Comparative Analysis of Banking Financial Performance Before and After Implementation of Financial Technology (FinTech)
Case Study on BUMN Banking Period 2012–2021

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Abstract. The aim to be achieved by holding this research is to determine the comparison of financial performance after the implementation of Fintech in BUMN banking for the period 2012–2021. The data used in this research is secondary data. The sampling technique used was the purposive sampling method. The analysis of this study used the normality test and the average comparative test. The variables used to measure financial performance in this study are LDR, NPL, ROA, and BOPO. In the comparative test before and after the implementation of fintech for Bank BRI the variables of NPL, ROA, and BOPO showed the results of sig value < 0.05 so there was a significant difference, but in the variable of LDR the sig value > 0.05 so there was no significant difference. For Bank BNI, the variable of ROA show sig values < 0.05 so there was a significant difference, but the variables of LDR, NPL, and BOPO shows a sig value > 0.05 so there was no significant difference. For Bank Mandiri, all variables show a sig value > 0.05 so there was no significant difference. For Bank BTN, the variables of ROA and BOPO show a sig value < 0.05 so there was a significant difference, while the variables of LDR and NPL show a sig value > 0.05 so there was no significant difference. This study reaffirms the importance of applying Fintech. BUMN banking is expected to maximize the use of fintech services in transaction activities because fintech can improve the image of banking names with ease and sophistication. That way the banking financial performance will run smoothly, to increase profitability.

Keywords: Financial Technology · Fintech · LDR · NPL · BOPO · ROA · BUMN Banking

1 Introduction

The world has now entered the Industrial Revolution 4.0 which is an effort to transform towards internet-based automation technology. These developments have penetrated various sectors, including the financial services sector, particularly the banking sector. Technological advances in financial services have given birth to Fintech companies as a way to meet people's desires for financial service efficiency. With its creative appearance

using technology, fintech presents new preferences for consumers in making payments, remittances, intermediary funds, and also investing.

Financial technology is a mixed product of financial services wrapped in digital technology which in the end is expected to create a new transformation of conventional business models that require direct interaction if you want to make transactions and also have to carry cash, so it can be done by just using a smartphone in a matter of seconds [1]. FinTech is also described as digital technology innovation packaged into business models, applications, and financial service products [2].

According to Le et al., [3] FinTech can be understood as a form of implementation of technological innovation that is shown to provide financial services. These technology-based financial services are created based on new creative thinking, or they can also be from something ancient but presented with innovations that focus on facilitating transactions and encouraging increased access to customer financial services.

Fintech in Indonesia has developed since 2006 however, Indonesian fintech companies have only gained public trust since the Indonesian Fintech Association (AFI) was established in September 2015, since then fintech has developed quite rapidly until now [4]. This data is based on a survey conducted by the Indonesian Internet Network Operators Association (APJII) showing results in 2016 of 132.7 million Indonesians already using the internet network.

The internet network has spread and developed rapidly in all aspects of people's lives in Indonesia and the world, including developments in the financial sector both nationally and internationally. The emergence of the internet, can facilitate the delivery of information quickly, broadly, and accurately [5]. The government provides convenience in licensing for financial institutions in developing their digital transaction services [6]. Banking in collaboration with Fintech companies aims to increase their profitability and financial performance.

Financial performance can prove the company's success in accounting for its work. Assessment of banking financial performance needs to be done because banks are one of the many financial institutions that make a major contribution to the economy of a country as institutions that serve financial transactions. Banks can be said to be the blood of a country's economy [7]. Assessment of banking financial performance can be measured using financial ratios.

Financial ratio analysis is a technique for assessing the company's financial performance by comparing the data in the financial statements at a certain period [8]. This analysis can also be used to assess future risks and opportunities. And can determine what strategies need to be done in the future related to current financial conditions.

This research was conducted in response to a research gap, specifically research by W. H. Putri et al., [9] which examines the impact of the emergence of financial technology and financial slack on the financial performance of a company shows that there are significant differences before and after launching fintech products. The financial performance ratio represented by ROA shows a significant difference. However, research conducted by Kristianti & Tulenan [10] which examined the impact of financial technology on financial performance in banks showed insignificant results.

The purpose of this study is to analyze the comparison of banking financial performance before and after the implementation of Fintech in BUMN Banking.

2 Literature Review

2.1 Financial Technology (Fintech)

Fintech is a product of a combination of digital technology and financial services that transforms business models from conventional to moderate, from the start transactions must be made in person and carry a certain amount of cash, now you can make remote transactions which can be done in seconds [11].

Fintech is included in disruptive innovation, which has succeeded in overthrowing previously well-known markets with a strategy of providing easy access, the convenience of transactions, and better effectiveness and efficiency in making transactions. Disruptive innovation is creating new product innovations that are easier to use to replace old products so that they will be more attractive to the public [12].

2.2 Financial Performance

Financial performance is an interpretation of the achievement of various activities that have been carried out by the company. It can also be explained that it is an assessment carried out within a certain period to evaluate the extent to which the company can carry out existing financial implementation regulations properly and correctly [13].

According to Anindyastri et al., [14] the existence of financial performance in a company can help in calculating the level of expenditure from activities carried out during the company's operations. Financial performance can also be a company parameter in determining the decisions and policies that will be implemented by the company in achieving its goals.

2.3 BUMN Banking

According to Lisnawati et al., [15] BUMN Banking s are banks where most of the ownership capital is owned by the government. Compared to private banks, BUMN Banking has relatively large nominal capital. It can be said that BUMN Banking has made a big contribution to moving the banking industry in Indonesia. BUMN Banking as the market leader with a large and broad market share can influence banking performance nationally. If BUMN Banking has good bank performance, it can have a positive impact on Indonesian banking performance [16].

2.4 Financial Ratio

Financial Ratio Analysis is a technique of combining analysis between elements in financial statements, which are explained in the mathematical form of a certain period or period. By comparing two variables, both the list of balance sheets, profit and loss, and business income in a company in a certain period can be used as a reference for the financial condition of a company in the company's financial statements [17]. LDR, NPL, ROA, and BOPO are the financial performance appraisal ratios used in this study.

The Loan Deposit Ratio (LDR) is shown to assess how capable the bank is in overcoming the risk of paying debtors' bills for banking [18] (Table 1).

Table 1. LDR Rating Criteria.

Criteria	Rank	Predicate
LDR ≤ 75%	1	Very healthy
75% < LDR ≤ 85%	2	Healthy
85% < LDR ≤ 100%	3	Healthy enough
100% < LDR ≤ 120%	4	Less healthy
LDR > 120%	5	Unhealthy

Source: SE BI 6/23/DPNP/2011

Non-Performing loans (NPL) are shown to assess how capable banking management is in managing non-performing loans [18] (Table 2).

Return On Assets (ROA) is shown to assess how capable banks are of obtaining net profits by optimally utilizing wealth [19] (Table 3).

Operating Expenses and Operating Income (BOPO) are shown to see the efficiency of banks in generating profits through their operations [18] (Table 4).

Table 2. NPL Rating Criteria

Criteria	Rank	Predicate
NPL ≤ 2%	1	Very healthy
2% < NPL ≤ 5%	2	Healthy
5% < NPL ≤ 8%	3	Healthy enough
8% < NPL ≤ 12%	4	Less healthy
NPL > 12%	5	Unhealthy

Source: PBI 23/2/PBI/2021

Table 3. ROA Rating Criteria.

Criteria	Rank	Predicate
ROA > 1,5%	1	Very healthy
1,25% < ROA ≤ 1,5%	2	Healthy
0,5% < ROA ≤ 1,25%	3	Healthy enough
0% < ROA ≤ 0,5%	4	Less healthy
ROA ≤ 0%	5	Unhealthy

Source: SE BI 6/23/DPNP/2011

Table 4. BOPO Rating Criteria.

Criteria	Rank	Predicate
BOPO ≤ 94%	1	Very healthy
94% < BOPO ≤ 95%	2	Healthy
95% < BOPO ≤ 96%	3	Healthy enough
96% < BOPO ≤ 97%	4	Less healthy
BOPO > 97%	5	Unhealthy

Source: SE BI 6/23/DPNP/2011

3   Research Methodology and Research Framework

This research includes descriptive research with a quantitative approach. The population consists of five BUMN Banking. Because it uses the non-probability technique of the purposive sampling method, four samples meet the criteria, including Bank BRI, Bank BNI, Bank Mandiri, and Bank BTN.

The data used is secondary data contained in the financial reports issued by BUMN Banking for the 2012–2021 period in the form of financial ratios. Data can be obtained through the website of the Indonesia Stock Exchange (IDX) and the bank's official website. The data analysis method uses analysis of average financial performance ratios,
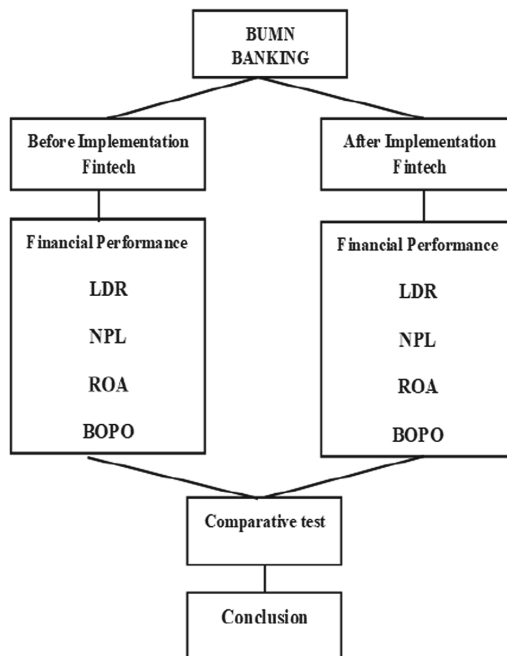

Fig. 1. Research Framework

Table 5. Descriptive Statistic.

	Min	Max	Mean	Std.Deviation
LDRbefore	83.11	105.12	89.735	10.31891
LDR after	86.58	101.23	90.508	7.161281
NPL before	1.81	3.68	2.5715	.798200
NPL after	2.57	3.66	3.0215	.458890
ROA before	1.64	4.58	3.1080	1.201994
ROA after	.93	3.11	2.1570	.941279
BOPObefore	64.51	83.84	72.036	8.359805
BOPOafter	70.59	89.33	77.505	8.392168

Source: Secondary data processed, 2022

normality tests, and different tests in the period before the implementation of Fintech 2012–2016 and the period after the implementation of Fintech 2017–2021 (Fig. 1).

4 Research Result

4.1 Descriptive Statistic

Descriptive statistics are used to determine the minimum value, maximum value, mean, and standard deviation. The results are shown in Table 5.

4.2 Financial Ratio Analysis

Analyze financial performance ratios by assessing the criteria LDR, NPL, ROA, and BOPO before the implementation of Fintech in 2012–2016 and after the implementation of Fintech in 2017–2021.

Assessment of Financial Performance Ratios Before Fintech Implementation
See Table 6.
    Assessment of Financial Performance Ratios After Fintech Implementation
    See Table 7.
    Based on the assessment of financial performance before and after the implementation of fintech at each bank, the results are:

1. Bank BRI, Bank BNI, and Bank Mandiri the ratio of LDR, NPL, and BOPO average value has increased which indicates the health condition of banks after the implementation of fintech has decreased. The average value of the ROA ratio has decreased which indicates that the bank's health condition has decreased after the implementation of fintech.

Table 6. Ratio Assessment Result.

Bank	Ratio	Average value	Criteria
BRI	LDR	84,94%	Healthy
	NPL	1,81%	Very healthy
	ROA	4,58%	Very healthy
	BOPO	64,51%	Very healthy
BNI	LDR	85,76%	Healthy enough
	NPL	2,54%	Healthy
	ROA	2,54%	Very healthy
	BOPO	3,02%	Very healthy
Mandiri	LDR	71,40%	Healthy
	NPL	83,11%	Healthy
	ROA	2,25%	Very healthy
	BOPO	3,17%	Very healthy
BTN	LDR	68,38%	Less healthy
	NPL	105,12%	Healthy
	ROA	3,68%	Very healthy
	BOPO	1,64%	Very healthy

Source: Secondary data processed, 2022

2. At Bank Mandiri, all the average value ratios decreased after the implementation of fintech. In the LDR, NPL, and BOPO ratios, the average value decreases, which indicates that the bank's health condition has decreased after the implementation of fintech. However, unlike the ROA ratio, the decrease in the average ROA value indicates that the bank's health condition has improved after the implementation of fintech.

4.3 Normality Test

The normality test is a test to see whether the data is normally distributed or not. The data normality test uses the Shapiro-Wilk test in the SPSS application program with a probability level (sig) of 0.05. Sig value < 0.05 data not normally distributed. Conversely, if the Sig value > 0.05, the data is normally distributed [20].

   Bank Rakyat Indonesia (BRI)

   See Table 8.

   The table above shows the significant value of all financial performance ratio data (LDR, NPL, ROA, and BOPO) both before and after the implementation of fintech > 0.05, namely 0.217, 0.097, 0.447, 0.336, 0.545, 0.151, 0.257, 0.175. This means that all data are normally distributed.

Table 7. Ratio Assessment Result.

Bank	Ratio	Average value	Criteria
BRI	LDR	86,73%	Less healthy
	NPL	2,57%	Healthy
	ROA	3,11%	Very healthy
	BOPO	72,63%	Very healthy
BNI	LDR	86,58%	Healthy enough
	NPL	2,90%	Healthy
	ROA	1,96%	Very healthy
	BOPO	77,46%	Very healthy
Mandiri	LDR	87,48%	Healthy enough
	NPL	2,94%	Healthy
	ROA	2,61%	Very healthy
	BOPO	70,59%	Very healthy
BTN	LDR	101,23%	Less healthy
	NPL	3,66%	Healthy
	ROA	0,93%	Healthy enough
	BOPO	89,33%	Very healthy

Source: Secondary data processed, 2022

Table 8. Bank BRI Normality Test Result.

Tests of Normality			
	Statistic	df	Sig.
LDRBefore	.951	5	.748
LDRAfter	.878	5	.299
NPLBefore	.748	5	.029
NPLAfter	.940	5	.667
ROABefore	.754	5	.032
ROAAfter	.893	5	.373
BOPOBefore	.829	5	.137
BOPOAfter	.794	5	.072

Source: Secondary data processed, 2022

Table 9. Bank BNI Normality Test Result.

Tests of Normality			
	Statistic	df	Sig.
LDRBefore	.857	5	.217
LDRAfter	.952	5	.753
NPLBefore	.920	5	.532
NPLAfter	.865	5	.247
ROABefore	.881	5	.314
ROAAfter	.872	5	.275
BOPOBefore	.986	5	.963
BOPOAfter	.830	5	.138

Source: Secondary data processed, 2022

Bank Negara Indonesia (BNI)

Table 9 shows the significant value of all financial performance ratios both before and after the implementation of fintech > 0.05, namely 0.217, 0.753, 0.532, 0.247, 0.314, 0.257, 0.963, and 0.138. This means that all data are normally distributed.

Bank Mandiri

Table 10 shows the significant value of the LDR and BOPO ratio data before and after as well as the NPL and ROA ratio data after > 0.05, namely 0.748, 0.299, 0.137, 0.072, 0.667, 0.373 This means that the data is normally distributed. Meanwhile, the NPL and ROA ratio data before the implementation of fintech had a significance value of <0.05, namely 0.029 and 0.032. This means that the data is not normally distributed.

Table 10. Bank Mandiri Normality Test Result.

Tests of Normality			
	Statistic	df	Sig.
LDRBefore	.951	5	.748
LDRAfter	.878	5	.299
NPLBefore	.748	5	.029
NPLAfter	.940	5	.667
ROABefore	.754	5	.032
ROAAfter	.893	5	.373
BOPOBefore	.829	5	.137
BOPOAfter	.794	5	.072

Source: Secondary data processed, 2022

Table 11. Bank BTN Normality Test Result

Tests of Normality			
	Statistic	df	Sig.
LDRBefore	.885	5	.334
LDRAfter	.893	5	.373
NPLBefore	.814	5	.104
NPLAfter	.915	5	.501
ROABefore	.876	5	.293
ROAAfter	.979	5	.929
BOPOBefore	.899	5	.405
BOPOAfter	.985	5	.959

Source: Secondary data processed, 2022

Bank BTN

Table 11 shows the significant value of all financial performance ratio data (LDR, NPL, ROA, and BOPO) both before and after the implementation of fintech > 0.05, namely 0.334, 0.373, 0.104, 0.501, 0.293, 0.929, 0.405, 0.959. This means that all data are normally distributed.

4.4   Paired Sample T-Test

Paired T-Test is a parametric test to measure two paired data. By doing this test it will be seen whether there is a difference in the mean of the two samples which are grouped assuming the data is normally distributed. Significance value (2-tailed) < 0.05, indicating a significant difference. Conversely, if the significance value (2-tailed) > 0.05, it indicates that there is no significant difference [5].

Bank BRI

Table 12 shows the sig. (2-tailed) for the ratio of NPL, ROA, and BOPO < 0.05, namely 0.005, 0.002, 0.006 indicates there is a significant difference, while the LDR

Table 12. Bank BRI Paired Sample T-Test Result.

Paired Samples Test					
	Std Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
LDRbefore-after	5.6837	2.5418	-.704	4	.520
NPL before-after	.3004	.13437	-5.671	4	.005
ROA before-after	.4307	.19263	7.652	4	.002
BOPObefore-after	3.3849	1.5137	-5.361	4	.006

Source: Secondary data processed, 2022

Table 13. Bank BNI Paired Sample T-Test Result.

Paired Samples Test

	Std Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
LDRbefore-after	7.1226	3.1853	-.257	4	.810
NPL before-after	.8414	.37630	-.957	4	.393
ROA before-after	.7231	.32342	3.277	4	.031
BOPObefore-after	6.9099	3.0902	-1.961	4	.121

Source: Secondary data processed, 2022

ratio shows a sig. (2-tailed) > 0.05, which is 0.520, meaning that there is no significant difference in the ratio of NPL, ROA, and BOPO after the implementation of Fintech. Whereas in the LDR ratio, there is no significant difference after the implementation of Fintech.

Bank BNI

Table 13 shows the sig. (2-tailed) for the ratio of LDR, NPL, and BOPO > 0.05, namely 0.810, 0.393, and 0.121 showed no significant difference, while the ROA ratio showed a sig. (2-tailed) < 0.05, i.e. 0.031 means that there is a significant difference in the ratios of LDR, NPL, and BOPO after the implementation of Fintech. Whereas in the ROA ratio, there is a significant difference after the implementation of Fintech.

Bank Mandiri

Table 14 shows the sig. (2-tailed) for the ratio of LDR and BOPO > 0.05, namely 0.364 and 0.627 indicating that there is no significant difference in the ratio of LDR and BOPO after the implementation of Fintech.

Bank BTN

Table 15 shows the sig. (2-tailed) for the ratio of LDR and NPL > 0.05, namely 0.365 and 0.975 showed no significant difference, while the ratio of ROA and BOPO showed sig. (2-tailed) < 0.05, namely 0.010 and 0.017 means that there is a significant difference in the ratio of LDR and NPL after the implementation of Fintech. Whereas in the ROA and BOPO ratios, there is a significant difference after the implementation of Fintech.

Table 14. Bank Mandiri Paired Sample T-Test Result.

Paired Samples Test

	Std Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
LDRbefore-after	9.5508	4.2712	-1.024	4	.364
BOPObefore-after	9.4107	4.2086	-.526	4	.627

Source: Secondary data processed, 2022

Table 15. Bank BTN Paired Sample T-Test Results.

Paired Samples Test

	Std Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
LDRbefore-after	8.5263	3.8131	1.020	4	.365
NPL before-after	1.2058	.53925	.033	4	.975
ROA before-after	.34989	.15647	4.550	4	.010
BOPObefore-after	3.1054	1.3887	-3.952	4	.017

Source: Secondary data processed, 2022

Table 16. Bank Mandiri Wilcoxon Test Result.

Test Statistics

	Z	Asymps. Sig. (2-tailed)
NPL before-after	-1.214[b]	.225
ROA before-after	-1.214[c]	.225

Source: Secondary data processed, 2022

4.5 Wilcoxon Signed Rank Test

The Wilcoxon Signed Rank Test is a non-parametric test that is shown to assess the differences in two paired data on an ordinal scale with the assumption that the data is not normally distributed. If the probability value of Asym.sig 2 tailed <0.05, it indicates that there is a significant difference. Conversely, if the probability value of Asym.sig 2 tailed > 0.05, it indicates that there is no significant difference [21].

Bank Mandiri

Table 16 shows the asymp value. sig. (2-tailed) for the ratio of NPL and ROA before and after implementing fintech > 0.05, which is 0.225. Shows that there is no significant difference in the ratio of NPL and ROA after the implementation of the fintech.

5 Discussion

5.1 Comparison of LDR Before and After Implementation of Fintech

LDR is a ratio shown to assess how capable a bank is of dealing with debt repayments. The higher the LDR value, the higher the profit, provided that they can distribute credit effectively. Increased bank profits will improve banking performance. The size of the LDR ratio can affect banking performance. The LDR standard is 78%–92%. So it can be said in the good category [22].

From Chart 1, it can be seen that Bank BRI, Bank BNI, and Bank Mandiri have LDR values in the standard category of 78%–92% from before implementing Fintech until
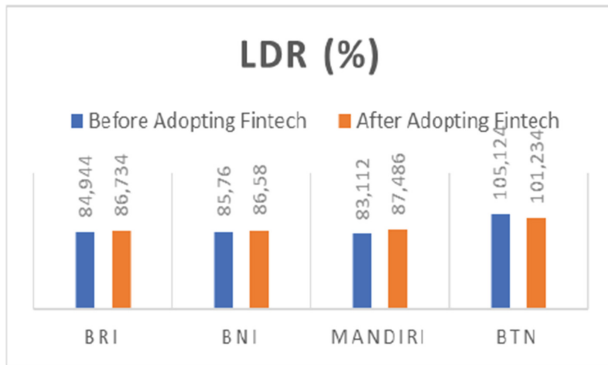
Chart 1. LDR Ratio Comparison. *Source: Secondary data processed, 2022*

they have implemented Fintech. Meanwhile, at Bank BTN, the LDR value exceeds the standard and is included in the unhealthy criteria. It can be seen that the LDR values of all banks tend to be constant before and after the implementation of Fintech.

The results of the paired sample t-test from all banks (Bank BRI, Bank BNI, Bank Mandiri, and Bank BTN) obtained a significance value greater than 0.05 (>0.05), namely 0.520, 0.810, 0.364, and 0.365. So there is no significant difference between LDR before and after the implementation of Fintech. This is because fintech lending services are less able to boost credit distribution to customers. Because with the implementation of fintech lending, the interest set by the bank will also increase. As a result, customers are still reluctant to use it. So that the conventional method is intensely used so that the Fintech services offered do not have an impact.

This study is in line with research conducted by Chairizky [23] and Anastasia & Munari [24] which stated that the LDR ratio variable showed no significant effect on banking financial performance after collaborating with Start-Up Fintech. Marked by the increase in LDR which resulted in lower liquidity of the Bank. This means that banks have not been able to extend credit to the public. However, contrary to the research of Idfilandu & Saripudin [25], Suharti & Ardiansyah [26] stated that there were significant differences in LDR before and after the fintech era.

5.2 Comparison of NPL Before and After Implementation of Fintech

NPL is shown to assess how capable the banking management is to manage non-performing loans. The impact of an NPL ratio that is too high is the reduced opportunity to obtain results from loans which will reduce banking profits [22]. Bank Indonesia stipulates that if a bank is in the healthy category, the NPL ratio must be below 5% [27].

From Chart 2, it can be seen that all banks (BRI Bank, BNI Bank, Mandiri Bank, and BTN Bank) have NPL values below 5% both before and when they implemented Fintech. It can be interpreted that the bank is included in the healthy category. Even so, it can be seen that the NPL value increased after the implementation of Fintech at Bank BRI, Bank BNI, and Bank Mandiri, and tended to be constant at Bank BTN. Which shows there is an increase in non-performing loans.
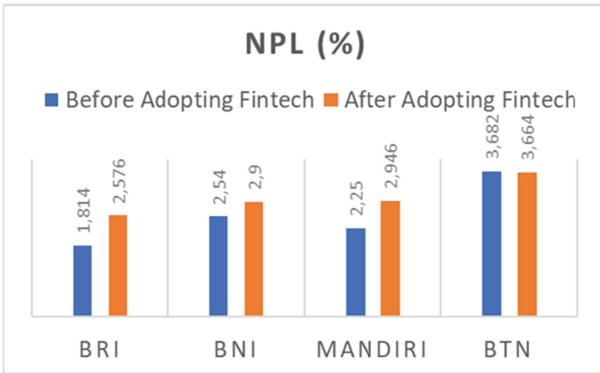
Chart 2. NPL Ratio Comparison. *Source: Secondary data processed, 2022*

The results of the paired sample t-test from Bank BRI showed a significance value of less than 0.05 (<0.05), which was 0.005. So there is a significant difference between NPL before and after the implementation of Fintech. Supported by Chart 2, this can happen because the Fintech services that are implemented increase the number of non-performing loans. Because fintech lending services have the potential to fail in payments. With the increase in the value of NPL faced by the bank, the profitability obtained by the bank will also decrease.

The results of research at BRI Bank are in line with the research of Sari [28], Prastika [29], and Ambarwati & Abunandti [30] which state that the NPL ratio after collaborating with fintech companies has a negative and significant effect on banking performance. Which can affect banking profits. However, contrary to the research of Anastasia & Munari [24], Stevani & Sudirgo [18], and Saputra *et al.*, [31] stated that NPL had no significant effect after collaborating with Fintech.

Meanwhile, the results of the paired sample t-test at Bank BNI and Bank BTN, as well as the Wilcoxon signed rank test at Bank Mandiri showed a significance value of more than 0.05 (>0.05), which was 0.393, 0.975, 0.225. So there is no significant difference in NPL before and after the implementation of Fintech. This happens because the Fintech services implemented by banks are not optimal in managing existing bad loans, so they cannot provide a significant difference to the NPL value and cannot generate optimal profits.

The results of research at Bank BNI, Bank BTN, and Bank Mandiri are in line with research by Apriani & Mansoni [22] that there is uncertainty between increases and decreases in NPL values followed by increases and decreases in financial performance as assessed by the ROA ratio, causing NPL to not have a significant effect on ROA after fintech adoption. However, contrary to the research of Munandar et al., [32] that there is a difference in NPLs after the implementation of Fintech.

5.3   Comparison of ROA Before and After Implementation of Fintech

ROA is the proportion shown to assess the amount of net profit that can be obtained from each asset invested in total banking assets [33]. The increase in the ROA value of a
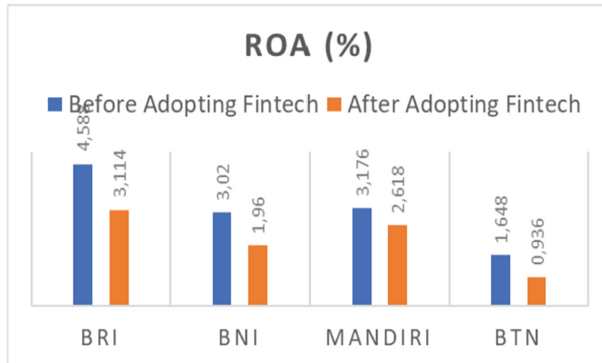
Chart 3. ROA Ratio Comparison. *Source: Secondary data processed, 2022*

bank shows that the condition of the bank is getting better in terms of the use of assets. According to Bank Indonesia Regulation No. 13/1/PBI/2011, the best ROA standard is more than 1.5% [34].

From Chart 3, it can be seen that the ROA values of all banks (Bank BRI, Bank BNI, Bank Mandiri, and Bank BTN) before and after the implementation of Fintech are above the best ROA standard of 1.5%. So that it is in the very healthy category. Except for ROA after the implementation of Fintech Bank BTN, it is in the healthy category. As a whole, the ROA value after the implementation of Fintech has decreased. The decreased ROA value indicates that the bank's ability to earn net profit has also decreased.

The results of the paired sample t-test from Bank BRI, Bank BNI, and Bank BTN show a significance value of less than 0.05 (<0.05), which is 0.002, 0.031, and 0.010. So there is a significant difference between ROA before and after the implementation of Fintech. This can be caused by the use of Fintech more frequently used than offline payment methods, due to its practical and efficient nature. The more people use banking Fintech services, the ROA value will increase. Banking financial performance and distribution of bank financing funds are getting easier. Thus, banking profitability will also increase.

The results of research on Bank BRI, BNI, and Bank BTN are supported by the research of Wadesango [35], W. H. Putri *et al.,* [9], and Mar'atushsholihah & Karyani [12] which states that the ROA ratio has a significant effect after collaborating with Start-up Up Fintech. Shows the bank can generate profitability. However, contrary to the research of Moridu et al., [36], Ramadhon [37], and Sinambela & Rohani [38] which stated that there was no significant effect on banking performance represented by ROA and ROE after the implementation of Fintech.

Meanwhile, the results of the Wilcoxon signed rank test from Bank Mandiri showed a significance value greater than 0.05 (>0.05), namely 0.225. So there is no significant difference between ROA before and after the implementation of Fintech. This could be due to the use of banking Fintech services not being used optimally in the initial period of implementation. So that there are still many people who choose to make offline transactions even though they have to be willing to queue at the bank because there is still a lack of public interest in using FinTech. In addition, Bank Mandiri has not

been able to process asset ownership in obtaining profits. Because banking operational activities tend to manage funds rather than assets.

The results of research on Bank Mandiri are in line with the research of Cantika et al., [33] which states that the ROA ratio has no significant effect on generating profitability due to the lack of asset utilization when collaborating with Start-Up Fintech by banks. However, contrary to the research of Kristianti & Tulenan [10] which stated that there was a significant effect on banking financial performance as measured by ROA after working with Fintech.

5.4   Comparison of BOPO Before and After Implementation of Fintech

BOPO is shown to see how big the level of efficiency is and how capable the bank is in managing operational costs against operating income. According to Bank Indonesia Circular No. 6/23/DPNP of 2004, a bank can be classified as healthy if it has a BOPO ratio between 94–96%. If the BOPO ratio exceeds that, the bank is said to be inefficient in managing its operational costs [39].

From Chart 4, it can be seen that the BOPO values of all banks (Bank BRI, Bank BNI, Bank Mandiri, and Bank BTN) before and after implementing Fintech are below 94–96%. So that the bank is included in the very healthy category. It can be seen that the overall BOPO value after the implementation of Fintech has increased. The more the BOPO value increases, it indicates that the bank's ability to control its operational costs is decreasing.

The results of the paired sample t-test from Bank BRI and Bank BTN show a significance value of less than 0.05 (<0.05), which is 0.006, 0.017. So there is a significant difference between BOPO before and after the implementation of Fintech. This can be caused because the more variants and the higher the quality of the Fintech provided by these banks, the more operational income they get because more and more people are using it. This shows that after collaborating with Fintech, banking operating expenses have decreased so that the profits obtained will be optimal.

The results of research at Bank BRI and Bank BTN are supported by research by Muchlis [40] and Puspa & Hendratno [41] which state that FinTech has an effect on
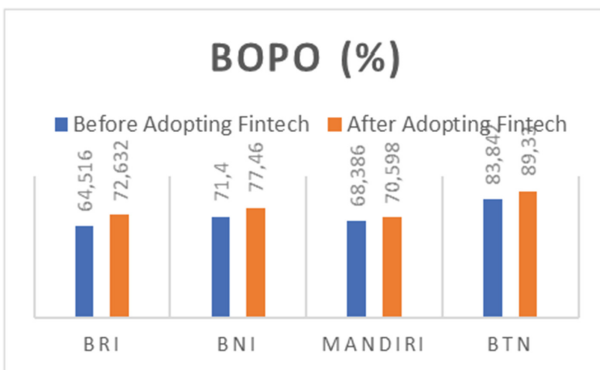

Chart 4. BOPO Ratio Comparison. *Source: Secondary data processed, 2022*

operational cost efficiency and has ease of use, according to customer wishes. However, contrary research by Moridu et al.,[36] and Lestari *et al.,* [42] stated that BOPO did not show any difference before and after the implementation of fintech.

Meanwhile, the results of the paired sample t-test at Bank BNI and Bank Mandiri showed a significance value of more than 0.05 (>0.05), which was 0.121, 0.627, and 0.225. So there is no significant difference between BOPO before and after the implementation of Fintech. This can happen because FinTech services facilitate all transaction activities in banking, but have not been able to cut operational financing at the bank so there is no significant difference. In addition, the collaboration between the bank and the FinTech Start-Up is not on the operational scale of the bank but through the stage of investing funds in the FinTech Start-Up, where the bank only becomes an investor or creditor [33].

The results of research at Bank BNI and Bank Mandiri are in line with research by Ratnawati[43] and Cantika *et al.,* [33] which state that the BOPO variable before and after collaboration with FinTech shows no significant effect. Because the bank is an investor, there is no direct operation in the bank's management. However, this is not in line with the research of Sandy[44] and Nagara & Syafitri [45] which state that Fintech has an effect on operational costs after the adoption of Fintech.

6   Conclusion

Based on the results of research and discussion, it can be concluded that:

1. At Bank BRI, the variables of NPL, ROA, and BOPO show that there is a significant difference, while the variable of LDR showed no significant difference in the period after the implementation of fintech.
2. At Bank BNI, the variable of ROA showed a significant difference, while for the variables of LDR, NPL, and BOPO there was no significant difference in the period after the implementation of fintech.
3. At Bank Mandiri, all variables (LDR, NPL, ROA, and BOPO) showed no significant differences in the period after the implementation of fintech.
4. At Bank BTN, the variables of ROA and BOPO showed significant differences, while the variables LDR and NPL showed no significant differences in the period after the implementation of fintech.

7   Limitations of the Research

Limitations of this study are:

1. This study only uses the subjects of BUMN Banking, namely Bank Rakyat Indonesia (BRI), Bank Negara Indonesia (BNI), Bank Mandiri, and Bank Tabungan Negara (BTN).
2. The Fintech variable is only used in this study, only as a time differentiator, so there is no separate data from Fintech.
3. The variables used in this study only use four financial performance ratios.

8 Suggestions

Based on the above conclusions, the suggestion that can be given for further research are as follows:

1. It is hoped that BUMN Banking can maintain and maximize fintech services in their financial transaction activities because fintech can boost the image of banking names to become better known to the public with their ease and sophistication in accessing financial services. That way the banking financial performance will run smoothly, to increase profitability.
2. Future research is expected to provide information and benefits, especially for those who practice research on financial performance to expand reference sources and provide information, especially in the banking sector after implementing Financial technology. It is hoped that further information will be provided will greatly help the economy and increase profits, especially in the banking sector.
3. For further research, it is expected to use different variables and a longer research period of years to obtain more accurate results.

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