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Analysis of the Influence of Fintech Cooperation, Bank Performance Variables (CAR, CR, LDR, ROA, BOPO) and Bank Size on BPR Risk Taking

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Abstract

This study aims to analyze the effect of cooperation with financial technology (fintech) companies, bank performance variables consisting of Capital Adequacy Ratio (CAR), Current Ratio (CR), Loan to Deposit Ratio (LDR), Return on Assets (ROA), Operating Costs to Operating Income (BOPO), and bank size on risk taking at Rural Credit Banks (BPR) in Banten Province. A quantitative approach is used in this study with a multiple linear regression method to test the relationship between variables. The data used are secondary data obtained from BPR financial reports and fintech cooperation reports for a certain period. The results of the study indicate that fintech cooperation and several bank performance indicators have a significant effect on BPR risk taking. Simultaneously, all independent variables contribute to explaining variations in risk taking. These findings provide important implications for BPR management in managing financial risk, especially in the context of collaboration with fintech and increasing operational efficiency.

1. Introduction

Bank Perekonomian Rakyat (BPR) is commonly translated into English as "Rural Bank" or sometimes *People's Credit Bank*. BPR in its role as a financial intermediary institution has a distinctive characteristic, namely its ability to collect funds from the community and its ability to distribute these funds. The health of the banking sector can improve bank performance, thus enabling competitiveness and survival in various industries. An efficient banking system is expected to ensure the implementation of appropriate monetary policy and facilitate economic stability.

BPR has short-term and long-term goals, so effective bank management is needed to maintain public trust in customers and investors who entrust their funds. This requires a continuous focus on operational efficiency to maintain performance (Aufa et al, 2022). BPR is very important in the economy, especially in channeling loans to MSMEs. Increasing financial access for MSMEs will improve their operational capabilities, thereby encouraging economic growth and job creation. To achieve this goal, it is important to conduct efficiency assessments in

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the banking sector, especially in Bank Perekonomian Rakyat (BPR). In addition to encouraging public welfare, efficiency in the banking sector can effectively meet the bank's short-term goals, including maximizing profits, as well as the long-term goal of optimizing the welfare of the owners. One strategy to achieve this goal is to increase the efficiency of BPRs.

BPRs have several advantages over conventional banks; although smaller in scale, BPRs are more numerous and spread throughout Indonesia, including areas with limited financial access. BPRs have facilitated financial inclusion in the targeted retail market segment, particularly by providing financing to micro, small, and medium enterprises (MSMEs) that mostly operate in the informal sector and have less access to credit from conventional banks. The importance of BPRs in the economy requires their efficiency to be realized to increase financial inclusion and regional development (Imron et al., 2024).

Since 2014, financial technology (fintech) has played an important role in advancing the financial industry. Fintech encompasses digital innovation and technology-based business model innovation in the financial sector. The advancement of fintech has increased the competitiveness of commercial banks, as digital technology has significantly improved the efficiency of services offered by banks and other financial institutions to small and micro businesses, as well as private companies (Berg et al., 2019).Financial institutions aim to minimize client acquisition costs and manage risks, thereby lowering operational costs (Yang Wang, 2021).

Fintech is an innovation in the use of technology whose product is a system that facilitates financial transaction mechanisms.(Prasetyo, 2022). Bitler et al. (2001)explains that "*mobile banking*, internet banking, SMS banking, and phone banking are some of the financial technologies utilized by banks.Lipton & Pentland (2018)predicting an increased role for banks in the future when incorporating fintech.The increasing adoption of fintech has increased the competitiveness of banks as financial technology plays a vital role in increasing the effectiveness of the services banks offer to MSMEs.(Berg et al., 2020).

Fintech, in addition to increasing bank efficiency, the characteristics of fintech which have dual uniqueness, namely technology and finance, may bring greater risk impacts to banks. Bank stability is also affected by advances in information technology and competitive pressures of fintech companies, and banks need to review their competitive advantages to adapt to new realities.(Jakši˘c & Matej, 2019).

Efficiency is the achievement of desired results through the comparison of inputs and outputs. A bank is considered technically efficient if it can produce a certain output with little input (Smith & Street, 2005). Berger and Mester (1997) stated that Efficiency in the banking business is a comprehensive representation of the key elements needed to achieve strong and sustainable financial performance. BPR financial performance, both positive and negative, can be assessed using analytical methods or ratios presented as financial ratios.

Bank size is a quality that often affects its efficiency. Large banks typically have advantages over medium-sized or small banks, including larger capital, superior workforce and reputation, and the capacity to generate non-interest income from sources such as investment banking, money transfers, foreign exchange, and insurance services. This makes it easier for large banks to access loans than medium-sized and small banks, thereby increasing the efficiency of large banks. Larger banks have more capital, which allows them to implement innovative technologies that increase profitability and reduce costs.(Berger & Mester, 1997).

This research will be conducted at BPR in Banten Province. BPR in Banten Province has started to grow rapidly from year to year. Although it has increased every year, BPR is still faced with several problems (Fiscal Study Agency, 2022). The problems faced by BPR in the Banten Province area include a decline in financial performance, especially during the Covid-19 pandemic. During the pandemic, namely from 2020, the performance of BPR in the Banten Region

has decreased. The NPL ratio has increased to 10.95%, reflecting the large number of problematic loans. The ROA ratio has decreased even until 2023, reaching one percent. The LDR ratio is stagnant at around 73.67% to 77.28%.

Previous research findings show that commercial banks can enjoy the benefits of technological developments by using fintech innovations, such as optimizing operational performance and improving risk control capabilities.(Gomber et al., 2017). Thus, fintech innovation can reduce risk taking by commercial banks. However, existing research does not provide a clear answer to the impact of bank fintech on risk taking. Most of the relevant studies are conducted from the perspective of macro fintech innovation. (Ernst & Young, 2019;Liao et al., 2022; Lee et al., 2021;Zhao et al., 2022)or simply show the impact of bank fintech innovation on one indicator, such as liquidity and asset quality.(Cheng & Qu, 2020), bank development (Anagnostopoulos, 2018). In addition, most researchers only conduct qualitative analysis.

Risk and threats are inherent elements in life, careful consideration of the potential consequences that may occur needs to be considered before decisions are made (Hoskisson et al. 2017). In an effort to achieve progress and success in uncertain situations, the banking sector proactively takes strategic steps by taking risks, of course by considering potential financial and security risks (Kosmidou et al., 2017). Rumondor & Bary (2020) stated that large banks are more careful in taking risks, compared to small banks that take excessive risks in their financing activities, including Islamic banks (Purbayanto et al., 2022). In Indonesia, banks with foreign ownership, government ownership, and low efficiency tend to take higher risks (Ismiyanti et al., 2018). The increase in risk-taking behavior is caused by the lack of quality information about borrowers, thus increasing the ratio of bad debts; political interests with high-risk projects and increasing short-term performance by accepting greater risks.

Based on the above explanation regarding the importance of BPR Risk Taking, its operations and the still limited research linking fintech cooperation, financial performance to bank efficiency and risk taking, it is interesting to conduct a study entitled "Analysis of the Influence of Fintech Cooperation, Bank Performance (CAR, CR, LDR, ROA, BOPO) and Bank Size on BPR Risk Taking in Banten Province".

2. Methods

This research is a quantitative research that is usually used in economic and financial research where the data to be processed is numerical data. This study uses secondary data, namely data obtained from bank financial reports. The secondary data used is time series in December 2020, 2021, 2022, 2023 and 2024. The data source is from the annual report of each BPR and Indonesian Banking Statistics data. According to (Sugiyono, 2016) population is a generalization of objects and subjects that have the quality and character that are in accordance with those determined by the researcher to be observed and concluded. The population in this study were all BPRs in the Banten Province area that collaborated with fintech lending. BPR collaboration with Fintech Lending began in 2020 to 2024, namely the number of BPRs as many as 14 (fourteen) BPRs in the Banten Province area. According to (Sugiyono, 2016) the sample is a number of quantities and characteristics of the population. Furthermore, Arikunto (2012:104) explains that if the population has not reached 100, then the number of data samples taken for the study is the whole, but if the population exceeds 100, then the sample taken is 10-15% or 20-25% of the population. Given that the research population is 14 BPRs, all of them will be used as research samples. The researcher uses panel data regression analysis techniques. Sir Francis Galton was the first to discover the "regression" analysis technique in 1986 which was then developed and updated by Gujarati in 2003. Panel data regression is a statistical method used to analyze data that combines time series and cross-sectional data to identify the relationship between independent variables and dependent variables.

3. Results and Discussion

F Test

The F Statistic Test basically shows whether all independent variables entered into the model have a joint influence on the dependent variable. Here are the results of the F Test:

Table 1.
F Test Results

F-Statistic	4673.06
Prob (F-Statistic)	0.0000

Source: Research results (2025)

The results of the simultaneous significant test can be seen in Table 2. The F test was conducted to determine the influence of the variables Fintech, CAR, ROA, BOPO, LDR, CR and Total Assets on Bank Risk Taking simultaneously. The Sig. value is0.000shows that the alpha significance level of 0.05 two tailed is significant. Meanwhile, testing with the F test is done by comparing the Ftable value with the Fcount. The Fcount value is4673.06, Ftable is 2.261 (see Table F), thus the calculated F result is obtained (4673.06) < F table (2.261) then the hypothesis is accepted. It can be concluded that Fintech, CAR, ROA, BOPO, LDR, CR and Total Assets have a simultaneous effect on BPR Risk Taking in Banten Province in the 2020-2024 reporting period.

T-test

The T-test basically shows how far the influence of one independent variable partially affects the dependent variable included in the model. Here are the results of the T-test:

Table 2.
T-Test Results

Y	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
X1	.1478576	.0243802	6.06	0.000	.0988638	.1968514
X2	.0011932	.0005814	2.05	0.045	.0000249	.0023615
X3	.4748681	.0071379	66.53	0.000	.4605238	.4892123
X4	.0037881	.0010843	3.49	0.001	.0016091	.0059672
X5	-.0010702	.000598	-1.79	0.080	-.0022718	.0001314
X6	.0008131	.0005662	1.44	0.157	-.0003247	.0019508
X7	-.1773451	.0191537	-9.26	0.000	-.2158359	-.1388542
_cons	1.539889	.4718369	3.26	0.002	.5916972	2.488081

Source: STATA v.17 output, researcher processing results (2025)

From the results of the model estimation, hypothesis testing is carried out in accordance with the objectives of this study. The T test is carried out to determine the effect of the variables Fintech, CAR, ROA, BOPO, LDR, CR and Total Assets on Bank Risk Taking partially (individually). The t test is carried out by comparing the t count value with the t table. If t count> t table, then

the effect is said to be significant, and if t count < t table, then the effect is said to be insignificant. The results of the hypothesis testing can be described below:

1. *H1 : The development of fintech products has a significant negative impact on BPR risk taking*

Based on the t-test at α = 5% in table 2, the probability value of the variableFintech product developmentas big as0.000or less than 0.05, it can be concluded that CAR does not have a significant effect on BPR risk taking in Banten Province. If you look at the t table value at alpha 0.05 (one tail) it is1,667, while the calculated t value is6.06(positive),then H1 is rejected. Thus, it can be concludedFintech product developmenthas a positive and significant effect on BPR Risk Taking in Banten Province in the 2020-2024 reporting period.

2. *H2 : BPR capital has a positive effect on BPR risk taking in Banten Province.*

Based on the t-test at α = 5% in table 2, the probability value of the variableBPR Capitalizationas big as0.045or less than 0.05, it can be concluded that BPR capital has a significant effect on BPR risk taking in Banten Province. If you look at the t table value at alpha 0.05 (one tail) it is1,667, while the calculated t value is2.05(positive),then H2 is accepted. Thus, it can be concluded that BPR Capital has a positive and significant effect on BPR Risk Taking in Banten Province in the reporting period 2020-2024.

3. *H3 : Cash Ratio BPR has a positive influence on BPR risk taking.*

Based on the t-test at α = 5% in table 2, the probability value of the variableBPR Cash Ratioas big as0.157or greater than 0.05 then it can be concluded BPR Cash Ratiodoes not have a significant effect onBPR risk taking in Banten Province. If you look at the t table value at alpha 0.05 (one tail) it is1,667, while the calculated t value is1.44(positive),then H3 is rejected. Thus, it can be concludedBPR Cash Ratiohas a positive but insignificant effect on BPR Risk Taking in Banten Province in the 2020-2024 reporting period.

4. *H4 : LDR BPR has a positive effect on BPR risk taking.*

Based on the t-test at α = 5% in table 2, the probability value of the variableLDR BPR as big as0.080or greater than 0.05 then it can be concluded LDR BPR does not have a significant effect onBPR risk taking in Banten Province. If you look at the t table value at alpha 0.05 (one tail) it is1,667, while the calculated t value is-1.79(negative),then H4 is rejected. Thus, it can be concludedLDR BPR has a negative but insignificant effect on BPR Risk Taking in Banten Province in the 2020-2024 reporting period.

5. *H5 : The ROA ratio of BPR has a positive effect on risk taking.*

Based on the t-test at α = 5% in table 2. the probability value of the variableBPR ROA Ratio as big as0.000or less than 0.05 then it can be concluded BPR ROA Ratio have a significant impact onBPR risk taking in Banten Province. If you look at the t table value at alpha 0.05 (one tail) it is1,667, while the calculated t value is66.53(positive),then H5 is accepted. Thus, it can be concludedBPR ROA Ratio has a positive and significant effect on BPR Risk Taking in Banten Province in the 2020-2024 reporting period.

6. H6 : BOPO BPR has a positive effect on credit risk taking.

Based on the t-test at α = 5% in table 2, the probability value of the variableBOPO BPR as big as0.001or less than 0.05 then it can be concluded BOPO BPR have a significant impact onBPR risk taking in Banten Province. If you look at the t table value at alpha 0.05 (one tail) it is1,667, while the calculated t value is3.49(positive),then H6 is accepted. Thus, it can be concludedBOPO BPR has a positive and significant effect on BPR Risk Taking in Banten Province in the 2020-2024 reporting period.

7. H7 : Bank size has a positive effect on BPR risk taking.

Based on the t-test at α = 5% in table 2, the probability value of the variableBank size as big as0.000or less than 0.05 then it can be concluded Bank size have a significant impact onBPR risk taking in Banten Province. If you look at the t table value at alpha 0.05 (one tail) it is1,667, while the calculated t value is-9.26(negative),then H7 is rejected. Thus, it can be concludedBank size has a negative and significant effect on BPR Risk Taking in Banten Province in the 2020-2024 reporting period.

4. Discussion

The Impact of Fintech Product Development on BPR risk taking

The first hypothesis states thatFintech product development has a significant negative effect on BPR risk taking in Banten Province in the 2020-2024 reporting period. The test results show that fintech product development has a positive and significant effect on BPR risk taking in Banten Province, thus it can be concluded that H1 is rejected. Fintech development significantly reduces the risk-taking behavior of commercial banks. Fintech has financial and technological characteristics that have a greater impact on bank risk-taking behavior. The risk mitigation effect is more pronounced in large banks, because large banks are more involved in the adoption of fintech products. They have better financial infrastructure, risk mitigation capabilities, and greater investment capabilities to invest in technology products. According to research by Liao, (2018) who analyzed the impact of Internet finance on the risk-taking behavior of commercial banks. The research study found that there is a positive and significant relationship between internet finance and bank risk taking. Cheng and Qu, 2020 examined the effect of fintech on bank credit risk in Chinese commercial banks. This study analyzed data collected from 60 commercial banks from 2008 to 2017. Their findings revealed that fintech development is faster in state-owned banks, and fintech products are negatively related to bank credit risk. This suggests that fintech products reduce bank credit risk. Banks that use fintech will increase bank efficiency, thereby reducing risk-taking behavior. However, on the other hand, the development of fintech products also increases bank risk-taking behavior, because fintech products carry operational risks due to the lack of understanding of employees and new customers about fintech technology, financial fraud, and the risk of customer losses.

The Influence of Capital on BPR Risk Taking

The second hypothesis states thatBPR capital has a positive effect on BPR risk taking in Banten Province. The test results show that BPR Capital has a positive and significant effect on BPR risk taking in Banten Province in the reporting period 2020-2024, thus it can be concluded

that H2 is accepted. Bank capital is intended to measure the financial health of a bank and is used when the bank must bear losses without stopping its business activities (Hayes, 2022). Meanwhile, according to (Anginer & Kunt, 2014) a high capital ratio has a positive effect on bank risk taking. In carrying out its business activities, the Bank requires capital, one of the fulfillments of which is in the form of debt (Hermanto & Aryani, 2020) which is used to absorb risks caused by crisis conditions and/or excessive banking credit growth. Higher capital will intensify the potential for absorbing bank losses (Abbas et al., 2021).

The Influence of Liquidity on BPR Risk Taking

The third hypothesis states that*Cash Ratio* BPR has a positive effect on BPR risk taking in Banten Province. The test results show that BPR Cash Ratio has a positive but insignificant effect on BPR risk taking in Banten Province in the 2020-2024 reporting period, thus it can be concluded that H3 is rejected. The fourth hypothesis states that BPR LDR has a positive effect on BPR risk taking in Banten Province. The test results show that BPR LDR has a negative but insignificant effect on BPR risk taking in Banten Province in the 2020-2024 reporting period, thus it can be concluded that H4 is rejected. Increasing liquidity encourages aggressive bank policies to provide loans with easy terms, which ultimately leads to an increase in bank risk(Abbas et al., 2021 and Lucchetta, 2007). There is also an inverse relationship between liquidity and risk taking, which concludes that the availability of highly liquid assets leads to decreased risk. (Dahir et al., 2018). In developing countries, banks prefer to have higher liquid assets compared to developed countries. They found that banks with higher levels of liquidity in terms of deposits tend to take lower risks.

The Influence of BPR Operational Efficiency on Risk Taking

The fifth hypothesis states thatThe ROA ratio of BPR has a positive effect on risk taking in Banten Province. The test results show that the ROA ratio of BPR has a positive and significant effect on risk taking of BPR in Banten Province in the reporting period of 2020-2024, thus it can be concluded that H5 is accepted. The sixth hypothesis states that the BOPO ratio of BPR has a positive effect on risk taking in Banten Province. The test results show that the BOPO ratio of BPR has a positive and significant effect on risk taking of BPR in Banten Province in the reporting period of 2020-2024, thus it can be concluded that H6 is accepted. Inefficient banks tend to take more risks to achieve high bank profits compared to efficient banks. Prakash et.al., 2021 research study examined the relationship between risk taking, capital, and bank efficiency. The researchers concluded that high capital reduces the risk of bank bankruptcy. Technically efficient banks reduce risk-taking behavior, while bank inefficiency increases bank bankruptcy and risk. Casu and Girardone, 2009 examined the impact of capital and operational efficiency on bank risk. The study showed that there is a significant relationship between bank efficiency and risk taking. A negative relationship was observed because low bank efficiency motivates banks to increase bank returns and increase credit risk; increased credit risk involves additional bank costs and managerial efforts, which reduce the technical efficiency of the bank.

The Influence of BPR Size on BPR Risk-Taking Behavior

The seventh hypothesis states thatBank size has a positive effect on BPR risk taking in Banten Province. The test results show that bank size has a negative and significant effect on BPR risk taking in Banten Province in the 2020-2024 reporting period, thus it can be concluded that H7 is rejected. There are mixed results in the literature regarding the impact of fintech on large and small banks. Large banks are suspected of participating in technological progress by establishing or collaborating with fintech companies. Establishing a fintech company requires large costs that

small banks cannot afford. In addition, large banks diversify their sources of funding and loan investments to reduce risk, thus, large banks have lower and more stable risks(A. Kasman et al., 2016). Investors also believe that large banks are less likely to fail and have better resources to handle unexpected financial problems.(M. Mercan, 2021).Thus, large banks may be encouraged to take greater risks. Conversely, MR Goetz et al., 2013 conclude that larger, more complex, and geographically diversified banks are more likely to lend to insiders, which can worsen loan quality.

5. Conclusion

Based on the analysis of data concerning the influence of Fintech cooperation, key bank performance indicators—namely Capital Adequacy Ratio (CAR), Cash Ratio (CR), Loan to Deposit Ratio (LDR), Return on Assets (ROA), Operational Efficiency Ratio (BOPO)—and bank size on BPR (Rural Bank) risk-taking in Banten Province during the 2020–2024 reporting period, several important conclusions can be drawn. These conclusions highlight both the individual and collective effects of financial and technological variables on the risk behavior of BPRs. The following is a summary of the main findings and their implications.

Firstly, the development of Fintech products shows a positive and statistically significant influence on BPR risk-taking during the reporting period. This means that advancements in Fintech have a directional effect on changes in BPRs' willingness to assume financial risk. In practical terms, as Fintech innovations grow, they are likely to encourage BPRs to engage in higher-risk financial activities due to expanded operational capacity and access to digital financial services.

Secondly, BPR capital is found to have a positive and significant effect on risk-taking behavior. A higher capital base contributes to increased confidence in managing financial risks, which in turn leads to more assertive financial decisions. Thus, when BPRs possess stronger capital positions, they are more inclined to increase their exposure to risk in pursuit of higher returns.

Thirdly, the Cash Ratio (CR) of BPRs demonstrates a positive but statistically insignificant effect on risk-taking. Although an increase in liquidity could theoretically enhance a bank's ability to take on risk, the data suggests that this relationship is not strong enough to reach statistical significance. Consequently, while liquidity may influence risk behavior directionally, it does not play a decisive role in this context.

Fourthly, the Loan to Deposit Ratio (LDR) of BPRs exhibits a negative but statistically insignificant effect on risk-taking. A higher LDR may signal reduced liquidity and potentially more conservative lending practices. However, the absence of statistical significance implies that the relationship between LDR and risk-taking behavior among BPRs in Banten Province is not robust.

Fifthly, Return on Assets (ROA) has a positive and statistically significant effect on BPR risk-taking. This indicates that BPRs with higher profitability are more likely to engage in greater levels of risk-taking, possibly as a strategy to sustain or enhance financial performance. Profitability appears to serve as both a motivator and a cushion for taking calculated financial risks.

Sixthly, the Operational Efficiency Ratio (BOPO) also has a positive and significant effect on BPR risk-taking. A higher BOPO, which indicates lower operational efficiency, correlates with an increase in risk-taking behavior. This may suggest that BPRs attempt to offset operational inefficiencies by pursuing riskier ventures to boost their overall returns.

Seventhly, bank size is found to have a negative and statistically significant effect on BPR risk-taking. Larger banks tend to adopt more risk-averse strategies, possibly due to increased

regulatory oversight and the need to maintain institutional stability. This finding indicates that as a bank grows in size, its propensity to take financial risks decreases in a statistically meaningful way.

Lastly, when all the variables—Fintech product development, BPR capital, ROA, BOPO, LDR, CR, and bank size—are tested simultaneously, the results show a collective and significant influence on BPR risk-taking in Banten Province over the 2020–2024 period. This suggests that risk-taking behavior among rural banks is not determined by isolated factors alone, but rather by the complex interplay of financial health, operational dynamics, and technological adaptation. These insights are essential for regulators and policymakers aiming to guide BPRs toward balanced and sustainable risk management practices.

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