

The Role of Asset Diversification in Moderating the Influence of Income Smoothing and Signaling on Loan Loss Provisions

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ARTICLE INFORMATION

Publication information

Research article

HOW TO CITE

Yudi, Y., & Siswanti, T. (2026). The role of the effects of income smoothing and asset diversification in moderating the signaling on bank LLPs, moderated by influence of income smoothing and asset diversification. The analysis employs signaling on loan loss provisions. regression techniques using a fixed-effects model. The sample consists of 43 banking firms listed on the Indonesia Stock Exchange, with observations covering 2021–2025. The results show income smoothing ($p=0.09$) and signaling ($p=0.08$) are positively associated with LLPs. Asset diversification has no effect on LLPs ($p=0.65$), but after interacting with signaling ($p=0.09$), it is shown to strengthen the effect, referred to as quasi-moderation. In contrast, the interaction between asset diversification and income smoothing ($p=0.58$) does not strengthen the relationship, indicating predictor moderation. These findings are relevant to banks and policymakers when designing stimulus measures intended to preserve liquidity during periods of economic stress. The study also provides empirical evidence concerning the consequences of credit-restructuring policies used as economic stimulus during the COVID-19 period.

DOI:

<https://doi.org/10.32535/ijafap.v9i3.4735>

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Received: 8 August 2026

Accepted: 15 September 2026

Published: 20 October 2026

ABSTRACT

Loan loss provisions (LLP) are affected by economic conditions as well as managers' income-smoothing and signaling practices, driven by incentives arising from asset diversification. This research investigates the effects of income smoothing and signaling on bank LLPs, moderated by influence of income smoothing and asset diversification. The analysis employs regression techniques using a fixed-effects model. The sample consists of 43 banking firms listed on the Indonesia Stock Exchange, with observations covering 2021–2025. The results show income smoothing ($p=0.09$) and signaling ($p=0.08$) are positively associated with LLPs. Asset diversification has no effect on LLPs ($p=0.65$), but after interacting with signaling ($p=0.09$), it is shown to strengthen the effect, referred to as quasi-moderation. In contrast, the interaction between asset diversification and income smoothing ($p=0.58$) does not strengthen the relationship, indicating predictor moderation. These findings are relevant to banks and policymakers when designing stimulus measures intended to preserve liquidity during periods of economic stress. The study also provides empirical evidence concerning the consequences of credit-restructuring policies used as economic stimulus during the COVID-19 period.

Keywords: Asset Diversification; Banking; Income Smoothing; Loan Loss Provisions; Signaling

JEL Classification: G21; G28; G32

INTRODUCTION

Banks distribute credit as a form of intermediation in a country's economy. Bank credit distribution carries various risks that must be properly managed by banks. Banks face credit risk in the form of customer default due to unfavorable economic conditions and other factors (Jasman et al., 2021). Therefore, to address the risk of customer default, banks establish loan loss reserves as part of credit risk mitigation. Loan loss provisions (LLPs) are costs set aside by banks based on estimates of potential losses due to credit (Pramono, 2021).

Prior literature suggests that LLPs are affected by economic conditions as well as managers' income-smoothing practices. Within credit-risk management, income smoothing may be used by bank managers as an instrument for anticipating credit risk and preparing for potential losses. COVID-19 pandemic represented an unprecedented health and economic shock, one that was entirely unexpected and beyond the control of all economic actors, including banks. This shock was triggered by a global public health crisis rather than by poor economic or financial conditions. He et al.'s (2025) findings suggest that United States community banks aggressively increased LLPs and indulged in earnings smoothing after the start of the Global Financial Crisis (GFC) of 2007-09 and during the COVID-19 pandemic. Nguyen et al. (2023) found that U.S. banks are more likely to exercise discretion regarding LLPs when facing intense exposure to COVID-19. The association between loan loss provisions and income smoothing can also represent a signal communicated by management to external stakeholders.

Income smoothing refers to banks' use of discretionary LLPs to stabilize reported earnings over time. By adjusting these provisions in response to earnings fluctuations, managers can dampen earnings volatility and signal stability to the market (Olszak et al., 2026). Bank managers attempt to project the bank's good prospects to external parties through income smoothing. Banks have the potential to become the center of attention and are monitored by external parties; hence, the managers will have private information to carry out signaling through credit loss provisions (Jasman et al., 2021).

Using a stakeholder theory and signaling theory approach, income smoothing and signaling are accounting policy choices made by bank managers to achieve specific reporting that is influenced by conflicts of interest (Valdiansyah et al., 2023). Previous studies have shown inconsistent findings about the relationship between income smoothing, signaling, and LLPs. Several studies found a positive relationship between income smoothing and LLPs (He et al., 2025; Le & Dinh, 2025; Olszak et al., 2026; Ozili, 2022b; Pramono et al., 2019; Vo et al., 2022). Conversely, other studies showed a negative relationship between income smoothing and LLPs (Jasman et al., 2021; Shala et al., 2020). Evidence concerning signaling is likewise mixed: some studies find a positive association with LLPs (Jasman et al., 2021; Le et al., 2021; Nguyen et al., 2023; Sharma & Rani, 2024). Other research reports a negative effect between signaling and LLPs (Pramono et al., 2019).

The mixed evidence reported in prior studies constitutes a research gap that warrants further examination. This research extends prior work by incorporating asset diversification as a moderating variable. Asset diversification is considered a relevant moderator because it may alter the effects of income smoothing, signaling, and LLPs. Risk management through asset diversification into securities with a lower risk impact than credit is one tactic used to reduce credit risk.

The novelty of the study adopts an asset-diversification proxy consistent with Financial Services Authority (OJK) Regulation Number 37/POJK.03/2019 concerning transparency of bank financial conditions (OJK, 2019). Unlike other studies that use the loan-to-deposit ratio (LDR) as a proxy, which relies on loans as high-risk assets, this study incorporates securities held by the bank as low-risk assets to achieve asset risk diversification.

Asset diversification moderates the interaction between income smoothing, signaling, and LLPs, a relationship grounded in the argument of conditional discretion. More diversified banks possess broader asset bases and greater flexibility in allocating risk; they face incentives for income smoothing and use signaling to communicate expected performance across various asset categories. In this context, management can more actively leverage asset diversification as part of a strategy to support earnings management or risk communication, as decisions regarding income smoothing and signaling can be coordinated with a portfolio that is not concentrated in loans, which are high-risk assets.

Banks with greater capacity for asset securitization driven by activities involving low-risk securities tend to foster loan growth while improving asset quality, ultimately leading to prudent credit expansion (Pramono et al., 2019). Based on data from the Federal Deposit Insurance Corporation (FDIC), community and non-community banks in the United States that are part of multibank holding companies have greater incentives to smooth earnings and the ability to diversify assets across various products (He et al., 2025). Prudent diversification can generate additional income that supports income-smoothing activities and facilitates more cautious loan expansion.

At the same time, with asset diversification, banks may communicate financial strength to external stakeholders and investors by demonstrating the ability to support healthy loan growth. Consistent with stakeholder theory, managers may combine liquidity-risk management, income smoothing, and diversification practices to improve asset quality and support lending (Agung et al., 2021).

Signaling theory posits that managers utilize observable reporting choices to communicate private information regarding their capacity to manage asset risks and their approach to establishing LLPs. Asset diversification can play a role in this communication, as the credibility and interpretation of the signal may hinge on the bank maintaining a low-risk asset structure.

Asset diversification can moderate the signaling value associated with LLPs in two ways. First, diversification reduces reliance on a single asset category, such as high-risk loans. Second, a diversified portfolio affords management greater scope to signal a prudent stance regarding the establishment of LLPs. Asset diversification is intended to diversify asset instruments into low-risk securities products so that the risk of loss provisions can be distributed and not concentrated in high-risk loans (Agung et al., 2021). Previous research indicates that asset diversification affects LLPs based on income smoothing (Rejeb & Merzki, 2023). Gross domestic product (GDP) is included as a control variable in this research. GDP is included as a control variable because previous research has linked economic growth with bank provisioning behavior (Pramono et al., 2019; Shala & Toçi, 2021).

While there are limited studies on banks in the context of COVID-19, very few have examined income smoothing practices by banks during the pandemic. To address this gap, the study examines income-smoothing practices and signaling in relation to LLPs among selected Indonesian banks. This study's first goal is to investigate how income

smoothing and signaling affect LLPs, based on stakeholder theory and signaling theory. Second, to investigate how asset diversification moderates the impact of signaling and income smoothing on LLPs. For regulators and practitioners, this study offers insightful information about how asset diversification strengthens the influence of income smoothing and signaling on the creation of LLPs.

LITERATURE REVIEW

Theoretical Review

Stakeholder Theory

Stakeholder theory highlights the importance of organizational actions that create value and improve performance for both internal and external stakeholders. Effective stakeholder management is therefore considered important because it can support organizational performance. Stakeholder engagement includes practices that encourage consent, cooperation, accountability, participation, and involvement, thereby supporting trust, fairness, and sound corporate governance (Kivits & Sawang, 2021). Because organizations operate in competitive markets, maintaining an advantage over competitors is important for meeting stakeholder expectations through sustained improvements in performance (Huynh & Vo, 2024).

One of the most popular types of earnings management is income smoothing, where managers purposefully lessen reported profit swings to show a more consistent financial performance over time (Desmiwerita et al., 2026). This stakeholder theory also indicates that bank managers act as risk-takers, as reflected in their asset diversification actions. Bank managers engage in asset diversification to minimize risk while maximizing performance for the benefit of external stakeholders. As market participants, bank managers often assess risk disproportionately, acting as risk-takers during economic expansion and becoming risk-averse when the economy weakens, thereby further exacerbating credit risk (Agung et al., 2021).

Signaling Theory

Signaling theory provides a framework for explaining how firms communicate relevant information to external investors through positive or negative signals (Ayem & Ina, 2023). When investors have less information than company management, managers may need to communicate signals because they possess more detailed knowledge about the firm's condition (Raharja & Budiharjo, 2026). In general, signaling theory explains how parties with superior information communicate with those who have less information (Avinda et al., 2025). In the context of signaling theory, Wahlen (1991) reported that bank managers increase the discretionary income-smoothing component of LLPs when they anticipate stronger future cash flows. Since LLPs reduce earnings, managers can adjust their income-smoothing practices based on these expectations. Within banking, management can use signaling to communicate expectations about the institution's future condition and prospects. Managers may seek to demonstrate financial strength and their ability to support sound and prudent loan growth.

Based on signaling theory, income smoothing is driven by incentives owned by banks to adjust bank performance in a certain period so that it can be compared with the average performance of other banks (Yudi & Rachmawati, 2025). One way to reinforce that message is to shift part of the asset portfolio away from higher-risk credit toward lower-risk securities. From this perspective, earnings management may be used to reduce information asymmetry and communicate private information to shareholders (Rejeb & Merzki, 2023).

Hypotheses Development

Income Smoothing and LLPs

Income smoothing can form part of a bank's approach to managing credit-default risk and limiting potential loan losses. Bank managers use income smoothing to establish LLPs to absorb loan losses. In line with stakeholder theory, bank managers are concerned with meeting accounting standards to meet current LLPs. Income smoothing and LLPs among Asia-Pacific banks have a positive correlation, according to Vo et al. (2022). Similar relationships have been documented for banks in Europe, China, and Japan (Aggelopoulos et al., 2023; Chen et al., 2021). Because income smoothing represents an accounting-policy choice that may be shaped by conflicts of interest and reporting objectives (Valdiansyah et al., 2022), previous evidence supporting a positive association provides the basis for the following hypothesis (He et al., 2025; Le & Dinh, 2025; Olszak et al., 2026; Ozili, 2022b; Pramono et al., 2019; Vo et al., 2022). The proposed hypothesis is:

H1: Income smoothing has a positive effect on LLPs.

Signaling and Loan Loss Provision

Signaling may arise from managers' incentives to establish provisions that are capable of absorbing both existing and anticipated losses. Such provisioning can communicate to external stakeholders that the bank is managing credit risk carefully and prudently. Banks can become the center of attention and are monitored by external parties; hence, managers may use credit loss provisions to signal private information (Jasman et al., 2021). Previous research has shown a positive effect of signaling on LLPs (Jasman et al., 2021; Le et al., 2021; Nguyen et al., 2023; Sharma & Rani, 2024). These findings lead to the following hypothesis:

H2: Signaling has a positive effect on LLPs.

Asset Diversification Moderates the Effect of Income Smoothing and Signaling on LLPs

Banks manage credit risk very carefully because credit is the largest source of assets and income for banks. To mitigate credit risk, one strategy chosen is risk management through asset diversification into securities that have a lower risk impact than credit. Stakeholder theory indicates that bank managers act as risk-takers, as reflected in their asset diversification activities. Bank managers diversify assets to minimize risk while maximizing performance for the benefit of external stakeholders. As market participants, bank managers often assess risk disproportionately; they act as risk-takers during economic expansions and tend to avoid risk when economic conditions weaken, thereby further exacerbating credit risk (Agung et al., 2021).

Asset diversification is intended to diversify asset instruments into low-risk securities products so that the risk of loss provisions can be distributed and not concentrated on high-risk loans (Agung et al., 2021). OJK Regulation Number 37/POJK.03/2019, issued December 19, 2019, on "Transparency of Bank Financial Conditions," is used to define asset diversification in this study. The rule is a reformulation of the 2015 Loan-to-Financing Ratio (LFR) and the 2010 LDR macroprudential policy. Prudent diversification can generate additional income that supports income-smoothing activities and facilitates more cautious loan expansion. At the same time, with asset diversification, banks may communicate financial strength to external stakeholders and investors by demonstrating the ability to support healthy loan growth. Managers may seek to demonstrate their financial strength and capacity to support healthy, prudent credit growth. One way to reinforce this message is by shifting a portion of the asset portfolio from high-risk loans to lower-risk securities.

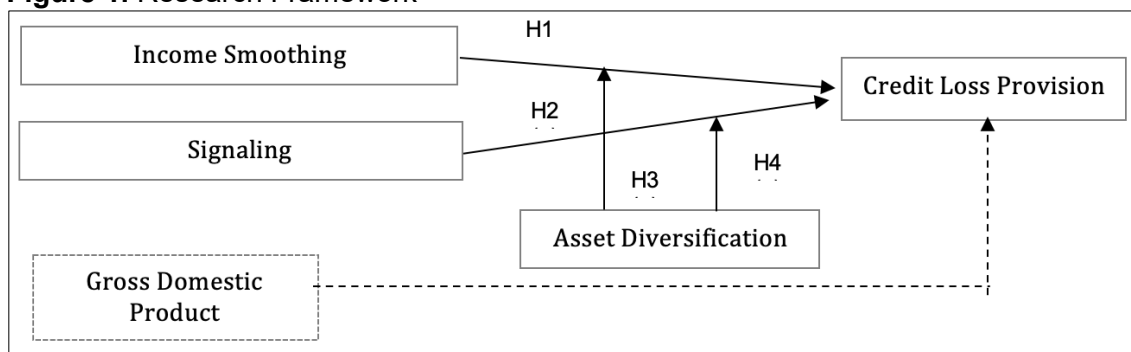
From the perspective of signaling theory, earnings management can be employed to reduce information asymmetry and communicate private information to shareholders (Rejeb & Merzki, 2023). Consistent with stakeholder theory, managers may combine liquidity-risk management, income smoothing, and diversification practices to improve asset quality and support lending (Agung et al., 2021). Banks with greater capacity for asset securitization driven by activities involving low-risk securities tend to foster loan growth while improving asset quality, ultimately leading to prudent credit expansion (Pramono et al., 2019). The proposed hypotheses are:

- H3: Asset diversification strengthens the positive effect of income smoothing on LLPs.
 H4: Asset diversification strengthens the positive effect of signaling on LLPs.

Conceptual Framework

Based on the hypotheses developed in this study, the proposed relationships among the research variables in Figure 1.

Figure 1. Research Framework



RESEARCH METHOD

Data Collection, Population, and Samples

The research relies on secondary information taken from annual reports of banking-sector companies listed on the Indonesia Stock Exchange during 2021–2025. The initial population consisted of 47 banking-subsector companies classified under code G111. Purposive sampling excluded four companies: two were placed under special surveillance by the Indonesia Stock Exchange, and two reported losses during the observation period. Consequently, 43 banking companies met the sampling criteria. Because the resulting panel was unbalanced, applying the profitability criterion produced 189 firm-year observations for the final analysis.

Data Analysis Technique and Measurement of Variables

Panel-data regression was performed using a Fixed Effects model (FEM) in EViews. The regression specification adopted in this study is based on Pramono et al. (2019):

$$LLP = \alpha + \beta_1 DIS1 + \beta_2 SIG2 + \beta_3 DIS \cdot DVA3 + \beta_4 SIG \cdot DVA4 + \beta_5 GDP5 + \varepsilon$$

Note: LLP=Loan loss Provision, DIS=Income Smoothing, SIG=Signaling, DVA=Asset Diversification, GDP=Gross Domestic Product.

Asset diversification is treated as the moderating variable in this research. The moderation-regression results are interpreted using four classifications: (1) pure moderator, (2) homologizer moderator, (3) quasi-moderator, and (4) predictor moderator. A pure moderator operates only as a moderating variable. A homologizer refers to a

variable that has the potential to function as a moderator. A quasi-moderator both changes the influence between an independent and dependent variable and also operates as an independent variable. A predictor moderator, in contrast, functions only as an intervening, exogenous, antecedent, or independent variable within the proposed model (Söderlund, 2023).

The study defines each research variable operationally. LLPs, the dependent variable, are calculated using the ratio of LLPs to total assets, following Pramono et al. (2019). Income smoothing, the main independent variable, follows the proxy used by Pramono et al. (2019), namely earnings before tax and provisions plus equity to total assets. Signaling (SIG) follows Jasman et al. (2021) and is measured using the change in earnings before tax and provisions relative to the change in total assets. Asset diversification follows OJK Regulation Number 37 (OJK, 2019) and is proxied by credit plus securities relative to third-party funds plus issued securities. GDP is included as the control variable and is measured using GDP, consistent with Pramono et al. (2019).

RESULTS

This study conducted a normality test using the Mahalanobis test by comparing the calculated Mahalanobis value with the chi-square table value (Etherington, 2021). In this study, the Mahalanobis test process continued until the assumption of no outliers was met; if outliers remained, the data points were excluded. For the model with seven research variables and a 0.01 significance level, the chi-square criterion produced a Mahalanobis threshold of 24.32. Following the Mahalanobis outlier test, a total of 15 outliers were identified with calculated Mahalanobis values exceeding 24.32 and were consequently excluded from the study. Fifteen observations exceeded this threshold and were therefore removed. As a result, the number of observations declined from 204 to 189 after the outlier-screening process.

Table 1. Descriptive Statistics Example (N =189)

Variables	Min.	Max.	Mean	St.Dev
LLPs	0.000	0.230	0.024	0.013
DIS	9.183	18.760	13.529	2.075
SIG	0.000	0.070	0.008	0.006
DVA	0.649	6.645	1.230	0.657
GDP	0.021	0.053	0.043	0.012

Notes: LLPs = Loan Loss Provisions, DIS = Income Smoothing, SIG = Signaling, DVA = Asset Diversification, GDP = Gross Domestic Product

Table 1 summarizes the descriptive statistics for the dependent variable and the other study variables. LLPs range in value from 0.000 to 0.230, with a mean of 0.024 and a standard deviation of 0.013 across 189 observations. Because the standard deviation is below the mean, the loan loss provision data for the banking sector during 2021–2025 is considered data tends to be stable and uniform, without extreme dispersion or variation around the mean value, as are other variables, namely income smoothing, signaling, asset diversification, and GDP, indicating that the mean value is sufficiently representative in describing the overall data.

Testing of Classical Assumptions and Model

Table 2. Multicollinearity Test

Variables	LLP	DIS	SIG	DVA	GDP
LLPs	1.000	0.025	0.268	0.087	-0.065
DIS	0.025	1.000	-0.111	0.187	0.068
SIG	0.268	-0.111	1.000	0.115	0.026

DVA	0.087	0.187	0.115	1.000	-0.035
GDP	-0.065	0.068	0.026	-0.035	1.000

Notes: LLPs = Loan Loss Provisions, DIS = Income Smoothing, SIG = Signaling, DVA = Asset Diversification, GDP = Gross Domestic Product

The multicollinearity assessment shows that none of the correlations among the independent variables exceeds 0.90, as reported in Table 2. Therefore, there is no indication of a multicollinearity issue in the regression model.

Table 3. Heteroscedasticity Test

Variables	Prob.	Conclusion
LLPs	0.559	No heteroscedasticity
DIS	0.144	No heteroscedasticity
SIG	0.799	No heteroscedasticity
DIS*DVA	0.968	No heteroscedasticity
DIS*SIG	0.254	No heteroscedasticity
GDP	0.085	No heteroscedasticity

Notes: LLPs = Loan Loss Provisions, DIS = Income Smoothing, SIG = Signaling, DVA = Asset Diversification, GDP = Gross Domestic Product

Table 3 has probabilities above 0.05, indicating there is no heteroscedasticity in the model.

Table 4. Autocorrelation Test

Durbin-Watson Stat	Upper Bound (du)	4-du	Conclusion
1.865	1.816	2.183	No autocorrelation

Autocorrelation is absent is supported by Table 4's Durbin-Watson statistic of 1.865, which falls within the lower bound of 1.816 and the upper bound of 2.183.

The Chow, Hausman, and Lagrange Multiplier tests were used in the model selection process to determine the best panel-data specification. The results favor the fixed-effects model.

Table 5. Chow Test Result

Test	Stat.	d.f.	Prob.
Cross section F	3.358	-42.140	0.000
Cross section Chi-sq.	131.723	42	0.000

The Chow test probability reported in Table 5 is 0.000. The fixed-effects criteria were chosen because the Chow test value is less than 0.05.

Table 6. Hausman Test Result

Test	Chi-Sq. Stat.	Chi-Sq. d.f.	Prob.
Cross Section Random	34.761	6	0.000

The Hausman test probability in Table 6 is also 0.000. The fixed-effects criteria were chosen because the Hausman test value is less than 0.05.

Table 7. Lagrange Multiplier (LM) Test

Test	Stat.	Prob
Breusch Pagan	6.033	0.014

Table 7 reports a Lagrange Multiplier test probability of 0.014. The fixed-effects criteria were chosen because the Lagrange multiplier test value is less than 0.05.

Moderated Regression Analysis

Table 8. Moderated Regression Analysis

Variables	Sign	Coefficient	t-Stat.	Std. Error	Prob.	Decision
C		- 0.11	- 1.37	0.08	0.17	
DIS	+	0.01	1.68	0.01	0.09***	Accepted
SIG	+	1.16	1.72	0.68	0.08***	Accepted
DIS*DVA	+	0.00	0.55	0.01	0.58	Rejected ^b
SIG*DVA	+	0.90	1.71	0.53	0.09***	Accepted ^a
DVA		- 0.04	- 0.46	0.08	0.65	Rejected
GDP		0.36	2.49	0.15	0.01*	
R-Squares			0.55			
Adjusted R-Squares			0.39			
^a Quasi-Moderation: the impact of income smoothing and signaling on LLPs, asset diversification serves as both an independent variable and a moderator (Söderlund, 2023).						
^b Predictor Moderation: Asset diversification does not moderate the impact of income smoothing and signaling on LLPs; rather, it solely functions as an independent variable (Söderlund, 2023).						

Notes: LLPs = Loan Loss Provisions, DIS = Income Smoothing, SIG = Signaling, DVA = Asset Diversification, GDP = Gross Domestic Product; *significant 1%, **significant 5%, ***significant 10%

Table 8 supports H1 with a positive coefficient of 0.01 for income smoothing, a t-statistic of 1.68, and a probability of 0.09. Additionally, signaling supports H2 with a likelihood of 0.08, a t-statistic of 1.72, and a positive coefficient of 1.16. Income smoothing, signaling, asset diversification, and growth together account for 39% of the variation in LLPs, according to the model's modified R-squared of 0.39. The remaining 61% can be attributed to variables not included in the model.

With an interaction value of 0.90, a t-statistic of 1.71, and a probability of 0.09, the moderation analysis shows that asset diversification quasi-moderates the relationship between signaling and LLPs (H3). Consequently, a stronger positive correlation between signaling and LLPs is linked to increased asset diversification. On the other hand, the combination of income smoothing and asset diversification (H4) yields a probability of 0.58, a t-statistic of 0.55, and a coefficient of 0.00. This pattern is categorized as predictor moderation, meaning that instead of enhancing the income-smoothing connection, asset diversification acts as an independent variable.

Asset diversification has a coefficient of negative 0.04, a t-statistic of negative 0.46, and a probability of 0.65, indicating that it does not have a significant influence on LLPs. GDP, by comparison, has a coefficient of 0.36, a t-statistic of 2.49, and a probability of 0.01, indicating a positive relationship with LLPs.

DISCUSSION

The Influence of Income Smoothing on LLPs

Testing of H1 demonstrates a positive correlation between income smoothing and LLPs, consistent with earlier findings (He et al., 2025; Le & Dinh, 2025; Olszak et al., 2026; Ozili, 2022b; Pramono et al., 2019; Vo et al., 2022). According to the findings, banks may

employ income smoothing as a managerial practice when determining provisions and stabilizing reported earnings.

This interpretation is consistent with stakeholder theory, which views income smoothing as an accounting-policy choice used by managers to pursue reporting objectives that may be affected by conflicts of interest (Valdiansyah et al., 2022). Managers may also employ discretionary smoothing in order to create dynamic reserves that can absorb future loan losses while maintaining the appearance of sound annual performance. Income smoothing and LLPs among Asia-Pacific banks have a positive correlation, according to Vo et al. (2022). Similar relationships have been documented for banks in Europe, China, and Japan (Aggelopoulos et al., 2023; Chen et al., 2021).

The findings also correspond with the policy environment created by the regulation of OJK No. 48/POJK.03/2020, which introduced stimulus for the economy through loan restructuring and provided incentives for banks to establish provisions for restructured COVID-19 loans. Countries facing deeper recessions and greater corporate distress experienced stronger pressure on bank asset quality and profitability. The severity of the crisis can be gauged by the scale of fiscal and monetary support measures aimed at economic recovery (Demirgüç-Kunt et al., 2023).

In Europe, these measures included government liquidity injections, borrower relief programs, monetary easing, and the European Central Bank's Pandemic Emergency Purchase Programme (ECB-PEPP); consequently, such interventions helped cushion the shock to bank performance (Olszak et al., 2026). Much like the policy implemented by the Indonesian Financial Services Authority, which introduced economic stimulus measures through loan restructuring, research by He et al. (2025) found that community banks in the United States engaged in income smoothing practices regarding LLPs during the COVID-19 pandemic; furthermore, the enactment of the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) provided incentives for these banks to employ income smoothing to increase their LLPs.

Following the global financial crisis of 2008–2009 and during the COVID-19 pandemic, provisioning attracted more attention, as financial institutions tended to maintain higher provisions in response to emerging loan problems during economic downturns (Alqam et al., 2022). By adjusting provisions in response to earnings fluctuations, managers can dampen earnings volatility and demonstrate stability to the market. Although this behavior is well-documented in previous crises, evidence from the COVID-19 crisis is limited (Olszak et al., 2026).

Under the restructuring stimulus, managers had discretion in determining provisions while assessing borrowers' prospects during the pandemic, particularly because principle-based accounting guided the recognition of provisions associated with restructuring. Since restructuring can contribute to future loss events, banks need to consider it when determining how to manage potential losses (Valdiansyah et al., 2023). He et al. (2025) observe that community banks exhibited asymmetric LLP behavior during the two major crises of this century, the 2007-2009 global financial crisis and the COVID-19 pandemic, with banks owned by multibank holding companies or publicly traded bank holding companies displaying more aggressive income smoothing behavior. Using a sample of U.S. banks during the ongoing COVID-19 outbreak, Nguyen et al. (2023) found that banks were more inclined to engage in discretionary income smoothing in response to the worsening pandemic situation.

Furthermore, banks significantly increased discretionary income smoothing during the early stages of the COVID-19 pandemic but subsequently reduced overall Loan Loss

Provision (LLP) levels as fiscal and monetary regulatory support stabilized borrower solvency and restored economic confidence. Income-smoothing practices may become more prominent during periods of crisis, including the first wave of COVID-19. In the United Kingdom, for example, temporary relaxation of banking regulations and supervisory requirements was used to help institutions manage the deterioration of their balance sheets during the pandemic (Ozili, 2022a).

The Influence of Signaling on LLPs

H2 is supported by the finding that signaling has a positive correlation with LLPs, consistent with prior studies (Jasman et al., 2021; Le et al., 2021; Nguyen et al., 2023; Sharma & Rani, 2024). The result suggests that banks may use provisioning decisions to communicate their perceived financial strength and their capacity to manage present and future credit losses to external stakeholders. Signaling theory, which highlights the significance of managerial actions, is consistent with this interpretation in communicating a bank's ability to establish adequate LLPs (Pramono et al., 2019). Signaling may also be motivated by managers' efforts to adjust reported performance over a particular period and compare it with the performance of other banks. Because banks are closely observed by external stakeholders, managers can use private information embedded in provisioning decisions as a means of signaling (Jasman et al., 2021). Banks tend to use discretionary provisions to reduce income volatility, maintain capital ratios, and signal financial health to the market (Olszak et al., 2026). Bank managers perceive loan loss provisions as a channel to signal private information about banks' future performance. Banks more severely affected by the COVID-19 pandemic were more likely to signal their private information through LLPs (Nguyen et al., 2023).

Asset Diversification Moderates the Influence of Income Smoothing and Signaling on LLPs

Asset diversification does not strengthen the positive correlation between income smoothing and LLPs, according to the test of H3. The interaction is therefore classified as predictor moderation, meaning that diversification does not operate as a moderator in this relationship. One possible explanation is the pandemic context, particularly 2021, when loan quality deteriorated and banking liquidity became constrained. The reduction in lending during COVID-19 also lowered current-period loan growth and may have reduced managers' incentives to engage in income smoothing. At the same time, weaker liquidity and lower profitability reduced banks' ability to undertake discretionary smoothing. This interpretation is consistent with evidence from Ozili (2022a), who documented spillover effects of COVID-19 on the banking sector, including reduced lending under heightened uncertainty and a decline in consumer spending in some markets.

Asset diversification strengthens the positive correlation between signaling and LLPs, according to the test of H4. The result suggests that banks can reinforce their signal of provisioning capacity by diversifying assets, including through securities. As a result, in the signaling–loan loss provision relationship, asset diversification serves as both an independent variable and a moderator. Expanding the asset portfolio beyond loans may provide managers with additional income and greater capacity to establish reserves, supporting managerial objectives while helping address credit risk during periods of crisis. Diversification is intended to spread exposure across lower-risk securities rather than concentrating potential loss provisions in high-risk lending (Agung et al., 2021). In a similar vein, Rejeb and Merzki (2023) discovered that even in a highly regulated banking environment, asset diversification can facilitate earnings management through LLPs. Their findings identify diversification as an important internal strategy affecting bank earnings management in developing economies, alongside external factors that may individually or jointly influence LLPs.

Signaling is the variable that has the biggest impact on LLPs, according to the regression results. One possible explanation is OJK Regulation No. 48/POJK.03/2020, which introduced loan-restructuring stimulus measures and encouraged bank managers to establish provisions for restructured loans during the COVID-19 pandemic. These provisions helped managers respond to the decline in borrowers' repayment capacity while simultaneously communicating the bank's perceived resilience to external stakeholders during the crisis. Banking supervisory authorities responsible for maintaining compliance as well as the safety and soundness of banks need to implement regulatory provisions to manage banks' discretionary behavior during times of crisis, given that such regulations help strengthen bank resilience in the face of challenging economic conditions (Nguyen et al., 2023).

Taken together, the findings suggest that asset diversification did not strengthen income-smoothing practices during the pandemic because deterioration occurred across overall asset quality rather than only within the loan portfolio. Under these conditions, banks had limited incentives to increase income-smoothing activities. At the same time, the decline in asset quality was accompanied by lower banking-sector profits during the COVID-19 period.

CONCLUSION

This research investigated how income smoothing and signaling influence loan loss provision, moderated by asset diversification, in the banking sector listed on the IDX during 2021-2025. The results show that income smoothing is positively associated with LLPs. Signaling also has a positive influence on LLPs. Bank management implements discretionary income smoothing for dynamic loss reserves to cover future loan losses, while signaling reflects managers' incentives to position bank performance relative to the average performance of other banks, thereby demonstrating good annual performance. The interaction between asset diversification and signaling strengthens this relationship and is therefore categorized as quasi-moderation. Banks can reinforce their signal of provisioning capacity by diversifying assets, including through securities. In contrast, the association between LLPs and income smoothing, which is categorized as predictor moderation, is not strengthened by asset diversification. During the COVID-19 pandemic period, loan disbursement decreased as a result of the pandemic, which lessened the incentive for banks to use income smoothing.

This study enriches the literature and offers theoretical implications regarding the impact of signaling on LLPs by presenting evidence that this effect can be amplified by asset diversification; conversely, asset diversification does not strengthen the correlation between income smoothing and LLPs. From a practical perspective, these findings can assist banks and regulators in evaluating the role of income-smoothing practices and asset allocation when managing provisions. The results are particularly relevant to banks and policymakers responsible for measuring and maintaining liquidity during economic downturns. The results offer more empirical support for OJK and Bank Indonesia on the impact of loan-restructuring measures implemented for the economy during the pandemic.

LIMITATION

Several limitations should be considered. The study uses secondary data collected during the COVID-19 pandemic, so the research conditions reflect economic and financial conditions that have not yet returned to normal. The data for this study cover the COVID-19 pandemic period, during which loan disbursement declined due to the pandemic, thereby reducing the incentive for banks to smooth income. Liquidity

constraints and declining profits in the banking sector also limited the capacity for discretionary income smoothing. Future studies could incorporate additional variables, including income diversification, to provide a clearer explanation of income smoothing in the formation of LLPs.

ACKNOWLEDGMENT

The authors sincerely thank the University of Bina Sarana Informatika and the University of Dirgantara Marsekal Suryadarma for providing research support and facilities, as well as all parties who contributed to the data collection process.

DECLARATION OF CONFLICTING INTERESTS

The authors declare that they have no potential conflicts of interest relating to the study, its authorship, or its publication.

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