

Unveiling the Mediating Pathways in Indonesia Financial Institutions Pension Funds

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Abstract

This study aims to analyze the factors that affect the return on investment in the Financial Institution Pension Fund in Indonesia for the 2020–2024 period, with the premise that investment performance does not always increase along with the increase in assets under management and the growth of contribution funds. The study examines the influence of assets under management, contribution fund growth, and asset allocation on return on investment and examines whether asset allocation plays a role as a mediating variable. The approach used is quantitative with panel data regression and specification selection through comparative testing that produces a fixed effect model. Data processing was carried out using the statistical software Econometric Views 13 and mediation testing using the Sobel test on the path coefficient. The results of the study show that assets under management have a negative and significant effect on return on investment, the growth of contribution funds has a negative and significant effect on return on investment, while asset allocation has a positive and significant effect on return on investment. The mediation test confirmed that asset allocation did not bridge the influence of assets under management or the growth of contribution funds on return on investment, so the two variables worked mainly through direct influence. Practical recommendations include strengthening cash management, accelerating the fund placement process, consistent portfolio rebalancing, setting measurable risk limits, and developing research with liquidity indicators, transaction costs, risk size, and macroeconomic factors.

Keywords: financial institution pension fund, return on investment, asset under management, growth of contribution fund, asset allocation

1. Introduction

Pension funds have broad systemic and social impacts, so their performance must be maintained. Pension funds are a stable source of long-term financing for the capital markets and financial sector. Consistent and transparent performance will increase trust, attracting participation from employers and workers, ultimately expanding the participant base and assets under management (AUM) (OECD, 2023). From a household perspective, adequate investment returns directly strengthen participants' retirement wealth, reduce the pension gap, and reduce the long-term fiscal burden (Bodie et al., 2024; OECD, 2023).

In Indonesia, awareness of the importance of retirement planning is growing. This is evidenced by the growth rate of assets, number of participants, and investments of Financial Institution Pension Funds (DPLK). From 2019–2023, DPLK assets increased from IDR 97.52 trillion to IDR 134.65 trillion, while the number of active participants increased from 2.94 million to 3.74

million. Total investment that year also rose from IDR 95.91 trillion to IDR 132.48 trillion (OJK, 2023). The growth rate in these three aspects was not accompanied by optimal investment performance or return on investment (ROI). In the same year, the ROI of DPLK (Financial Institutions Funds) in Indonesia tended to fluctuate. In 2019, DPLK ROI was recorded at 8.17 percent, dropping to 4.60 percent in 2021, and rising to 5.97 percent in 2023 (OJK, 2023).

DPLK ROI serves to assess the effectiveness of a portfolio in generating returns on invested resources (Bodie et al., 2024). Fluctuations in DPLK ROI reflect its high sensitivity to economic factors such as interest rates, market volatility, and a conservative portfolio profile. A conservative portfolio profile promotes stability, while it can depress returns when inflation rises or yields decline (Bodie et al., 2024; OECD, 2023). ROI variations also indicate the importance of asset allocation, rebalancing effectiveness, and cost efficiency. At the policy level, strengthening asset liability management (ALM) practices is necessary to align investment returns with participant liability profiles (OECD, 2023; OJK, 2023). This study will use several factors, namely AUM, contribution growth, and asset allocation, as mediators, to determine their impact on ROI.

A larger AUM can reduce costs and expand access to alternative asset classes, potentially increasing ROI. This theory aligns with economies of scale, which explains that the larger the operational scale, the lower the average cost per participant (Afolabi & Erasmus, 2023; Carlo et al., 2023). AUM also opens up space for more asset diversification policies and more diverse investment plans. This space expands and fosters varied asset allocation strategies to achieve more optimal results (Bond et al., 2025; Umut, 2023). In the context of DPLK in Indonesia, increases in AUM do not follow a linear path with increases in ROI (OJK, 2023). AUM increases are considered insufficient to boost ROI without asset allocation policies and the implementation of ALM (Bregnard & Salva, 2023; Wahyudi et al., 2020). Findings in the UK also suggest that a large AUM does not always have a positive effect on asset allocation. A larger AUM actually reduces the proportion of funds allocated to alternative and riskier asset classes (Zhao & Sutcliffe, 2021).

Growth in contribution funds and a stable contribution flow can strengthen liquidity. Liquidity needs during market stress can be adequately met without the need to sell invested assets. Contribution fund growth also opens up opportunities for diversification, potentially increasing ROI through appropriate asset allocation strategies (Kandie et al., 2023; Mazreku et al., 2020). Several other studies have shown that contribution fund growth does not necessarily result in high returns. High returns can be achieved through sound internal company management. Contribution fund growth, particularly during high volatility, does not directly impact ROI (Aubry & Yin, 2024; Mustafidah & Fauzi, 2023). Research in the UK also suggests that variations in asset allocation are explained more by maturity and funding ratios than by cash flow. Cash flow volatility does not have a significant effect on asset allocation (Zhao & Sutcliffe, 2021).

Asset allocation plays a crucial role in the returns and investments of pension funds, including Pension Funds (DPLK). Strategic asset allocation and diversification, along with disciplined

rebalancing, are key factors in achieving maximum returns (Anthropelos & Blontzou, 2023; Bond et al., 2025; Kabasinskas et al., 2020; Kopa et al., 2022; Maritato et al., 2022; Wahyudi et al., 2020). Asset allocation and diversification strategies contribute positively to pension fund portfolio performance, even amid market volatility (Prabowosunu et al., 2024; Wahyudi et al., 2020). Unlike many other studies, recent research has found that the direction and significance of asset allocation's influence on ROI are heterogeneous, requiring a distinction between the pathways through which it influences and does not influence, or negatively impacts, ROI (Rachman, 2025).

2. Literature Review

ROI essentially measures a company's ability to convert its investment base into expected returns. Through a managerial accounting approach, ROI is understood as the ratio of investment returns from portfolio management to the average total invested funds (Drury, 2021; Garrison et al., 2024; Horngren et al., 2021). Some other financial management literature equates ROI with return on assets (ROA), which is the ratio of net income to average total assets. Total assets are placed as the basis for returns because all managed resources, from cash to fixed assets, contribute to net income (Brigham & Houston, 2022; Gitman & Zutter, 2015; Kasmir, 2019). OJK Circular Letter No. 09/SEOJK.05/2016 defines ROI as the total investment return divided by the average investment value. This formulation directly aligns with the investment-based ROI principle, which is a reference in managerial accounting literature. This alignment has important functional implications (Garrison et al., 2024; Horngren et al., 2021; Koh et al., 2014; OJK, 2016).

In theory, AUM is the total fair value of investment assets entrusted to an investment manager for management by investors at a given point in time. At the investment manager level, AUM includes both discretionary and non-discretionary portfolios. This measure is based on fair value to allow for comparison between quarters or years without historical cost bias. In practice, cash, trading securities, and receivables related to the portfolio are also included. AUM reflects the actual scale of operations, not simply the size reflected in the records (CFA Institute, 2020).

A larger AUM generally boosts ROI and strengthens the quality of asset allocation because scale offers three key benefits: cost efficiency, deeper diversification, and broader access to asset classes (Bodie et al., 2024). Higher AUM broadens diversification opportunities across sectors, durations, and instruments. This allows for portfolio formation closer to the efficient frontier and more disciplined rebalancing, which in turn stabilizes volatility and supports long-term ROI (Reilly et al., 2019). Consistent with previous research, AUM has a positive impact on asset allocation and ROI. A larger AUM in a DPLK facilitates asset diversification, broadens allocation space, and improves cost efficiency. These conditions then influence and create positive ROI performance (Afolabi & Erasmus, 2023; Carlo et al., 2023; Umut, 2023)

Within a valuation framework, growth is understood as the process of estimating growth, namely assessing the capacity for increasing contribution flows over time based on historical records, fundamental factors, and institutional assumptions (Darmodaran, 2012). From a fundamental perspective, the financial text tradition views sustainable growth as arising from a

retained surplus policy and the ability to generate profits/returns on an existing basis (CFA Institute, 2020). Methodologically, the econometric literature suggests consistent and stable measurements of scale changes to ensure that interpretations of contribution fund growth remain plausible when the participant base or contribution amount changes (Wooldridge, 2020).

Contributing growth increases AUM, lowers relative costs, broadens instrument selection, and facilitates disciplined strategic asset allocation (SAA), thus improving asset allocation quality and ROI. Steady cash inflows facilitate timely rebalancing and maintain target risk-return profiles (CFA Institute, 2021). Larger scale opens access to low-cost instruments and asset classes that were previously difficult to access, strengthening liquidity and reducing cash drag, resulting in more consistent investment policy implementation (Fabozzi & Pachamanova, 2016; Reilly et al., 2019). At the same time, a larger fund base allows for broader factor diversification to optimize long-term returns (Bodie et al., 2024). In line with the theory of contribution fund growth, several studies have shown that contribution fund growth has a positive impact on asset allocation and ROI (Hasa & Salva, 2024; Kandie et al., 2023; Mazreku et al., 2020).

Asset allocation is the decision about the percentage of funds allocated to each asset class to achieve investment objectives with controlled risk. Simply put, assets are divided into risk-free (e.g., cash or very short-term government bonds) and risky (e.g., stocks, corporate bonds, and alternative assets). The core idea is that combining several risky assets with different volatility can reduce portfolio risk without eliminating all potential returns. The proportion of risk-free assets is used to adjust the total risk level according to the investor's profile. Investors choose an asset mix that aligns with the efficient line, which is the best combination of risk and return. If risk-free assets are available, the final decision becomes the optimal portfolio mix of risky and risk-free assets (Elton et al., 2014). Asset allocation is a high-level policy that determines the proportion of each asset class to meet objectives, horizons, and risk tolerances (Gitman & Zutter, 2015). SAA and periodic rebalancing are crucial to maintaining portfolio consistency with the policy (Reilly et al., 2019). Increasing the proportion of risky assets increases potential returns and volatility, while increasing non-risky assets decreases both (Ross et al., 2013).

Appropriate asset allocation tends to increase ROI because a diversified portfolio moves toward a more efficient risk-return combination, including a mix of optimally risky portfolios with risk-free assets (Elton et al., 2014). In practice, disciplined SAA and rebalancing reduce cash drag and maintain an objective risk profile, resulting in better long-term results (Gitman & Zutter, 2015; Reilly et al., 2019). Utilizing the risk-return relationship through the capital market line and beta allows for measured increases in risky assets when the investor profile supports it, potentially increasing ROI (Ross et al., 2013). This theory aligns with previous research that states that asset allocation has a positive effect on ROI (Anthropelos & Blontzou, 2023; Bond et al., 2025; Kabasinskas et al., 2020; Kopa et al., 2022; Maritato et al., 2022; Prabowosunu et al., 2024; Wahyudi et al., 2020).

H₁: Assets under management have a significant positive effect on return on investment.

H₂: Contribution fund growth has a significant positive effect on return on investment.

- H₃: Assets under management have a significant positive effect on asset allocation.
H₄: Contribution fund growth has a significant positive effect on asset allocation.
H₅: Asset allocation has a significant positive effect on return on investment.
H₆: Asset allocation mediates the effect of assets under management on return on investment.
H₇: Asset allocation mediates the effect of contribution fund growth on return on investment.

3. Research Method

This research method uses an explanatory quantitative approach with annual panel data to examine the effect of AUM and contribution fund growth on ROI, as well as the role of asset allocation as a mediator. The population comprised all Pension Funds (DPLK) in Indonesia, while the sample was purposively selected based on data completeness, resulting in the selection of 11 (eleven) Pension Funds (DPLK) with consistent reporting for the 2020–2024 period. The data collection and processing design followed systematic quantitative research stages, starting with determining data sources, developing instruments, measuring variables, and conducting statistical analysis (Sugiyono, 2022). Operational definitions include annual ROI as net investment income divided by the average of total investment in the current and previous years in percent, AUM transformed to natural log for a stable scale and more meaningful interpretation of elasticity, contribution fund growth as an annual change or log difference, and asset allocation as the portion of risky assets that represents SAA decisions (Bodie et al., 2024; Brealey et al., 2023; Brigham & Ehrhardt, 2017; Fabozzi & Pachamanova, 2016; Fahmi, 2020; Jogiyanto, 2022; Kasmir, 2019; Tandelilin, 2017).

Table 1. Operationalization of Variables

Variable	Definition	Indicator	Scale
Return on Investment (ROI)	Annual investment performance relative to the investment base	$ROI_t = \frac{\text{Net Investment Income}_{t-1}}{\frac{\text{Total Investment}_t + \text{Total Investment}_{t-1}}{2}} \times 100\%$	Ratio
Asset Under Management (AUM)	Scale of funds managed, reflecting capacity & efficiency	$\text{LnAUM}_{t-1} = \ln(\text{Total Net Assets}_{t-1})$	Ratio
Growth of Contribution Fund	Rate of change in contribution deposits between years	$\text{Growth}_{t-1} = \frac{\text{Contributions}_{t-1} - \text{Contributions}_{t-2}}{\text{Contributions}_{t-2}} \times 100\%$	Ratio
Asset Allocation	Proportion of risk assets in the portfolio	$\text{Allocation}_{t-1} = \frac{\text{Risk Asset Value}_{t-1}}{\text{Total Investment}_{t-1}} \times 100\%$	Ratio

Source: (Baltagi, 2021; Bodie *et al.*, 2024; Brealey *et al.*, 2023; CFA Institute, 2020, 2021; Darmodaran, 2012; Drury, 2021; Elton *et al.*, 2014; Garrison *et al.*, 2024; Gitman, 2009; Horngren *et al.*, 2021; OJK, 2016; Wooldridge, 2020)

The temporal design uses a one-year lag for LnAUM, contribution fund growth, and asset allocation to clarify the annual causal sequence and reduce the potential for simultaneity. The selection and explanation of the log transformation and the use of lags follow econometric principles for panel data, which emphasize variance stability, economical coefficient interpretation, and strong exogeneity in estimation (Baltagi, 2021; Wooldridge, 2020). The procedure includes data extraction, consistent asset class mapping, weight normalization to achieve a 100% total, variable calculation, and panel construction with entity and time markers.

Testing begins with descriptive statistics, followed by regression model selection, conducted in stages, including the F-test or Chow test to select the common effects model (CEM) or the fixed effects model (FEM), the Hausman test to select between the fixed effects model (REM) and the random effects model (FEM), and the Breusch-Pagan LM test to assess the suitability of the random effects model (REM) or the common effects model (CEM) (Baltagi, 2021; Wooldridge, 2020). Classical assumption tests were conducted after the model was selected, including multicollinearity, heteroscedasticity, and autocorrelation tests. In the hypothesis testing stage, parameter testing was conducted at a significance level of $\alpha = 5$ percent using a t-test to determine the significance of the coefficients for each variable, an F-test to determine the significance of the simultaneous model, and an R2 test to test the coefficient of determination. Mediation testing was conducted using the coefficient product approach and the Sobel test to assess the significance of the indirect effect of managed fund size and contribution fund growth through asset allocation on ROI. The software used in this panel data regression was Econometric Views (EViews) 13 (Baltagi, 2021; Wooldridge, 2020).

Based on theoretical analysis supported by previous research, it can be assumed that AUM and contribution fund growth have a significant positive effect on ROI, either directly or through the mediation of asset allocation. The conceptual framework is depicted in Figure 1.

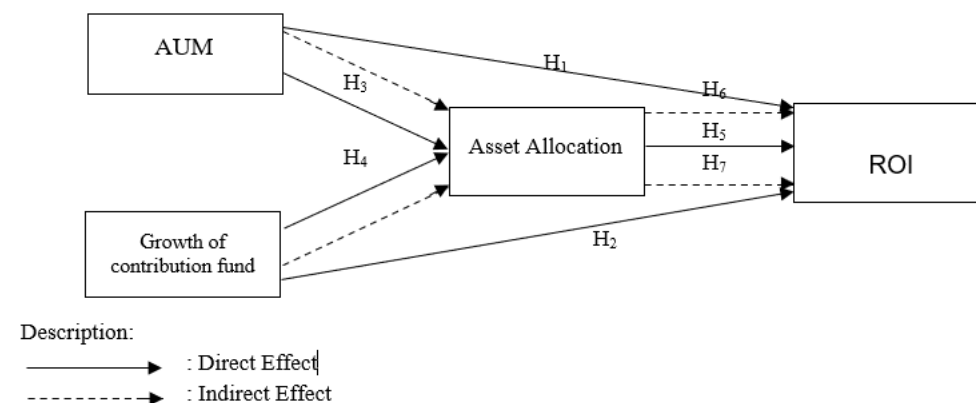


Figure 1. Conceptual framework

Direct influence testing was conducted on the influence of AUM and contribution fund growth on asset allocation in substructure I.

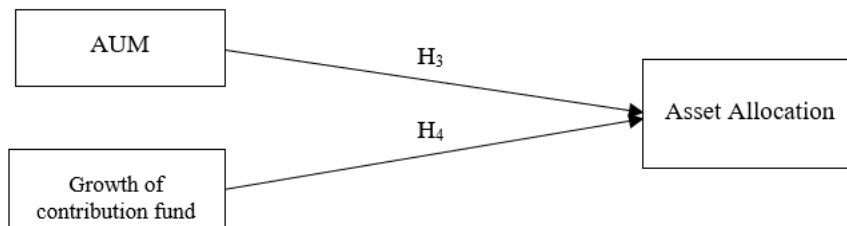


Figure 2. Substructure I

Direct influence testing was conducted on the influence of AUM, contribution fund growth, and asset allocation on ROI in substructure II.

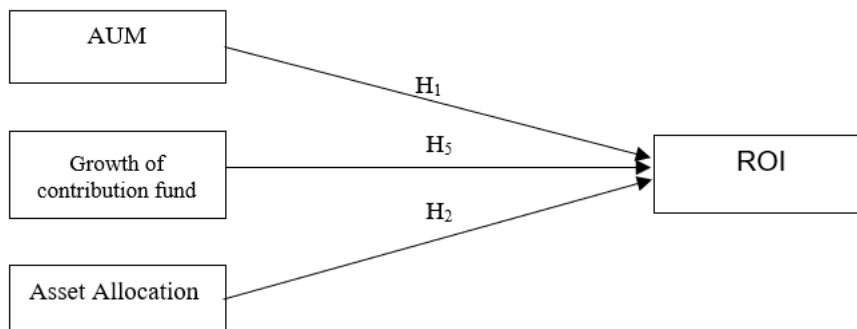


Figure 3. Substructure II

4. Finding and Discussion

To examine the distribution of the data used in this study, descriptive statistical tests were conducted. The results of the descriptive statistical tests on the 55 data sets used are shown in Table 2.

Table 2. Results of Descriptive Statistical Tests

	Asset Allocation	LnAUM	Growth of CF	ROI
Mean	0.174944	14.99884	0.210058	0.056822
Median	0.161762	15.18654	0.117237	0.057599
Maximum	0.451918	17.17189	1.880368	0.098837
Minimum	0.000000	11.12715	-0.443631	0.028384
Std. Dev.	0.107894	1.623769	0.454116	0.013042
Observations	55	55	55	55

Source: EViews 13

Based on Table 2 during the research period with 55 observations, the allocation of risky assets shows a conservative pattern with an average value of 0.174944 and a median of 0.161762. The

data distribution is quite wide with a standard deviation of 0.107894 in the range from 0.000000 to 0.451918, indicating that the majority of DPLKs place a small portion of risky assets although some entities have increased it to 45 percent. AUM illustrates a striking difference in scale between institutions with an average of 14.99884, a median of 15.18654, and a standard deviation of 1.623769 in the range of 11.12715 to 17.17189, indicating the existence of very small to very large DPLKs. Contribution fund growth appears to be the most volatile, with an average of 0.210058, a median of 0.117237, and a standard deviation of 0.454116, ranging from 0.443631 to 1.880368, reflecting periods of sharp contraction and surges in deposits. Meanwhile, annual ROI remains relatively stable, with an average of 0.056822, a median of 0.057599, and a standard deviation of 0.013042, ranging from 0.028384 to 0.098837. Variations in DPLK scale and contribution flow dynamics are significant enough to explain differences in allocation behavior, while a defensive allocation profile contributes to a moderate ROI distribution.

After model selection using the Chow test to compare CEM with FEM and the Hausman test to distinguish FEM from REM, the results of both consistently support the use of the fixed effects model (FEM) in the cross-sectional dimension. Estimation was then run in EViews 13 with the Effects specification setting cross-section: fixed and period: none. To improve efficiency under conditions of heteroscedasticity between entities, estimation used GLS Weights with the cross-section weights option. To ensure that standard errors remain robust against heteroscedasticity and the possibility of clustering across periods, the coefficient of covariance method was set to white cross-section (period cluster) with the no d.f. correction option enabled. This combination of settings allows for well-controlled unobserved heterogeneity between DPLKs while maintaining the reliability of statistical inference. Testing of the model used was carried out through the model fit test (F test) in substructure I, with the results in Table 3.

Table 3. Results of Feasibility Test of Substructural Model I

R-squared	0.926014	Mean dependent var	0.239194
Adjusted R-squared	0.904875	S.D. dependent var	0.176687
S.E. of regression	0.037823	Sum squared resid	0.060084
F-statistic	43.80616	Durbin-Watson stat	1.740534
Prob(F-statistic)	0.000000		

Source: EViews 13

Table 3 shows an F value of 43.80616 with a significance level of $0.000000 < 0.05$. This test confirms that the regression model used is suitable for explaining variations in the dependent variable. The Adjusted R-squared value of 0.904875 means that approximately 90.49 percent of the variation in the dependent variable can be explained by all independent variables in the model, while the remaining 9.51 percent is influenced by other factors outside the model. The model's accuracy is also good, reflected in the S.E. of regression of 0.037823 which is much smaller than the S.D. of dependent var of 0.176687. The Durbin Watson value of 1.740534 is close to 2, which indicates there are no serious autocorrelation problems in the residuals.

Overall, these results indicate that the model has very strong explanatory power and is valid for further hypothesis testing. The results of the partial hypothesis test (t-test) to see the influence of each independent variable on the dependent variable in Substructural I obtained the results in Table 4.

Table 4. Results of Substructural Panel Data Regression I

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.149838	0.030447	4.921200	0.0079
LnAUM	0.001619	0.002006	0.807294	0.4648
GoCF	0.003907	0.004619	0.845946	0.4452

Source: EViews 13

Based on Table 4, it can be explained that AUM and contribution fund growth have a positive but insignificant effect on the allocation of risky assets in DPLK during the observation period. The partial probability test (t-test) value for AUM is 0.4648 and for contribution fund growth is 0.4452, both greater than 0.05, so H3 and H4 are rejected. Economically, the AUM coefficient of 0.001619 indicates that a 1 percent increase in AUM is only correlated with an increase of approximately 0.000016 in the allocation portion, while the growth coefficient of 0.003907 indicates an additional 0.0039 points for a 1.00 increase in the growth variable. Both variables have not been proven to statistically influence allocation, and allocation variations are more likely explained by other factors and differences in fixed characteristics between institutions. Testing of the model used through the model feasibility test (F test) in substructural II with the results in Table 5.

Table 5. Results of Feasibility Test of Substructural Model I

R-squared	0.784654	Mean dependent var	0.126865
Adjusted R-squared	0.716373	S.D. dependent var	0.183347
S.E. of regression	0.010694	Sum squared resid	0.004688
F-statistic	11.49162	Durbin-Watson stat	1.983031
Prob(F-statistic)	0.000000		

Source: EViews 13

Table 5 shows an F value of 11.49162 with a significance level of $0.000000 < 0.05$. These results confirm that the regression model is suitable for explaining variations in the dependent variable. The Adjusted R-squared value of 0.716373 means that approximately 71.64 percent of the variation in the dependent variable can be explained by all independent variables in the model, while the remaining 28.36 percent is influenced by other factors outside the model. The model's accuracy is also good, reflected in the S.E. of regression of 0.010694, which is much smaller than the S.D. of the dependent variable of 0.183347, so the remaining error is relatively small (Sum squared resid = 0.004688). In addition, the Durbin Watson value of 1.983031 is very close to 2, so it does not indicate serious residual autocorrelation. The results of the partial hypothesis test (t-test) to see the influence of each independent variable on the dependent

variable in Substructural II are shown in Table 6.

Table 6. Results of Substructural Panel Data Regression II

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.205012	0.021904	9.359620	0.0007
LnAUM	-0.010414	0.001468	-7.093422	0.0021
Growth	-0.003641	0.000268	-13.58973	0.0002
Asset Allocation	0.050137	0.006658	7.530003	0.0017

Source: EViews 13

AUM has a significant negative effect on ROI in DPLK. Because the partial test probability value (t-test) of 0.0021 is smaller than the significance level of 0.05, then H1 in this study is rejected because the direction of the coefficient is negative. The growth of contribution funds also has a significant negative effect on ROI. The probability value of the t-test is $0.0002 < 0.05$, so H2 is rejected because the direction of the coefficient is negative. Asset allocation has a significant positive effect on ROI. The probability value of the t-test is $0.0017 < 0.05$, so H5 is accepted with a positive direction of the coefficient. Overall, the partial results show that only the allocation variable supports the initial hypothesis, while AUM and contribution fund growth have opposite effects on ROI. The results of the mediation test (Sobel Test) to see the effect of AUM on ROI through asset allocation are obtained in Table 7.

Table 7. Sobel Test Results: The Effect of AUM on ROI through Asset Allocation

	Test Statistic	Std. Error	p-value
Sobel Test	0.8024829	0.00010115	0.42227368
Aroian Test	0.79557761	0.00010203	0.42627758
Goodman Test	0.80957119	0.00010027	0.41818667

Source: EViews 13

The results of the Sobel test for the AUM path through asset allocation to ROI are shown in Table 7, the multiplied path coefficients produce an indirect effect of 0.0000812. The z-statistic value obtained is 0.8024829 with a p-value of 0.42227368, so it is above the significance threshold of 0.05 and indicates an insignificant indirect effect. The companion test provides the same conclusion, the Aroian test produces a z-statistic of 0.79557761 with a p-value of 0.42627758, while the Goodman test produces a z-statistic of 0.80957119 with a p-value of 0.41818667. With these results, H6 is rejected, asset allocation plays a role as a mediator in the relationship between AUM and ROI is not proven. The results of the mediation test (Sobel Test) to see the effect of contribution fund growth on ROI through asset allocation are obtained in Table 8.

Table 8. Sobel Test Results: The Effect of Contribution Fund Growth on ROI through Asset Allocation

	Test Statistic	Std. Error	p-value
Sobel Test	0.84056791	0.00023304	0.40059004
Aroian Test	0.83334286	0.00023506	0.40465139
Goodman Test	0.8479842	0.000231	0.39644677

Source: EViews 13

Table 8 shows the results of the Sobel test for the contribution fund growth path through asset allocation to ROI. Multiplication of the path coefficients yields an indirect effect of approximately 0.000196. The Sobel z-statistic is 0.84056791 with a p-value of 0.40059004, indicating that the indirect effect is not significant at the five percent level. The results of the accompanying tests provide consistent conclusions: the Aroian test yields a z-statistic of 0.83334286 with a p-value of 0.40465139, while the Goodman test yields a z-statistic of 0.8479842 with a p-value of 0.39644677. These results reject H7; asset allocation's role as a mediator in the relationship between contribution fund growth and ROI is not proven.

The regression results indicate that fund size, as reflected in AUM, is negatively correlated with ROI. This finding suggests that increasing scale does not automatically lead to improved performance. In large fund management practices, the scope for positioning portfolios in high-yield opportunities tends to narrow because markets aren't always deep enough to absorb large transactions without moving prices. Investment approval processes typically lengthen, cross-functional coordination becomes more complex, and governance obligations demand stricter compliance discipline. At the same time, liquidity needs increase, requiring some assets to be held in safe, easily liquidated instruments. This combination of factors reduces managers' agility in capturing momentum, creates execution lags, and ultimately depresses returns. In other words, scale brings stability and resilience, but without agile investment processes and effective cash management systems, it can become a burden on ROI.

The following findings show that contribution fund growth is negatively correlated with ROI. Substantially, large inflows of funds cannot always be immediately allocated to the target asset mix with the ideal composition. New funds are often temporarily parked in low-risk instruments to ensure liquidity, comply with internal policies, and maintain operational smoothness. During this waiting period, the asset base grows faster than realized returns, resulting in a decline in the current period's return. Market conditions at the time of the inflow also play a role, as unfavorable prices result in suboptimal initial positions and require a longer time to return to the desired level of return. This situation emphasizes the importance of a clear cash management architecture, a regularly updated list of ready-to-buy instruments, and a gradual and measured allocation schedule so that each contribution is immediately utilized in the target portfolio according to the risk profile and return objectives.

Asset allocation, proxied by risky assets, is positively correlated with ROI, consistent with the principle that higher returns come with the courage to take calculated risks. A larger portion of

risky asset classes can generate higher return premiums if managed with disciplined rebalancing, clear risk limits, and adequate diversification. However, the results of the Sobel mediation test indicate that asset allocation does not mediate the relationship between AUM and contribution growth with ROI. This means that performance does not improve simply because funds grow larger or contributions flow rapidly. Performance improvements emerge when these flows are quickly translated into clear allocation decisions and swift execution, accompanied by governance that maintains compliance without sacrificing decision-making agility. The policy implication is to strengthen investment policy design that provides sufficient room for maneuver, accelerate the fund placement process, and establish cross-functional coordination mechanisms so that the scale and flow of contributions are truly converted into sustainable returns for participants.

5. Conclusion

This study shows that DPLK investment performance, as measured by ROI, is not absolutely determined by AUM growth or contribution increases. AUM and contribution growth were shown to have a significant negative effect on ROI, indicating the consequences of scale, including greater liquidity requirements, increasingly limited placement space, and more complex governance processes, which reduce execution agility. Risky asset allocation had a significant positive effect on ROI; measured and consistent allocation decisions can translate market opportunities into increased returns. The Sobel test also indicates that allocation does not mediate the effect of AUM or contribution growth on ROI, suggesting that both operate more directly. These findings confirm that the quality of the fund placement strategy and disciplined portfolio management are more important determinants of performance than simply increasing scale or relying solely on inflows. DPLK managers should prioritize a clear cash management architecture to ensure new contributions are quickly allocated to target instruments, update the list of ready-to-purchase instruments, simplify the approval process without compromising compliance, and strengthen risk management to reduce placement lead times. Enforce rebalancing discipline, set measurable risk limits, and regularly evaluate diversification effectiveness to ensure risk premiums are truly realized in ROI. Regulators should encourage market deepening and the availability of liquid and diverse instruments to provide maneuvering space for large-scale funds, while strengthening transparency guidelines for allocation strategies and reporting on the placement of new contributions.

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