifty?

4.2. Hypothesis

H0: There is a positive relationship between working capital management and profitability

H1: There is a positive correlation between working capital management and profitability

5. Methods

The secondary data from the published annual reports of 12 banks listed on Banknifty for the years 2019 through 2022 were used to gather the fundamental data for this study. Pre-pandemic (2019–2020), pandemic (2020–2021), and post-pandemic (2021-2022) are the three time periods used for the study. Information on ROA, ROCE, and Asset Turnover Ratio was obtained from www.moneycontrol.com. The whole financial system depends on the banking sector. By offering infrastructure, financing, and investment, it has an impact on the national economy. The backbone of the world's economies is the banking sector. Any nation's economic development and growth are greatly influenced by its banking industry.

Our research explores the relationship between Working Capital Management and profitability of the banks both public and private sector banks. The dependent variable, profitability of banks both private sector and public sector bank listed in BankNifty is measured through Return on Assets (ROA) and Return on Capital Employed (ROCE) and the independent variable, working capital management is, measured through Deposit to Total Asset Ratio (DTTR), Cash to Asset Ratio (CTA), Asset Turnover Ratio (AT), Net loan to Total Assets (NLTTA), Loan to Deposit (LTD) and Cash Conversion Cycle (CCC).

Based on our dependent variable ROA and ROCE, the following multiple Regression models have been formulated:

$$ROA = \alpha+\beta1DTTR+ \beta2CTA+ \beta3AT+ \beta4NLTTA+ \beta5LTD+ \beta6CCC+ Ɽ$$

$$ROCE = \alpha+\beta1DTTR+ \beta2CTA+ \beta3AT+ \beta4NLTTA+ \beta5LTD+ \beta6CCC+ Ɽ$$

Where α represents constant and β indicates coefficients and Ɽ represents the residual term.

The various ratios used to measure Working Capital Management and Profitability of banks are calculated using the following formulas as shown in Table 2

Table 2: Formulas used for the calculation of ratios

Ratios	Formulas
DTTR	Total Deposits/Total Assets
CTA	Cash and Cash Equivalents/ Total Assets
AT	Total Sales/ Opening Balance of Assets +Closing Balance of Assets/2
NLTTA	Net loan/ Total Assets *100
LTD	Total Amount of Loans/ Total amount of Deposits
CCC	Average Collection Period– Average payment period
ROA	Net income / average Total Assets *100
ROCE	Profit Before Tax/Total Equity*100

6. Results and Discussion

6.1. Descriptive Statistics (Pre pandemic period)

Table 3: Descriptive Statistics (Pre pandemic period)

Variable	Mean	Std Dev	Minimum	Maximum	Observations
DTTA	0.652565	0.220338	0.059571	0.8430676	12
CTA	0.041835	0.02059	0.021466	0.0915636	12
AT	0.298792	0.331512	0.0763	0.91	12
NLTTA	62.29415	5.303878	56.00438	72.646693	12
LTD	0.92276	0.191069	0.671384	1.3146679	12
CCC	77.10269	230.3191	-178.1562	564.13658	12
ROA	0.837083	1.274349	-1.91	3.29	12
ROCE	2.735	1.281608	1.4	6.14	12

Table 3 shows the descriptive statistics for the pre pandemic period. The total observations sum to 12. It's evident that ROA ranges between -1.91 and 3.29 and ROCE ranges between 1.4 and 6.14. The mean and Standard deviation are mainly calculated to determine the central tendency and goodness of fit. For all the variables the mean is positive.

6.2. Descriptive Statistics (During pandemic period)

Table 4: Descriptive Statistics (During pandemic period)

Variable	Mean	Std Dev	Minimum	Maximum	Observations
DTTA	0.73193	0.102981	0.543621	0.870278	12
CTA	0.039703	0.009407	0.026161	0.054109	12
AT	0.451117	0.378169	0.074	0.92	12
NLTTA	61.08393	5.821082	52.6629	70.97201	12
LTD	0.851592	0.152615	0.609981	1.133746	12

CCC	4.548261	248.7367	-357.808	368.0761	12
ROA	1.018658	0.761619	0.07	2.26	12
ROCE	2.938333	1.328498	1.64	6.1	12

Table 4 is showing the descriptive statistics during pandemic period. During this period the minimum of ROA is 0.07 and maximum is 2.26 whereas for ROCE the minimum is 1.64 and maximum is 6.1. Even during the pandemic period all the variables have positive means. It's also visible that the maximum od cash conversion cycle is 368.07 which implies that the banks are taking measures to recover the money from the customers quickly in order to meet their short-term debts.

6.3. Descriptive Statistics (Post pandemic period)

Table 5: Descriptive Statistics (Post pandemic period)

Variable	Mean	Std Dev	Minimum	Maximum	Observations
DTTA	0.733181	0.096328	0.555439	0.861818	12
CTA	0.044598	0.013899	0.029367	0.078655	12
AT	0.40345	0.340513	0.0664	0.85	12
NLTTA	61.33475	4.676559	54.78722	67.67283	12
LTD	0.834909	0.152861	0.608674	1.115715	12
CCC	-42.0726	323.2117	-643.406	402.5329	12
ROA	0.96785	0.664735	0.07	1.99	12
ROCE	2.638333	1.248605	1.42	5.99	12

Table 5 mainly shows the descriptive statistics during Post pandemic period. During this period the minimum of ROA is 0.07 and maximum is 1.99 and for ROCE the minimum is 1.42 and maximum is 5.99. During this period the maximum of cash conversion cycle is 402.53 which implies that bank has made its credit management policies little lenient.

6.4. Correlation Analysis

The term "correlation" refers to the degree of link between two variables. The correlation coefficient analysis is used in this study to determine how working capital management and profitability are related. It demonstrates the degree to which working capital management and profitability are related.

Table 6: Correlation Analysis (Pre pandemic period)

Variables	*DTTA*	*CTA*	*AT*	*NLTTA*	*LTD*	*CCC*	*ROA*	*ROCE*
DTTA	1							
CTA	0.294804	1						
AT	0.190047	0.337515	1					
NLTTA	0.249577	0.44063	0.368645	1				
LTD	-0.55562	-0.01184	0.033131	0.313707	1			
CCC	0.388975	0.63869	0.585239	0.191334	-0.20224	1		
ROA	-0.09739	0.242872	-0.00568	0.676557	0.055249	-0.18323	1	
ROCE	-0.16426	0.453932	-0.08954	0.734038	0.424119	-0.09929	0.849739	1

During the pre-pandemic period the Pearson correlation matrix as in Table 6. The ROA has a positive correlation with CTA,NLTTA,LTD where as there is a negative correlation with DTTA,AT and CCC. Also, ROCE is positively correlated with CTA, NLTTA, LTD and also there is a negative correlation with DTTA, AT and CCC.ROA is significantly correlated with NLTTA at 5% significant level and ROCE is significantly positively correlated with NLTTA at 1% significant level

Table 7: Correlation Analysis (During pandemic period)

Variables	*DTTA*	*CTA*	*AT*	*NLTTA*	*LTD*	*CCC*	*ROA*	*ROCE*
DTTA	1							
CTA	0.235762	1						
AT	-0.20744	0.320871	1					
NLTTA	-0.10324	0.266014	0.500059	1				
LTD	-0.86531	-0.11574	0.403948	0.569468	1			
CCC	0.501594	0.316191	0.340461	0.140372	-0.31066	1		
ROA	-0.38295	0.015495	0.162212	0.454773	0.461257	-0.46894	1	
ROCE	-0.3509	0.186402	0.024196	0.586177	0.51507	-0.21453	0.827132	1

In Table 7 Pearson Correlation matrix during pandemic is being presented. We can see that ROA exhibits a positive relation with CTA,AT,NLTTA and LTD where as it exhibits a negative relationship with DTTA and CCC. For ROCE there is a positive relationship with CTA, AT, NLTTA and LTD and a negative correlation with DTTA and CCC.ROCE is significantly positively correlated with NLTTA at 1% significant level.

Table 8: Correlation Analysis (Post pandemic period)

Variables	*DTTA*	*CTA*	*AT*	*NLTTA*	*LTD*	*CCC*	*ROA*	*ROCE*
DTTA	1							
CTA	0.258257	1						
AT	-0.14129	0.395594	1					
NLTTA	-0.055	0.033091	0.551291	1				
LTD	-0.83372	-0.21394	0.414189	0.413254	1			
CCC	0.501049	0.464596	0.445052	0.215022	-0.23582	1		
ROA	-0.16207	0.145035	0.270628	0.062007	-0.01695	-0.31027	1	
ROCE	-0.29492	-0.20628	-0.0502	0.51572	0.356251	-0.14813	0.048164	1

In Table 8 we can see the correlation calculated for post pandemic period. During this period, we can see that ROA is positively related with CTA, AT, NLTTA and is negatively associated with DTTA, LTD and CCC. In the case of ROCE, it is positively related with NLTTA and LTD and is negatively correlated with all the other components of working capital.

6.5. Regression Analysis

Model 1- ROA = α+β1DTTR+ β2CTA+ β3AT+ β4NLTTA+ β5LTD+ β6CCC+ ϶

6.5.1. Pre-Pandemic

Table 9: Regression Statistics	
Multiple R	0.937741319
R Square	0.879358782
Adjusted R Square	0.734589321
Standard Error	0.656519493

Table 10: ANOVA

	df	SS	MS	F	Significance F
Regression	6	15.70853369	2.618089	6.074201	0.033270675
Residual	5	2.155089222	0.431018		
Total	11	17.86362292			

Table 11: Coefficient

	Coefficients	Standard Error	t Stat	P-value
Intercept	8.751573842	2.572478972	-3.402	0.019209
DTTA	3.951667414	1.325135185	-2.98209	0.030726
CTA	12.87974114	14.16235948	0.909435	0.404826
AT	0.512070929	0.805366021	-0.63582	0.552851
NLTTA	0.26329368	0.053625681	4.909843	0.004436
LTD	4.854592536	1.508339023	-3.2185	0.023505
CCC	0.001821953	0.001443289	-1.26236	0.262494

In table 9 the regression results are being presented. Multiple R which is 0.937 measures the degree of relationship between actual value and predicted value of ROA, since the obtained value is a linear combination of DTTR,CTA,AT,NLTTA,LTD and CCC, the coefficient value of 0.937 indicates that relationship between ROA and variables of Working capital is strong and positive.R^2 is 0.879 implies that about 88% of the variation in ROA is estimated by DTTR,CTA,AT,NLTTA,LTD and CCC. This helps in assessing the overall accuracy of the model. From the Table 10 with the significance level of 0.05, F value is greater than the significance level which implies that working capital management contributes towards the increase in the profitability of banks be it private sector or public sector.

6.5.2. During Pandemic

Table 12: Regression Statistics	
Multiple R	0.848624
R Square	0.720163
Adjusted R Square	0.384358
Standard Error	0.597588
Observations	12

Table 13: ANOVA

	df	SS	MS	F	Significance F
Regression	6	4.595143	0.765857	2.14459	0.210001588
Residual	5	1.785556	0.357111		
Total	11	6.3807			

Table 14: Coefficient

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	17.75648724	10.87167521	1.63328	0.163338
DTTA	25.69781852	13.25387221	-1.93889	0.110227
CTA	18.09679423	24.40934477	-0.74139	0.491789
AT	0.003695211	0.66666525	0.005543	0.995792
NLTTA	0.331077243	0.143385364	2.309003	0.068993
LTD	20.46934133	10.53185843	-1.94356	0.10957
CCC	0.000874014	0.001075621	-0.81257	0.453402

Since the obtained value is a linear combination of DTTR, CTA, AT, NLTTA, LTD, and CCC, multiple R, which is 0.0.848, measures the degree of relationship between actual value and predicted value of ROA. The coefficient value of 0.848 indicates that relationship between ROA and variables of Working capital is strong and positive. DTTR, CTA, AT, NLTTA, LTD, and CCC are predicted to account for around 72% of the variation in ROA, according to R2, which is 0.720. This aids in evaluating the model's overall accuracy. The F value in Table 13 with a significance level of 0.05 is greater than the significance level, which suggests that working capital management helps banks—private sector or public sector—become more profitable.

6.5.3. Post pandemic

Table 15: Regression Statistics

Regression Statistics	
Multiple R	0.75934904
R Square	0.576610965
Adjusted R Square	0.068544123
Standard Error	0.641548746
Observations	12

Table 16ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	2.802674202	0.467112	1.134912	0.45444598
Residual	5	2.057923968	0.411585		
Total	11	4.86059817			

Table 17: Coefficient

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	5.761118537	5.637683358	1.021895	0.353703
DTTA	4.285321319	5.11143932	-0.83838	0.440045
CTA	2.778881518	17.56952324	0.158165	0.880516
AT	1.615267838	0.922050192	1.751822	0.140193
NLTTA	0.024519297	0.059092219	0.414933	0.695394
LTD	4.779697395	3.345241459	-1.4288	0.212436
CCC	0.001420431	0.00089677	-1.58394	0.174058

Since the obtained value is a linear combination of DTTR, CTA, AT, NLTTA, LTD, and CCC, multiple R, which measures the degree of relationship between actual value and predicted value of ROA, is 0.759. This coefficient value suggests that there is a strong and positive relationship between ROA and variables of Working capital. R2 of 0.576 indicates that DTTR, CTA, AT, NLTTA, LTD, and CCC are responsible for estimating around 58% of the variation in ROA. This aids in determining the model's general level of accuracy. According to Table 16 with a significance level of 0.05, F value is higher than the significance level, which suggests that working capital management helps boost the profitability of banks in both the public and private sectors.

Model 2: ROCE = α+β1DTTR+ β2CTA+ β3AT+ β4NLTTA+ β5LTD+ β6CCC+ ϶

6.5.4. Pre-Pandemic

Table 18: Regression Statistics

Regression Statistics	
Multiple R	0.947647334
R Square	0.898035469
Adjusted R Square	0.775678032
Standard Error	0.607003221
Observations	12

Table 19: ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	16.22543545	2.704239	7.339443	0.022486847
Residual	5	1.842264552	0.368453		
Total	11	18.0677			

Table 20: Coefficient

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	8.372244421	2.37845645	-3.52003	0.016919
DTTA	2.382118333	1.225190317	-1.94428	0.109468
CTA	28.303601	13.09420043	2.161537	0.083026
AT	1.354582806	0.744623388	-1.81915	0.128549

NLTTA	0.20089931	0.049581103	4.051933	0.009807
LTD	0.591367193	1.394576484	-0.42405	0.689156
CCC	0.001125452	0.001334432	-0.84339	0.437484

Multiple R which is 0.947 measures the degree of relationship between actual value and predicted value of ROCE, since the obtained value is a linear combination of DTTR,CTA,AT,NLTTA,LTD and CCC, the coefficient value of 0.947 indicates that relationship between ROCE and variables of Working capital is strong and positive.R^2 is 0.898 implies that about 90% of the variation in ROCE is estimated by DTTR,CTA,AT,NLTTA,LTD and CCC. This helps in assessing the overall accuracy of the model. From the Table 19 with the significance level of 0.05, F value is greater than the significance level which implies that working capital management contributes towards the increase in the profitability of banks be it private sector or public sector

6.5.5. During pandemic

Table 21: Regression Statistics

Regression Statistics	
Multiple R	0.886187622
R Square	0.785328502
Adjusted R Square	0.527722704
Standard Error	0.912975937
Observations	12

Table 22: ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	15.24634136	2.541057	3.048567	0.120884961
Residual	5	4.167625306	0.833525		
Total	11	19.41396667			

Table 23: Coefficient

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	27.89362293	16.60940327	1.679387	0.153913
DTTA	44.84483147	20.24884889	-2.21469	0.077645
CTA	3.209340872	37.29182883	0.08606	0.934759
AT	2.094614204	1.018510191	-2.05655	0.094849
NLTTA	0.582416299	0.219059648	2.658711	0.044953
LTD	31.58393357	16.09024189	-1.96292	0.106887
CCC	0.001279378	0.0016433	0.778542	0.471468

Multiple R which is 0.886 measures the degree of relationship between actual value and predicted value of ROCE, since the obtained value is a linear combination of DTTR,CTA,AT,NLTTA,LTD and CCC, the coefficient value of 0.886 indicates that relationship between ROCE and variables of Working capital is strong and positive.R^2 is 0.785 implies that about 79% of the variation in ROCE is estimated by DTTR,CTA,AT,NLTTA,LTD and CCC. This helps in assessing the overall accuracy of the model. From the Table 22 with the significance level of 0.05, F value is greater than the

significance level which implies that working capital management contributes towards the increase in the profitability of banks be it private sector or public sector.

6.5.6. Post Pandemic

Table 24: Regression Statistics

Regression Statistics	
Multiple R	0.743360722
R Square	0.552585163
Adjusted R Square	0.015687358
Standard Error	1.23877291
Observations	12

Table 25: ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	9.476375055	1.579396	1.029219	0.497750645
Residual	5	7.672791611	1.534558		
Total	11	17.14916667			

Table 26: Coefficient

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	4.126889815	10.88585935	-0.37911	0.720175
DTTA	7.476078188	9.869729462	-0.75748	0.482915
CTA	4.367224482	33.92516868	0.128731	0.902588
AT	2.338455911	1.780395966	-1.31345	0.246072
NLTTA	0.230734501	0.114101759	2.022182	0.099094
LTD	1.351059739	6.459360294	-0.20916	0.842576
CCC	0.000684805	0.001731582	0.395479	0.708799

Multiple R which is 0.743 measures the degree of relationship between actual value and predicted value of ROCE, since the obtained value is a linear combination of DTTR,CTA,AT,NLTTA,LTD and CCC, the coefficient value of 0.743 indicates that relationship between ROA and variables of Working capital is strong and positive.R^2 is 0.552 implies that about 55% of the variation in ROCE is estimated by DTTR,CTA,AT,NLTTA,LTD and CCC. This helps in assessing the overall accuracy of the model. From the Table 25 with the significance level of 0.05, F value is greater than the significance level which implies that working capital management contributes towards the increase in the profitability of banks be it private sector or public sector.

7. Discussion

The study's findings revealed that working capital management is significantly related to the profitability of public and private sector banks listed in BankNifty. This finding is in line with the Nor & Noriza's (2010) conclusion that controlling working capital ensures an improvement in market values as well as the profitability of the businesses. Additionally, it was discovered that working capital management aided in the organisations' promotion of strategic, effective, and efficient operations. The results also agreed with those of Kieschnick,

LaPlante, and Moussawi (2008), who found that businesses, including banks, performed at their best when they used working capital management. The study's findings also in agreement with Irene & Lee's (2007) finding that working capital and profitability had a linear positive connection mainly the results of pandemic and post pandemic period. The findings of the current study and those of Raheman and Nasr (2007) that there was a substantial inverse association between working capital management and business profitability in Pakistan disagreed.

8. Conclusion

The research shows that there is a significant relation between working capital management and profitability of banks. Effective working capital management directly impacts a firm's profitability. The study is carried out with the main objective of finding out the impact of working capital management on profitability among public and private sector banks listed in BankNifty. We tried to establish the relationship during three time periods namely pre pandemic, during pandemic and post pandemic. There is a strong positive correlation between variables of profitability and variables of working capital. It is crucial that management conveys to all stakeholders the significance of working capital management so that everyone may pursue optimal utilisation inside the organisation. They should also make sure that there is an appropriate mix of capital and that political, economic, and other vices that could be detrimental to the company are adequately monitored. Finally, a good forecasting methodology should be used to help reduce waste and guarantee the most effective and efficient use of working capital for the ultimate benefit of all stakeholders and the economy as a whole. In the banking sector, working capital management plays the part of maintaining the ability to convert funds to pay customers in accordance with rules, freeing up the financial managers to focus on maintaining the bank's liquidity position and maximising profits as a result. The profitability of these banking institutions will ultimately improve if they handle their cash effectively.

9. Future Research and recommendations

Future research on working capital in India needs to be done in detail. Additionally, the research suggests that other studies on the same problem be carried out at NSE and by comparing with different sectors while extending the sample's time frame. The area of further study could include various managing working capital components.

Following Recommendations are made:

Existing and new investors should be informed about forecasting working capital management information so that they would be encouraged to support the company in achieving its high level of financial performance.

Private sector and public sector banks in India should create detailed plans that will boost their efficiency and profitability.

For greater performance and profitability, banks can enlist the assistance of their overseas counterparts in managing working capital.

In managing short-term funding, the impact of inflation and exchange rate changes is crucial, therefore the financial managers of the relevant banking and insurance industries should always focus on the best fund utilisation movements to achieve high financial performance.

10. Acknowledgement and Conflict of Interest

Both First author and second author contributed equally through the conception and design of the study to all the various stages in the development of the paper. Any errors are our own. The authors declare that there is no conflict of interest.

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