THE MEDIATING ROLE OF NON-PERFORMING LOANS ON THE RELATIONSHIP BETWEEN INCOME DIVERSIFICATION AND BANK PERFORMANCE EVIDENCE FROM INDONESIA

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ABSTRACT

Introduction: *Income diversification and profitability are widely seen as strategies to reduce credit risk in banking. However, their effectiveness in improving asset quality remains debated, especially in emerging markets like Indonesia. This study focuses on how income diversification influences bank performance, with non-performing loans (NPLs) acting as a mediating variable*

Methods: *Using quantitative method with panel data from 79 Indonesian banks listed on the OJK between 2018 and 2024. Data were obtained from audited financial reports and analyzed using fixed effect panel regression and mediation testing via the Sobel test. Income diversification is measured by the ratio of non-interest income to total income, NPLs by the NPL ratio, and bank performance by return on assets (ROA)*

Results: *Income diversification reduces credit risk (NPLs) by expanding income sources beyond traditional lending. Despite reducing NPLs, income diversification introduces operational complexities and inefficiencies that can diminish bank performance. NPLs partially mediate the relationship between income diversification and bank performance, showing that improved credit quality alone is insufficient to enhance profitability without addressing internal management and operational challenges.*

Keywords: *Bank Performance, Credit Risk, Income Diversification, Non-Performing Loans, Trade-off Theory*

INTRODUCTION

Income diversity is a strategy the banking industry adpots to increase its competitiveness in response to regulatory changes (Xie, 2022). Traditional banking systems, however, rely solely on loan interest. To face increasing market volatility, regulatory tightening, and technological disruption, banks are increasingly shifting toward non-interest income sources such as fees, commissions, trading revenues, and other service-based activities (Ratnasari, 2021). This shift is driven by the belief that a more diverse income portfolio can cushion banks against interest rate fluctuations and economic shocks, ultimately leading to more stable and improved financial performance.

Over the past decades, Indonesian banks have significantly diversified their income streams in response to intensified competition and regulatory encouragement for financial innovation. COVID-19 pandemic pushed the urgency for income diversification (Mehmood & De Luca, 2023). However, this shift has not directly translated into improved performance. Recent trends show that while non-interest income has increased, some banks have also experienced a simultaneous rise in NPLs and a stagnation in profitability.

As the banking landscape evolves, it becomes evident that the relationship between income diversification and profitability is not always direct (Khan et al., 2020). Factors such as asset quality could serve as intermediary variables (Nwafor & Nwafor, 2023). One of the key indicators of asset quality is the level of Non-Performing Loans (NPLs), which reflects the proportion of loans in default or close to default (Tham, 2022). Banks that pursue diversification without a correct risk management framework may face increased credit risk, as they often expand into unfamiliar or riskier market segments. This could lead to an increase in NPL, which erodes profitability by reducing the return on assets (ROA).

This study aims to explore the mediating role of NPLs in the relationship between income diversification and bank profitability. While previous studies have explored the direct relationship between income diversification and bank performance, few have collaborated on NPLs as a mediating factor, especially in the context of emerging economies like Indonesia. This research intends to fill this gap by empirically analyzing how diversification strategies may indirectly affect ROA through changes in NPL. The novelty of this study lies in its emphasis on indirect pathways and its focus on the Indonesian banking sector, which is underrepresented in the global literature.

A study by Nguyen et al., (2023) analyzed Vietnamese banks and found that income diversification can lead to higher risk-taking behaviour, which increases NPLs and decreases profitability. Similarly, Danso et al., (2024), studying sub-Saharan African banks, observed that while non-interest income provides short-term benefits, and coincides with deteriorating NPL in the long run. These findings suggest that the profitability of income diversification strategies might lead to effective credit risk management.

Further, Goswami & Malik, (2024) examined Indian banks and found a statistically significant mediating effect of NPLs between income diversification and financial performance.The study revealed that poorly managed diversification efforts often result in adverse credit outcomes, ultimately weakening their intended benefits.Likewise, Al-khazaleh et al., (2023) studied banks in the Middle East and demonstrated that diversification into fee-based activities had a negative impact on ROA when NPL levels were high. These studies pinpoint that NPLs are a critical variable in connecting the diversification and ROA.

The present study seeks to empirically assess whether income diversification directly increases bank profitability or whether its effects are significantly mediated by changes in NPLs. This research offers a more nuanced and context-specific understanding of how Indonesian banks can optimize their income strategies without compromising credit discipline. The findings are expected to provide both academic contributions and practical implications for financial managers, policymakers, and regulators in formulating sustainable growth strategies in the banking industry.

LITERATURE REVIEW

TRADE-OFF THEORY

The trade-off theory explains that firms make financing and operational decisions by balancing the potential benefits of an action against its associated costs, particularly in terms of risk and return (Liu, 2022). This theory serves as a relevant foundation to examine the mediating role of NPL in the relationship between income diversification and bank performance. Income diversification, often characterized by shifting from interest-based income to non-interest income such as fees, commissions, and trading revenues in order to stabilize earnings and improve performance (Indriyani et al., 2024). However, such diversification also introduces banks to unfamiliar or riskier markets, which, if not managed properly, can lead to an increase in credit defaults and a rise in NPLs (Wijaya et al., 2024).

In Indonesia, where banking faces diverse regulatory environments and market dynamics, the trade-off between diversification benefits and credit risk becomes an important issue (Khan et al., 2020). NPLs function as a mediating variable that reflects the risk side of the diversification-performance equation (Nguyen et al., 2023). Elevated NPLs can negatively affect bank profitability through increased provision costs, impaired asset quality, and reduced investor confidence (Alouane, 2022). The trade-off theory provides a useful framework to understand that while income diversification may enhance revenue, its net impact on performance is conditional upon the bank's ability to effectively manage the accompanying credit risk.

INCOME DIVERSIFICATION AND NON-PERFORMING LOAN (NPLs)

Income diversification is often pursued with the aim of reducing reliance on interest-based income and enhancing overall stability (Atichasari et al., 2023). By spreading revenue sources, banks can better withstand market fluctuation and credit shocks (Ramananda & Nugrahanti, 2014). However, empirical findings on this relationship have been mixed. Some studies, particularly in Indonesia, highlight a risk that diversification could stretch managerial oversight and elevate credit risk (Loang, 2023; Marlina, 2021; Sudarsono, 2021), while others suggest that diversification, if well-managed, contributes positively to credit portfolio health (Khattak, 2021; Maghyereh, 2022; Nguyen et al., 2023). The variations in previous research outcomes indicate that the effect of diversification on loan quality may depend significantly on banks' internal control mechanisms and risk management practices.

A more diversified income structure may allow banks to generate stable earnings, reducing the pressure to engage in excessive risk-taking within their lending portfolios (Rahmania et al., 2024). By relying less on interest income, banks might improve their ability to screen borrowers more carefully, enforce stricter credit risk policies, and reduce their exposure to bad loans (Huljak, 2022). Additionally, banks with higher non-interest income might have greater flexibility in managing financial stress, allowing them to allocate resources more efficiently toward maintaining asset quality (Mehmood & De Luca, 2023). If diversification strengthens financial resilience and allows for better risk mitigation, it is expected to have a negative and significant impact on NPLs.

H1: Income Diversification has a negative and significant impact on NPLs.

INCOME DIVERSIFICATION AND BANK PERFORMANCE

Income diversification has significantly increased as a banks' strategy to improve performance and manage revenue volatility in a competitive and evolving financial landscape (Waghmare et al., 2024). Previous decades, banks rely heavily on interest income from lending activities, but now, banks have expanded into non-interest income sources such as fees, commissions, trading gains, and other financial services (Faizi et al., 2024). This strategic shift is intended to stabilize income streams and increase profitability, particularly during periods of declining interest margins. According to the trade-off theory, banks must weigh the benefits of diversification against the potential risks it bears (Tang et al., 2024). Expanding into unfamiliar products or client segments may increase operational complexity and credit risk, potentially leading to suboptimal performance if not supported by strong risk management frameworks (Suyo, 2021).

There are so many mixed findings between income diversification and bank performance. Some studies, such as Al-Qudah, (2023); Atichasari et al., (2023); and Dorfleitner, (2021) suggest that while diversification can enhance revenue, it may also increase risk and earnings volatility, especially for banks with inadequate risk oversight. Similarly, Djalil, (2023); Maria, (2022); and Yudaruddin, (2023) found that in emerging markets, the benefits of diversification are not guaranteed and depend heavily on the bank's size, experience, and regulatory environment. In the Indonesian banking sector, where market conditions and institutional capabilities vary widely, these trade-offs are particularly relevant (Andrian, 2022). Thus, while income diversification holds promise for improving bank performance, its success depends on the bank's ability to manage the associated risks effectively.

H2: Income diversification has a significant and negative effect on bank performance

NON-PERFORMING LOANS (NPLs) AND BANK PERFORMANCE

Bank performance is fundamentally influenced by the quality of a bank's credit portfolio (Mirza, 2023). A higher level of non-performing loans (NPLs) reflects deteriorating asset quality and is often associated with weakening profitability, increased provisioning expenses, and reduced operational efficiency (Hegde, 2021). According to prior empirical studies, elevated NPL ratios constrain a bank's ability to generate income, weaken capital buffers, and ultimately impair financial performance indicators such as return on assets (ROA) (Al-khazaleh et al., 2023). Although some research points to temporary resilience through capital injection or restructuring measures, in the long term, the accumulation of bad loans is widely recognized as a serious threat to financial stability, especially in emerging economies like Indonesia (Shah, 2022).

The persistence of high NPL levels forces banks to divert earnings into loan-loss provisions, reducing their ability to expand credit or invest in profitable activities (Katusiime, 2021). This situation creates a ripple effect where not only profitability declines, but operational efficiency and market competitiveness are also compromised (Anis, 2023). Furthermore, a rising burden of non-performing loans may trigger higher funding costs, stricter regulatory scrutiny, and loss of stakeholder confidence, compounding financial pressure on the institution (Do et al., 2023). From the perspective of risk management and resource allocation, it is thus theoretically expected that an increase in NPLs would exert a negative and significant influence on a bank's financial performance, especially ROA.

H3: Non-performing loans (NPLs) have a negative and significant effect on bank performance.

INCOME DIVERSIFICATION, BANK PERFORMANCE, AND NPL

Income diversification has emerged as a strategic response by banks to manage risks and enhance financial performance, particularly in increasingly competitive and volatile financial markets (Azmi, 2021). By shifting from traditional interest-based income toward a more stable source of non-interest income, such as fees, commissions, and trading revenues, banks seek to stabilize earnings and reduce exposure to credit risk (Alnabulsi, 2023). However, the impact of income diversification on bank performance remains inconclusive. Some studies generate positive contribution to profitability and bank resilience (Ghouse, 2022; Jan, 2023; Supari, 2022), others highlight potential drawbacks, including increased operational complexity and weakened cous on core lending activities (Abu-Taieh, 2022; Cincinelli, 2021; Locurcio, 2021). Within this debate, NPLs play a critical intervening role. As a proxy for asset quality and credit risk, NPL mediates the relationship between income diversification and bank performance. Income diversification strategies that neglect proper credit risk management could lead to a higher NPLs level, and deteriorate bank performance (Bojnec, 2021).

This relationship could be explained by trade-off theory, which posits that firms, including banks, seek to optimize their performance by balancing the benefits and costs of strategic decisions (Simoens, 2021). Income diversification offers benefits in the form of revenue stability and reduced dependence on interest income, but these come with trade-offs such as potential inefficiencies, agency problems, and increased exposure to unfamiliar risks

(Foglia, 2022). When NPLs are introduced as intervening variables, they represent the cost of financial distress arising from ineffective risk oversight in diversified income activities. High NPLs can offset the potential gains from diversification by reducing asset quality and increasing loan loss provisions, and weakening bank performance (Bıçakcıoğlu-Peynirci & Tanyeri, 2022). Therefore, the influence of income diversification on bank performance is not direct and linear but relies on its impact upon NPLs. Understanding this mediating role of NPLs provides a more nuanced view on how banks can strategically manage the risks and returns of diversification in alignment with trade-off theory.

H4: NPL mediates the relationship between income diversification and bank performance.

RESEARCH METHODS

This study adopts a quantitative research design with a causal approach to investigate the effect of income diversification on bank performance with NPLs as an intervening variable. By obtaining Indonesian banks and utilizing panel data collected using the period from 2018 to 2024, this research collected 79 banks from periode 2018 to 2024. The samples are selected using purposive sampling based on the following criteria: banks operating in Indonesia that have published annual financial reports consistently during 2018-2024 and reported complete and accessible data related to the variables studied. The study employs secondary data, sourced from annual reports published by each bank from www.ojk.go.id. Data analysis was conducted using panel least squares (PLS) regression with fixed effect. Statistical analysis was performed using Eviews 12.

Income diversification uses the ratio of non-interest income to total income (Khan et al., 2020; Nguyen et al., 2023; Tang et al., 2024). A higher ratio indicates greater income diversification, suggesting that the bank has reduced its dependence on interest income, which is more sensitive to credit risk and interest rate fluctuations. By capturing this ratio, the variable allows the study to assess whether such diversification translates into better performance or introduces new risks, such as increased operational complexity or lower focus on credit risk management.

The proxy used for calculating non-performing loans (NPLS) is NPL ratio (Nwafor & Nwafor, 2023; Rahmania et al., 2024; Sannino, 2021) , by comparing non-performing loans to total loans. A higher NPL ratio suggests a greater incidence of default, which may weaken the bank's financial stability and erode investor confidence.

To evaluate bank performance, this study employs Return on Assets (ROA) as the proxy (Al-khazaleh et al., 2023; Danso et al., 2024; Sohibien, 2022). ROA is calculated as net income divided by total assets, reflecting who efficiently a bank utilizes its assets to generate profits. A higher ROA indicates better performance and value creation for stakeholders.

The panel data regression model used in this study can be expressed as follows:

$$NPL_{it} = \alpha + \beta_1 DIV_{it} + \mu_i + \varepsilon_{it} \ldots \ldots \ldots (1)$$

$$ROA_{it} = \alpha + \beta_1 DIV_{it} + \beta_1 NPL_{it} + \mu_i + \varepsilon_{it} \ldots \ldots \ldots (2)$$

RESULT AND ANALYSIS

Descriptive Statistic

Table 1
Descriptive Analysis Result

VARIABLE	MIN	MAX	MEAN	STD DEV
DIV	0,00	4,29	2,64	0,77
ROA	0,00	1,61	0,56	0,50
NPL	0,00	3,09	0,82	0,57
OBSERVATION	417	417	417	417

Source: Data Proceed, 2025

First table shows 417 observations, with income diversification mean is 2,64 which could be interpreted as Indonesian banks generally maintain moderate to high levels of income diversification. The standard deviation of 0,77 suggests considerable variation in diversification strategies across the banking sector, indicating that banks adopt different approaches to revenue generation. The mean ROA of 0,56 indicats moderate overall profitability in the sector. The standard deviation of 0,50 points suggests that while some banks achieve relatively high returns on their assets, others struggle to generate profits effectively from their asset base. NPL values range from 0,00 to 3,09 with a mean of 0,82. This slow average suggests that Indonesian banks generally maintain healthy loan portfolios. However, the standard deviation of 0,57 indicates notable differences in credit risk management practices across institutions.

Table 2
Model Estimation Result

MODEL ESTIMATION	MODEL 1	MODEL 2
CHOW TEST	0,000	0,000
HAUSMAN TEST	0,025	0,005
LM TEST	-	-

Source: Data Proceed, 2025

The following table illustrates the probability values for Model 1 in the Chow test (0,000) and the Hausman test (0,025). It was determined that both variables were less than 0,05, thus necessitating the implementation of a fixed effect model. In the case of the second model, the Chow test and Hausman test indicated a probability of 0,0000 and 0,005, respectively. This resulted in the selection of a fixed effect model.

Classical Assumption Test

Table 3
Classical Assumption Test Result

VARIABLE	JARQUE-BERA	VIF	PROB. CHI-SQUARE
DEPENDENT: NPL			
MODEL 1	0,25		0,06
DIV		1,00	
DEPENDENT: BANK PERFORMANCE			
MODEL 2	0,23		0,24
DIV		1,00	
NPL		1,25	

Source: Data Proceed, 2025

Based on the classical assumption test results, both Model 1 and Model 2 appear to meet the necessary conditions for valid regression analysis. The Jarque-Bera test, with probabilities of 0,06 and 0,23 for Model 1 and Model 2 respectively (both exceeding the 0,05 threshold), suggests that the residuals are normally distributed. Additionally, the VIF values for all variables in both models are close to 1,00, indicating no significant multicollinearity issues among the independent variables. Breusch-Pagan testing for heteroskedasticity yielded a probability chi-square value of 0,06 and 0,24 respectively (both exceeding the 0,05 threshold). This finding suggests that the data are free from heteroskedasticity.

Hypothesis Testing

Table 4
Hypothesis Test Result

VARIABLE	COEFFICIENT	STD.ERROR	PROBABILITY	T
DEPENDENT: NPL				
MODEL 1				
DIV	-0,087	0,038	0,023	-2,268
ADJUSTED R-SQUARED	0,569			
DEPENDENT: BANK PERFORMANCE				
MODEL 2				
DIV	-0,093	0,037	0,011	-2,557
NPL	-0,210	0,043	0,000	-4,830
ADJUSTED R-SQUARED	0,643			

Source: Data Proceed, 2025

Based on the regression results in Model 1, the coefficient of income diversification on NPLs is negative at -0,087 with probability value of 0,023, which is below the 5% significance threshold. The t-statistic value of -2,268 further supports the significance of this relationship. This findings confirms that higher income diversification contributes to a reduction in NPLs, aligning with the theoretical expectation that broader income streams allow banks to better manage credit risk and maintain asset quality. Thus, H1 is accepted.

The second hypothesis (H2) posits that income diversification has a significant and negative effect on bank performance. As shown in Model 2, the coefficient of income diversification on bank performance is negative at -0,093, with a probability value of 0,011 and a t-statistic of -2,557. The significance of this negative relationship suggests that greater income diversification improves performance. This could indicate that diversification activities in banks may not be optimally managed, leading to inefficiencies or increased operational complexity. Therefore, H2 is also supported based on the results.

The third hypothesis (H3) asserts that non-performing loans (NPLs) have significant and negative effects on bank performance (ROA). The regression result shows that the NPL coefficient is -0,210 with a probability value of 0,000 and t-statistic of -4,830, demonstrating a very strong and significant negative relationship. This result supports the notion that higher levels of NPLs severely impair bank performance (ROA) by increasing credit risk costs, reducing profitability, and weakening overall financial stability. Therefore, the evidence confirms that NPLs play a critical role in deteriorating bank performance, and H3 is accepted.

The Sobel test is used to determine the significance of a mediation effect by assessing whether the indirect effect of an independent variable on a dependent variable through a mediator is statistically significant. In this case, the calculated t-value (t-count) from the Sobel test is 2,068076, which is greater than the critical t-table value of 1,65 at the 0,05 significance level (one-tailed test). Since the t-count exceeds the t-table, it indicates that the mediation effect is statistically significant. Additionally, the reduction in the direct effect coefficient of diversification after considering NPLs indicates a partial mediation of the impact of income diversification on bank performance. Therefore, non-performing loans (NPL) significantly mediate the relationship between income diversification and bank performance, supporting the hypothesis four (H4) that the indirect pathway through NPL is meaningful.

DISCUSSION

Income diversification has been shown to have a negative and significant effect on Non-Performing Loans (NPLs), indicating that banks expanding their income sources beyond traditional lending activities can better manage their credit risk exposure. By reducing reliance on interest income alone, banks may implement more

prudent credit screening practices, resulting in a healthier loan portfolio. This result supports the notion that a broader business model provides more financial stability, echoing the findings of Loang, (2023), who emphasized that banks in emerging markets with diversified income sources often experience a decline in credit default rates. In a regulatory environment such as Indonesia's, where monitoring mechanisms have progressively improved, this negative relationship appears consistent with theoretical expectations.

However, income diversification does not guarantee better financial performance, as the findings reveal a significant and negative impact on banks' profitability measures. Although diversification reduces credit risk, it may simultaneously introduce operational complexities that dilute financial efficiency. Abbas, (2022) previously observed that banks extending aggressively into non-traditional business lines often suffered from diseconomies of scope, where new business activities lacked strategic fit or required additional management layers. In this sense, diversification can become a double-edged sword, where the pursuit of multiple income streams stretches organizational capacity and undermines cost control, particularly when diversification is not grounded in core competencies.

The observed negative link between diversification and bank performance further reflects the underlying trade-offs inherent in banking strategies. While spreading income sources provides a cushion against credit shocks, it may expose banks to operational risk, agency conflicts, and diminished focus. This tension resonates with the trade-off theory, where diversification benefits must be balanced against the risks of complexity and inefficiency. Particularly in Indonesian banks, where non-interest income segments such as wealth management and bancassurance are still developing, rapid diversification may encounter challenges that suppress overall returns rather than enhance them (Nugraha, 2021).

Strengthening this perspective, the analysis also confirmed that Non-Performing Loans (NPLs) have a substantial and negative impact on bank performance. Elevated NPLs necessitate higher loan loss provisions, directly eroding profits and weakening key financial ratios such as Return on Assets (ROA) and Return on Equity (ROE). Louzis et al. (2022) similarly emphasized that in emerging banking markets, asset quality remains a critical determinant of bank profitability. Hence, even when banks succeed in expanding income sources, failure to control credit quality remains a major impediment to achieving sustainable performance outcomes.

The relationship between NPLs and performance highlights that at the core of bank financial health lies effective credit risk management. Losses arising from bad loans not only reduce profitability but also constrain future lending capacity, limit dividend distribution, and attract greater regulatory scrutiny. Goswami & Malik, (2024) reinforced this by demonstrating that higher NPL levels consistently predict future earnings declines. This underscores the enduring relevance of asset quality preservation, especially during periods of strategic expansion through diversification.

Beyond direct effects, the analysis shows that NPLs play a mediating role between income diversification and bank performance. The partial mediation observed suggests that while diversification helps improve credit quality, this alone is insufficient to fully offset the negative impacts arising from diversification-related inefficiencies. This finding aligns with the work of Maghyereh, (2022), who demonstrated that risk profile improvements partially mediate the relationship between bank strategies and financial outcomes, emphasizing that diversification's benefits are conditional rather than automatic.

The mediation effect also reflects the importance of integrated strategic planning in banking operations. Without a strong framework for managing both the opportunities and risks of diversification, banks may find that reductions in credit risk are not fully translated into better financial results. Effective diversification thus requires not just expansion into new areas, but parallel investments in risk management, internal controls, and operational integration to minimize the inefficiencies that can undermine profitability.

Moreover, the Indonesian banking landscape presents unique dynamics where regulatory efforts to encourage diversification coexist with a market structure still heavily reliant on traditional lending (Atichasari et al.,

2023). Banks venturing into fee-based services, digital banking, or investment services must build new capabilities, which entails significant learning costs and transitional risks. Consequently, the negative effects of diversification on performance observed in this study should be seen not as a failure of diversification, but as a reflection of transitional inefficiencies that may diminish over time with maturity and experience.

Collectively, these findings provide a more nuanced understanding of the diversification-performance nexus in banking. They show that diversification can contribute positively to asset quality but may also introduce operational and managerial challenges that temporarily or even persistently weigh on overall performance. In emerging markets like Indonesia, where the banking sector continues to evolve rapidly, these insights are particularly relevant for balancing strategic ambition with operational prudence.

Ultimately, this study confirms that income diversification, non-performing loans, and bank performance are intricately interconnected, with no single dimension able to guarantee success without consideration of the others. Future research could further explore these complex relationships, particularly by investigating how factors such as technological capability, governance structures, and competition intensity condition the effects of diversification strategies on long-term bank stability and profitability.

CONCLUSION

This study investigated the relationship between income diversification, non-performing loans (NPLs), and bank performance (ROA) in the Indonesian banking sector, finding that income diversification significantly reduces NPLs, supporting the notion that broadening income sources enhances credit quality in line with trade-off theory. However, despite this improvement in asset quality, diversification was also found to negatively and significantly affect bank performance, suggesting that operational inefficiencies and strategic complexities introduced by diversification may outweigh its benefits in the short term. The negative and significant impact of NPLs on bank performance further emphasizes the critical role of effective credit risk management, reinforcing that maintaining asset quality remains fundamental for sustaining profitability. The partial mediation effect of NPLs between diversification and performance highlights that while diversification can lower risk, it does not automatically lead to better financial outcomes without addressing internal operational challenges. These findings suggest that banks must complement diversification strategies with strong risk management, governance, and operational integration. For future research, it would be beneficial to investigate moderating factors such as technological innovation, management quality, and market competition intensity, as well as to undertake longitudinal studies capturing whether the adverse effects of diversification lessen over time as banks adjust and mature their non-traditional income operation.

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