

Volatility Risk and Retail Investors' Asset Allocation: Parallel Mediation by Exposure Limitation and Risk Tolerance

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Received : September 2, 2026 | Revised : September 14, 2026 | Accepted : September 18, 2026 | Online : October 7, 2026

Abstract

Real-time trading platforms expose Indonesian retail investors to rapid price fluctuations, but how perceived volatility translates into implemented portfolios remains unclear. This study tests the association between Volatility Risk (VR) and Actual Asset Allocation (AA) and parallel mediation through Risk Exposure Limitation (RE) and Risk Tolerance (RT). A cross-sectional survey of 200 active Indonesian retail investors was analyzed with PLS-SEM. The model explains 56.0% of AA variance. VR is positively associated with RE ($\beta = 0.412$, $p < 0.001$) and AA ($\beta = 0.378$, $p < 0.001$), while RE is positively associated with AA ($\beta = 0.496$, $p < 0.001$). The VR-RE-AA indirect effect is significant ($\beta = 0.204$, bootstrap 95% CI [0.144, 0.265]), indicating complementary partial mediation. The RT-mediated path is unsupported. The conceptual contribution is the distinction between a supported rule-based exposure-control channel and an unsupported preference-based risk-tolerance channel, with implications for suitability assessment, brokerage safeguards, and financial advice.

Keywords: *Volatility Risk, Risk Exposure Limitation, Risk Tolerance, Asset Allocation, PLS-SEM*

INTRODUCTION

Digital brokerage has reduced participation costs and expanded financial-market access for Indonesian retail investors. By the close of Financial Inclusion Month 2025, the Indonesia Stock Exchange reported 19 million capital-market investors, including 8 million stock investors (Indonesia Stock Exchange, 2025). App notifications, intraday valuation, and social-media narratives make price changes continuously salient.

Technology-enabled access can improve information availability but can also intensify attention, sentiment, and behavioral bias (Hirshleifer, 2020; Giglio et al., 2021). This setting is important because many newer investors make portfolio decisions through mobile platforms and may have limited capacity to absorb losses (Ahmad et al., 2020; Hidayat & Pamungkas, 2022).

Modern Portfolio Theory links allocation to expected return, variance, covariance, and investor preferences (Markowitz, 1952). Prospect Theory adds reference dependence and loss aversion, explaining why salient losses can receive disproportionate weight (Kahneman & Tversky, 1979). Recent evidence further shows that subjective beliefs, ambiguity, and adjustment frictions shape implemented portfolios beyond static risk preferences (Bianchi & Tallon, 2019; Giglio et al., 2021; Choukhmane & de Silva, 2026).

Two gaps remain. First, studies commonly estimate a direct relationship between perceived risk and investment decisions, leaving it unclear whether investors act through explicit exposure limits or through changing risk tolerance. Second, risk tolerance is often treated as stable, even though market salience may trigger learning or defensive rules (Hemrajani et al., 2024).

Evidence is also mixed: Indonesian studies often find positive links between risk tolerance and investment decisions (Nur Aini & Lutfi, 2019; Hidayat & Pamungkas, 2022), whereas stated

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tolerance may not well predict behavior during volatile episodes ([Brooks & Williams, 2022](#)).

Accordingly, this study tests the direct VR-AA association and two parallel indirect paths, VR-RE-AA and VR-RT-AA, among Indonesian retail investors. Its novelty lies in explicitly separating a rule-based defensive mechanism (RE) from a preference-based mechanism (RT) while retaining the direct path. The model clarifies how perceived volatility is translated into portfolio action.

LITERATURE REVIEW

Modern Portfolio Theory, Prospect Theory, and Perceived Volatility

Modern Portfolio Theory treats allocation as a risk–return optimization problem, whereas Prospect Theory explains reference dependence and loss aversion. Perceived volatility is therefore not identical to observed variance: it is a subjective assessment of instability, possible loss, and uncertainty that varies with attention, experience, and beliefs ([Almansour et al., 2023](#); [D’Acunto et al., 2023](#)). Ambiguity and monetary uncertainty can further alter portfolio choices even when measured volatility is unchanged ([Bekaert et al., 2013](#); [Bianchi & Tallon, 2019](#); [Giglio et al., 2021](#)).

Volatility Risk and Risk Exposure Limitation

Risk Exposure Limitation is defined here as an investor's rule-based restriction on the amount, concentration, or persistence of risky-asset exposure. It includes maximum risky-asset weights, cash buffers, postponed purchases, defensive rebalancing, and predetermined loss limits.

Unlike risk capacity, which concerns financial ability to bear loss, RE is an implemented control rule; unlike defensive rebalancing, RE also includes ex ante limits before a trade. Perceived volatility should strengthen these safeguards because salient potential losses encourage protective action ([Kahneman & Tversky, 1979](#); [Brooks & Williams, 2022](#)).

H1: Volatility Risk is positively associated with Risk Exposure Limitation.

Risk Exposure Limitation and Actual Asset Allocation

Exposure limits matter only when reflected in the portfolio actually held. Investors may prefer safety without rebalancing, while transaction costs, liquidity, and default positions can impede implementation ([Amihud, 2002](#); [Choukhmane & de Silva, 2026](#)). AA therefore measures the extent to which portfolio composition responds to risk-based considerations; a positive RE-AA path indicates stronger alignment with exposure rules, not a larger share of risky assets.

H2: Risk Exposure Limitation is positively associated with Actual Asset Allocation.

Volatility Risk and Risk Tolerance

Risk tolerance is a relatively dispositional willingness and psychological capacity to accept uncertainty and temporary losses for potential long-term gains; it differs from perceived risk and objective financial capacity ([Grable & Lytton, 1999](#); [Hemrajani et al., 2024](#)). Findings differ partly because studies measure stated tolerance, realized risk-taking, and investment decisions differently, and because samples face different liquidity constraints and market conditions. Indonesian evidence often reports positive associations ([Ahmad et al., 2020](#); [Hidayat & Pamungkas, 2022](#)), whereas volatile-market evidence shows that stated tolerance may not translate into action ([Brooks & Williams, 2022](#)).

H3: Volatility Risk is positively associated with Risk Tolerance.

Risk Tolerance and Actual Asset Allocation

Higher risk tolerance can support continued diversified exposure and reduce panic selling, but income uncertainty, prior losses, liquidity needs, and platform cues may prevent stated

preferences from becoming actual allocation. Positive findings in Indonesia (Nur Aini & Lutfi, 2019; Hidayat & Pamungkas, 2022) can therefore coexist with null results when explicit constraints and realized allocations are modeled (Choukhmane & de Silva, 2026).

H4: Risk Tolerance is positively associated with Actual Asset Allocation.

Direct Effect and Parallel Mediation

The direct VR-AA path is retained because perceived volatility may be associated with allocation without first changing RE or RT. Parallel mediation then separates the defensive, rule-based RE channel from the adaptive, preference-based RT channel. Specific indirect effects must be assessed separately with bootstrap inference; a significant indirect effect does not require the direct path to be zero (Zhao et al., 2010).

H5: Volatility Risk is positively associated with Actual Asset Allocation after accounting for RE and RT.

H6: Risk Exposure Limitation mediates the association between Volatility Risk and Actual Asset Allocation.

H7: Risk Tolerance mediates the association between Volatility Risk and Actual Asset Allocation.

RESEARCH METHOD

Research Design, Population, and Sample

This study uses a quantitative explanatory design and a cross-sectional survey of 200 active Indonesian retail investors. Eligible respondents held an investment account or Single Investor Identification and had traded at least one financial-market instrument during the previous 12 months.

Purposive sampling matched the hypotheses to investors with actual portfolio experience. For AA, the most complex endogenous equation with three incoming predictors, an a priori multiple-regression power benchmark ($\alpha = 0.05$, $f\text{-squared} = 0.15$, $\text{power} = 0.80$) requires 77 observations; $N = 200$ exceeds this equation-level minimum.

The 2026 questionnaire was distributed electronically and completed voluntarily. Respondents were informed of the study purpose, and the analysis used no direct identifiers. All 20 items used a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Respondent Demographic Profile

The sample comprises 126 men (63.0%) and 74 women (37.0%). Respondents aged 17–25 years form the largest group (48.0%), followed by those aged 26–35 years (40.5%) and 46 years or older (11.5%). Most respondents hold a Diploma IV/bachelor's degree (47.5%), while 102 respondents (51.0%) report one to three years of investment experience.

Table 1. Respondent Demographic Profile

Characteristic	Category	n	%
Gender	Male	126	63.0
Gender	Female	74	37.0
Age	17–25 years	96	48.0
Age	26–35 years	81	40.5
Age	46 years or older	23	11.5
Education	Junior secondary or lower	22	11.0
Education	Senior secondary	50	25.0
Education	Diploma IV/Bachelor's	95	47.5
Education	Master's	33	16.5

Occupation	Student	72	36.0
Occupation	Private-sector employee	71	35.5
Occupation	State/regional enterprise employee	22	11.0
Occupation	Professional/independent worker	29	14.5
Occupation	Civil servant/military/police	6	3.0
Investment experience	Less than 1 year	19	9.5
Investment experience	1–3 years	102	51.0
Investment experience	4–5 years	23	11.5
Investment experience	More than 5 years	56	28.0

Source: Primary data, processed (2026)

VR captures subjective price instability and potential loss; RE captures maximum risky-asset weights, cash retention, delayed purchases, and loss rules; RT represents willingness to absorb temporary losses; and AA captures implemented changes between risky and safer assets. Appendix A lists all 20 items and construct assignments. Item wording was adapted from the constructs developed in the cited volatility, exposure-control, risk-tolerance, and allocation literature (Kahneman & Tversky, 1979; Grable & Lytton, 1999; Giglio et al., 2021; Hemrajani et al., 2024).

PLS-SEM Model

The model was estimated in PLS-SEM using a mixed measurement specification. Of the 20 questionnaire items, 17 contributed to the final model. VR and AA were specified as reflective constructs because their retained indicators were treated as manifestations of a common underlying perception or implemented allocation response.

RE and RT were operationalized as standardized observed composite scores because their five indicators represent distinct, non-interchangeable behavioral components that jointly form an exposure-control profile and a tolerance profile, respectively. Accordingly, internal-consistency statistics and AVE were evaluated only for VR and AA, whereas item collinearity was assessed for RE and RT (Hair et al., 2022; Henseler, 2021).

All five RE indicators were retained because maximum risky-asset limits, reductions during volatility, cash retention, loss rules, and risk-based allocation are complementary exposure-control mechanisms; an investor may adopt one mechanism without necessarily adopting all others. RT1–RT5 were likewise aggregated as an observed composite index covering willingness to accept temporary losses, hold risky assets during downturns, withstand fluctuations, accept higher risk for return, and avoid panic selling. This operationalization does not claim that RE or RT constitutes a unidimensional reflective scale.

VR1, AA3, and AA4 were removed only from the final reflective blocks. VR1 expressed a broad cognitive judgment that volatility makes the market risky, whereas VR2–VR5 more consistently capture behavioral and affective responses to price instability. AA3 primarily reflects willingness to retain risky assets and therefore overlaps conceptually with RT; AA4 overlaps with AA2 and expresses a general tendency to react to risk signals rather than implemented allocation.

The retained AA1, AA2, and AA5 still cover observed portfolio composition, adjustment between risky and safer assets, and the investor's implemented allocation decision. Indicator removal was therefore based on inadequate loading together with conceptual breadth or redundancy, while preserving content validity; it was not used to improve structural path coefficients or R-squared.

The model equations, with AA as the dependent variable, VR as the independent variable, and RE and RT as the two mediating variables, can be expressed using a Path Analysis or Structural Equation Modeling (SEM) approach as follows:

$$RE = \alpha_1 + \beta_1 VR + \varepsilon_1 \quad (1)$$

$$RT = \alpha_2 + \beta_2 VR + \varepsilon_2 \quad (2)$$

$$AA = \alpha_3 + \beta_3 RE + \beta_4 RT + \beta_5 VR + \varepsilon_3 \quad (3)$$

Here, β_1 and β_2 represent the effects of VR on RE and RT; β_3 and β_4 represent the effects of RE and RT on AA after controlling for VR; β_5 is the direct effect of VR $\rightarrow$ AA after controlling for both mediators; and ε_1 - ε_3 are disturbance terms. The indirect effects are IE_RE = $\beta_1\beta_3$ and IE_RT = $\beta_2\beta_4$; the total effect is TE = $\beta_5 + \beta_1\beta_3 + \beta_2\beta_4$.

FINDINGS AND DISCUSSION

Descriptive Results

Construct means range from 3.485 to 4.006. Respondents report the highest mean score for risk tolerance, followed by risk exposure limitation and actual asset allocation. This pattern indicates that the sample is aware of volatility while also reporting defensive control and the capacity to remain invested. Descriptive statistics indicate tendencies only and do not establish causal relationships.

Table 2. Descriptive Statistics

Construct	Mean	Standard Deviation	Interpretation
Volatility Risk (VR)	3.485	0.722	Moderately high
Risk Exposure Limitation (RE)	3.978	0.563	High
Risk Tolerance (RT)	4.006	0.554	High
Actual Asset Allocation (AA)	3.953	0.689	High

Source: Primary data, processed (2026)

Measurement Model Assessment

VR and AA meet reflective reliability and convergent validity: VR has alpha = 0.757, CR = 0.851, and AVE = 0.589; AA has alpha = 0.718, CR = 0.847, and AVE = 0.648. Alpha, CR, and AVE do not apply to the observed composite scores RE and RT. Their VIFs are below 3.3, indicating no problematic collinearity.

Table 3. Measurement Quality Summary

Construct	Type	Retained Indicators/Score	Alpha	CR / AVE or outer VIF
VR	Reflective	VR2–VR5	0.757	CR 0.851; AVE 0.589
RE	Composite	RE1–RE5 score	n.a.	VIF 1.248–1.624
RT	Composite	RT1–RT5 score	n.a.	VIF 1.249–1.336
AA	Reflective	AA1, AA2, AA5	0.718	CR 0.847; AVE 0.648

Source: Primary data, processed (2026)

Table 4. Discriminant Validity Diagnostics

Criterion	Scope	Statistic	Benchmark	Assessment
HTMT	VR–AA	0.782	< 0.85	Meets
Fornell–Larcker	VR–AA	sqrt AVE: 0.767; 0.805	r = 0.584	Meets

Source: Primary data, processed (2026)

The VR-AA HTMT value is 0.782 (<0.85), while the square roots of AVE (0.767 for VR; 0.805 for AA) exceed their correlation (0.584). Discriminant validity is therefore supported for VR and AA only. HTMT, cross-loadings, and the Fornell-Larcker criterion do not apply to the single observed RE and RT composite scores.

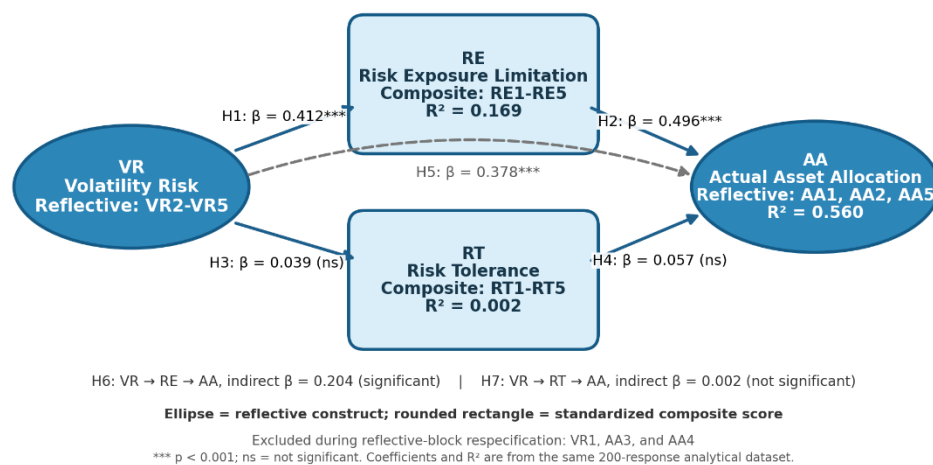
Structural Model and Hypothesis Testing

R-squared values are 0.169 for RE, 0.002 for RT, and 0.560 for AA; adjusted values are 0.165, -0.003, and 0.553. The model therefore explains substantial AA variance but virtually none of RT. For AA, f-squared is 0.269 for VR, 0.443 for RE, and 0.007 for RT; inner VIF values of 1.207, 1.262, and 1.050 are below 3.3.

Table 5. Structural Model Explanatory Diagnostics

Endogenous Construct	Predictors	R-squared	Adjusted R-squared	f-squared / inner VIF
RE	1	0.169	0.165	VR: 0.203 / n.a.
RT	1	0.002	-0.003	VR: 0.002 / n.a.
AA	3	0.560	0.553	VR: 0.269 / 1.207; RE: 0.443 / 1.262; RT: 0.007 / 1.050

Source: Primary data, processed (2026). Adjusted R-squared and the two single-predictor f-squared values were calculated from N = 200.



Source: Primary data, processed (2026)

Figure 1. PLS-SEM structural model

Figure 1 shows the direct VR-AA path and the two parallel mediation routes through RE and RT. Ellipses denote reflective constructs, whereas rounded rectangles denote standardized composite scores; the retained indicators are stated inside each node. Arrow labels report standardized coefficients, while values inside endogenous constructs are R-squared.

Table 6. Structural Paths, Indirect Effects, and Bootstrap Confidence Intervals

Hyp.	Path	beta	t-statistic	p-value	Bootstrap 95% CI
H1	VR → RE	0.412	7.646	< 0.001	[0.299, 0.509]
H2	RE → AA	0.496	9.883	< 0.001	[0.393, 0.595]

H3	VR → RT	0.039	0.450	0.653	[-0.134, 0.208]
H4	RT → AA	0.057	1.039	0.299	[-0.043, 0.164]
H5	VR → AA	0.378	7.346	< 0.001	[0.272, 0.468]
H6	VR → RE → AA	0.204	6.704	< 0.001	[0.144, 0.265]
H7	VR → RT → AA	0.002	0.282	0.778	[-0.010, 0.024]

Source: Primary data, processed (2026). Percentile confidence intervals are based on 1,000 bootstrap resamples (seed 20260830).

Discussion

Volatility Risk and Risk Exposure Limitation

H1 is supported ($\beta = 0.412$, $p < 0.001$); higher perceived volatility is associated with stronger exposure limits. This pattern is consistent with loss aversion and protective responses to salient downside risk (Kahneman & Tversky, 1979; Brooks & Williams, 2022). Indonesian evidence similarly shows that risk perception matters for investment decisions, although the direction varies with how decision quality and risk-taking are coded (Nur Aini & Lutfi, 2019; Hidayat & Pamungkas, 2022; Widyastuti & Murtanto, 2024).

Risk Exposure Limitation and Actual Asset Allocation

H2 is supported ($\beta = 0.496$, $p < 0.001$), making RE one of the strongest AA correlates. The result indicates that perceived risk becomes behaviourally relevant when translated into maximum weights, liquidity buffers, delayed purchases, or rebalancing rules. It complements evidence that beliefs shape portfolios (Giglio et al., 2021) and that frictions separate preferences from implemented choices (Choukhmane & de Silva, 2026). The positive sign denotes more risk-responsive allocation, not greater risky-asset ownership.

Volatility Risk and Risk Tolerance

H3 is not supported ($\beta = 0.039$, $p = 0.653$). Two interpretations are plausible. First, RT may be sufficiently dispositional to remain stable when situational volatility perceptions change. Second, the near-zero R-squared may reflect unmodelled heterogeneity in wealth, liquidity, experience, or market conditions, compounded by using a single composite score. This differs from Indonesian studies linking tolerance to investment decisions (Ahmad et al., 2020; Hidayat & Pamungkas, 2022) but accords with evidence that stated tolerance can remain stable while behavior changes (Brooks & Williams, 2022).

Risk Tolerance and Actual Asset Allocation

H4 is not supported ($\beta = 0.057$, $p = 0.299$). After VR and RE are included, stated tolerance is not significantly associated with AA. This differs from positive risk-tolerance findings in Indonesia (Nur Aini & Lutfi, 2019; Hidayat & Pamungkas, 2022) and suggests that platform cues, liquidity needs, investment horizon, and explicit exposure controls may dominate preferences in volatile conditions. The cross-sectional design supports an association, not a causal claim.

Direct, Total, and Mediation Effects

H5 is supported ($\beta = 0.378$, $p < 0.001$). Because higher AA scores represent stronger risk-responsive portfolio adjustment, the positive coefficient indicates more active alignment between risk signals and portfolio composition. The total coefficient of 0.584 is the sum of the standardized

direct and specific indirect components ($0.378 + 0.204 + 0.002$); the unrounded calculation is 0.584148.

The VR-RE-AA indirect effect is significant ($\beta = 0.204$, bootstrap 95% CI [0.144, 0.265]), while the direct path remains significant and has the same sign. Under Zhao et al. (2010), H6 therefore represents complementary partial mediation. The VR-RT-AA effect is not significant ($\beta = 0.002$, bootstrap 95% CI [-0.010, 0.024]), so H7 shows no mediation.

The main novelty is therefore both empirical and conceptual: among Indonesian retail investors, a rule-based defensive channel transmits volatility perceptions to allocation, whereas the parallel tolerance channel does not. This distinction is more informative than treating risk perception or tolerance as a single direct predictor.

CONCLUSIONS

The study finds that perceived volatility is associated with actual allocation directly and indirectly through RE, while RT neither changes with VR nor predicts AA in the parallel model. RE is therefore the principal behavioral transmission mechanism. The study's central novelty is separating exposure-control rules from stated tolerance and showing complementary partial mediation only through the rule-based channel in an Indonesian retail-investor setting.

For regulators, suitability assessments should distinguish perceived volatility, objective risk capacity, stated tolerance, and implemented exposure limits. Brokerage platforms can support rule-based caps, cash-buffer prompts, loss-limit planning, and rebalancing alerts without encouraging panic selling. Financial advisers should compare stated tolerance with observed allocations and discuss income, wealth, liquidity needs, and investment horizon when the two diverge. These actions target the mechanism the model identifies rather than relying only on general risk education.

The cross-sectional, self-reported design cannot establish causality and remains vulnerable to common method bias because the questionnaire lacked a marker variable. Purposive sampling limits generalization beyond active investors; the self-reported demographics describe the sample, not the investor population. Allocation was not verified against portfolio or transaction records, and income, wealth, and investment horizon were not controlled. Future studies should use longitudinal transaction-linked data, probability sampling, controls, marker techniques, and complete predictive diagnostics.

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APPENDIX A. MEASUREMENT ITEMS

Indicator	Construct	Description	Final treatment
VR1	VR	High price fluctuations make the financial market appear increasingly risky.	Excluded
VR2	VR	Sharp price movements lead me to reduce investment in risky assets.	Reflective
VR3	VR	A major market correction makes me postpone purchases of risky instruments.	Reflective
VR4	VR	I feel uncomfortable holding assets whose values change drastically in a short period.	Reflective
VR5	VR	Market volatility makes me prefer relatively safe and stable instruments.	Reflective
RE1	RE	I set a maximum proportion of risky assets in my portfolio.	Composite
RE2	RE	When markets become highly volatile, I reduce the proportion invested in risky assets.	Composite
RE3	RE	I prefer holding cash rather than adding risky assets when volatility increases.	Composite
RE4	RE	I use a predetermined loss limit before deciding to sell risky assets.	Composite
RE5	RE	My perception of market risk determines how much money I allocate to risky assets.	Composite
RT1	RT	I am willing to accept temporary losses to obtain potential long-term gains.	Composite
RT2	RT	I continue to hold risky investments even when the market is declining.	Composite
RT3	RT	I can face portfolio fluctuations without immediately selling.	Composite
RT4	RT	I am willing to place part of my funds in high-risk instruments when the return potential is attractive.	Composite
RT5	RT	I do not panic easily when my investment value falls in the short term.	Composite
AA1	AA	My portfolio composition reflects the level of risk I perceive.	Reflective
AA2	AA	I adjust the proportions of risky and safe assets according to market conditions.	Reflective
AA3	AA	I retain risky assets only when the perceived risk remains acceptable.	Excluded
AA4	AA	I tend to change asset allocation when market-risk signals emerge.	Excluded
AA5	AA	My actual investment decisions reflect risk, return, and personal psychological considerations.	Reflective

Note. All items used a five-point agreement scale. Final-treatment labels: Reflective = retained in a final reflective block; Composite = retained in a standardised composite score; Excluded = administered but not used in the final model.

Conceptual sources: VR, Giglio et al. (2021) and Brooks and Williams (2022); RE, Kahneman and Tversky (1979), Amihud (2002), and Choukhmane and de Silva (2026); RT, Ahmad et al. (2020), Hidayat and Pamungkas (2022),

and Hemrajani et al. (2024); AA, Nur Aini and Lutfi (2019) and Almansour et al. (2023). Wording was adapted to the Indonesian digital-investment context.

APPENDIX B. INDICATOR-LEVEL MEASUREMENT DIAGNOSTICS

Indicator	Measurement role	Loading / VIF	Assessment
VR1	Reflective indicator	n.a.	Excluded in respecification
VR2	Reflective indicator	0.781 loading	Retained
VR3	Reflective indicator	0.719 loading	Retained
VR4	Reflective indicator	0.799 loading	Retained
VR5	Reflective indicator	0.769 loading	Retained
RE1	Composite indicator	1.458 VIF	< 3.3
RE2	Composite indicator	1.534 VIF	< 3.3
RE3	Composite indicator	1.248 VIF	< 3.3
RE4	Composite indicator	1.271 VIF	< 3.3
RE5	Composite indicator	1.624 VIF	< 3.3
RT1	Composite indicator	1.334 VIF	< 3.3
RT2	Composite indicator	1.336 VIF	< 3.3
RT3	Composite indicator	1.329 VIF	< 3.3
RT4	Composite indicator	1.299 VIF	< 3.3
RT5	Composite indicator	1.249 VIF	< 3.3
AA1	Reflective indicator	0.762 loading	Retained
AA2	Reflective indicator	0.844 loading	Retained
AA3	Reflective indicator	n.a.	Excluded in respecification
AA4	Reflective indicator	n.a.	Excluded in respecification
AA5	Reflective indicator	0.807 loading	Retained

Source: Final respecified PLS-SEM output, processed (2026). Loadings apply to reflective blocks; VIFs apply to composite indicators.