



Pecking Order Or Passive Members? Unpacking Capital Structure Determinants In Producer Cooperatives Evidence From West Java, Indonesia

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ABSTRACT

This study analyzes the effect of business efficiency (ROA), asset structure (fixed asset ratio), member participation as owners, and member participation as users on the capital structure (DER) of primary producer cooperatives in West Java Province, Indonesia, over the 2021–2023 period. The population comprised all active producer cooperatives that reported financial data through the Online Data System (ODS) of the Ministry of Cooperatives. A sample of 50 cooperatives was selected using two-stage purposive sampling. Panel data regression with the Random Effects Model (REM) was employed. Partially, only business efficiency (ROA) had a negative and significant effect on capital structure (coefficient = -4.47; $p = 0.003$). Asset structure, member participation as owners, and member participation as users were not significant. Simultaneously, all four variables significantly influenced capital structure ($F = 3.49$; $p < 0.01$), though they explained only 9% of its variation (adjusted $R^2 = 0.09$). This study is the first to simultaneously examine the dual role of cooperative members (owner and user) in influencing capital structure within Indonesian producer cooperatives, integrating Pecking Order Theory, Agency Theory, and cooperative-specific identity principles.

Keywords: Capital Structure, Business Efficiency, Asset Structure, Member Participation, Producer Cooperatives, Panel Data.

ABSTRAK

Penelitian ini menganalisis pengaruh efisiensi usaha (ROA), struktur aset (rasio aset tetap), partisipasi anggota sebagai pemilik, dan partisipasi anggota sebagai pengguna terhadap struktur modal (DER) koperasi produsen primer di Provinsi Jawa Barat, Indonesia, selama periode 2021–2023. Populasi penelitian terdiri dari seluruh koperasi produsen aktif yang melaporkan data keuangan melalui Sistem Data Online (SDO) Kementerian Koperasi. Sebanyak 50 koperasi dipilih sebagai sampel menggunakan metode sampling purposif dua tahap. Regresi data panel dengan Model Efek Acak (REM) digunakan. Secara parsial, hanya efisiensi usaha (ROA) yang memiliki pengaruh negatif dan signifikan terhadap struktur modal (koefisien = -4,47; $p = 0,003$). Struktur aset, partisipasi anggota sebagai pemilik, dan partisipasi anggota sebagai pengguna tidak signifikan. Secara simultan, keempat variabel tersebut secara signifikan mempengaruhi struktur modal ($F = 3,49$; $p < 0,01$), meskipun hanya menjelaskan 9% variasi struktur modal (R^2 disesuaikan = 0,09). Studi ini merupakan yang pertama kali secara simultan mengkaji peran ganda anggota koperasi (sebagai pemilik dan pengguna) dalam mempengaruhi struktur modal di koperasi produsen Indonesia, dengan mengintegrasikan Teori Pecking Order, Teori Agen, dan prinsip-prinsip identitas khusus koperasi.

Kata Kunci: Struktur Modal, Efisiensi Bisnis, Struktur Aset, Partisipasi Anggota, Koperasi Produsen, Data Panel.

1. INTRODUCTION

Cooperatives serve as a vital pillar of Indonesia's people-centered economy, aiming to improve member welfare and strengthen economic resilience. The Indonesian government, through the Ministry of Cooperatives and SMEs, has prioritized the development of real-sector cooperatives, particularly producer cooperatives, to become key players in utilizing regional economic potential (Kementerian Koperasi dan UKM, 2024). However, the cooperative landscape in Indonesia remains dominated by the financial sector (70%), while real-sector cooperatives such as those in agriculture and fisheries account for less than 30% (Kementerian Koperasi dan UKM, 2024). This situation contrasts with the global trend toward *New Generation Cooperatives* (NGC), which focus more on value addition and efficiency (Harris et al., 1996; Franken & Grashuis, 2023).

Data from the Ministry of Cooperatives' *Online Data System* (ODS) reveal that the proportion of active producer cooperatives in West Java Province is only 15–16% of all active cooperatives, with only about 10–11% conducting Annual Member Meetings (*Rapat Anggota Tahunan* – RAT) during 2021–2023. Financially, a 56% decline in internal equity (from IDR 1.6 billion to IDR 707 million) has been accompanied by a more than twofold increase in external debt, causing the Debt-to-Equity Ratio (DER) to jump from 0.29 to 1.46. This shift indicates an increasing reliance on external financing, which threatens long-term sustainability (Sugiyanto & Ikhsan, 2022).

Capital structure decisions in cooperatives are influenced by multiple factors. According to Brigham & Houston (2019), these include sales stability, asset structure, profitability, taxes, and financial flexibility. The *Pecking Order Theory* (Myers, 1984) suggests that entities prioritize internal financing over external debt. The *Trade-Off Theory* (Frank & Goyal, 2009) emphasizes balancing tax benefits against bankruptcy costs. In cooperatives, the unique dual identity of members as both owners and users (Novkovic & Webb, 2019) is also expected to affect capital structure through member economic participation (Putra et al., 2018; Fitri et al., 2024). Furthermore, agency conflicts between managers and dispersed members (Jensen & Meckling, 1976) can influence financing choices, while institutional constraints (Scott, 2014) may limit the role of asset tangibility.

Previous research on capital structure determinants in conventional firms has yielded inconsistent results. Some studies find a negative significant effect of profitability (Chandra et al., 2024; Ariyani, 2024; Wiguna & Arta, 2022), while others report a positive effect (Khotimah, 2023; Wilhemma & Durya, 2022). Findings on asset structure are also mixed (Wiguna & Arta, 2022 vs. Dewi Anggita & Priyanto, 2022). However, studies specifically examining the influence of member participation in its dual role on the capital structure of producer cooperatives remain very limited. To address this research gap, this study investigates the influence of business efficiency, asset structure, member participation as owners, and member participation as users on the capital structure of primary producer cooperatives in West Java.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Capital Structure of Cooperatives

Capital structure is defined as the financing composition reflecting the balance between debt and equity (Brigham & Ehrhardt, 2021). In cooperatives, equity consists of member deposits (principal, mandatory, and voluntary savings), reserve funds, and grants, while debt may come from members, other cooperatives, banks, or financial institutions (Law No. 25/1992). The optimal capital structure is achieved when the weighted average cost of capital is minimized and firm value is maximized (Sugiyanto & Ikhsan, 2022). In agricultural cooperatives, larger cooperatives tend to have higher debt proportions, and product portfolio diversification positively affects debt proportion (Franken & Grashuis, 2023; Grashuis & Franken, 2024).

2.2 Business Efficiency (ROA) and Capital Structure

Business efficiency reflects a cooperative's ability to generate profit from its assets, commonly proxied by Return on Assets (ROA). According to *Pecking Order Theory* (Myers, 1984), highly profitable firms prefer retained earnings as the primary funding source, reducing debt reliance. Empirical evidence from cooperatives confirms that ROA negatively affects leverage (Woldeyohanes, 2023). Conversely, profitability in input supply cooperatives is associated with higher debt proportions, while in grain marketing cooperatives it increases allocated equity proportions (Grashuis & Franken, 2024). Similarly, capital structure has been found to have a negative correlation with ROA in non-financial firms (Dodoo et al., 2023).

H1: Business efficiency (ROA) has a significant negative effect on capital structure.

2.3 Asset Structure (FAR) and Capital Structure

Asset structure reflects the proportion of fixed assets to total assets. Tangible assets can serve as collateral for debt according to the Trade-Off Theory (Brigham & Houston, 2019). Studies in Kosovo's SMEs confirm that asset tangibility is associated with higher leverage (Krasniqi & Koci, 2023). In Malaysian firms, profitability reduces leverage, while tangible assets significantly increase debt usage (Noor & Izhar, 2020). However, in Indonesian producer cooperatives, many fixed assets lack formal certificates or have low market value, so they may not necessarily improve debt access. Institutional weaknesses such as insecure land rights and limited bank acceptance can render tangibility irrelevant (Scott, 2014). Findings in Indonesian manufacturing firms are mixed (Fitriati & Pratama, 2023; Dewi Anggita & Priyanto, 2022).

H2: Asset structure has a significant positive effect on capital structure.

2.4 Member Participation as Owners and Capital Structure

Member participation as owners is measured by the proportion of equity originating from member deposits. Higher participation increases internal capital, allowing cooperatives to reduce external debt (Fitri et al., 2024; Istiqomah, 2017). In Ethiopian SACCOs, optimal financing sources derive from member participation through member capital and deposit funding avenues (Sebhat, 2024). However, in practice, many members pay only minimal mandatory savings and do not periodically increase their capital. From an agency perspective,

dispersed member-owners face collective action problems, making it difficult to enforce additional capital contributions, while managers may prefer debt to avoid pressures from members (Jensen & Meckling, 1976).

H3: Member participation as owners has a significant negative effect on capital structure.

2.5 Member Participation as Users and Capital Structure

As users, members contribute to cooperative revenue through transactions. Higher member-based business volume increases surplus (SHU), which can be retained as capital reserves. In platform cooperatives, members with lower affective commitment and less social capital are less likely to participate (Bunders, 2024), underscoring the importance of engagement. In the Indonesian Pasir Jambu Cooperative, participation as owners significantly affects equity efficiency, while participation as users shows moderate effects (Asbaruna et al., 2025).

H4: Member participation as users has a significant negative effect on capital structure.

2.6 Simultaneous Influence

Together, these four factors reflect the cooperative’s internal conditions regarding efficiency, asset structure, and member loyalty, jointly influencing capital structure decisions. However, given the institutional and agency context, their combined effect may be limited without considering external factors.

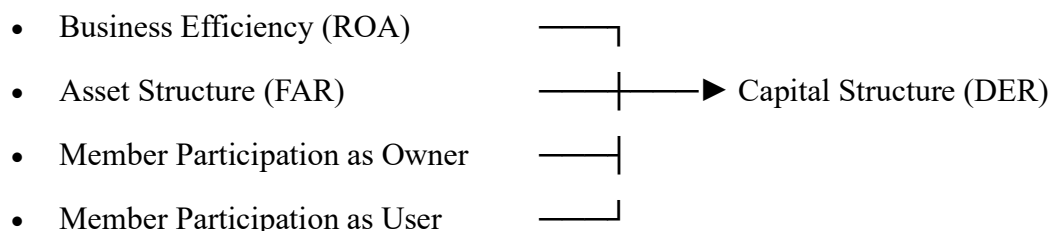
H5: Business efficiency, asset structure, member participation as owners, and member participation as users have a significant simultaneous effect on capital structure.

2.7 Conceptual Framework

Figure 1 illustrates the conceptual framework.

Figure 1. Conceptual Framework

Independent Variables (X) → Dependent Variable (Y)



Note: ROA = Return on Assets; FAR = Fixed Asset Ratio; DER = Debt-to-Equity Ratio

3. RESEARCH METHOD

3.1 Population and Sample

The population consisted of all primary producer cooperatives in West Java Province that were active and submitted financial reports through the Ministry of Cooperatives’ ODS for the 2021–2023 period. The total population was 233 cooperatives. A two-stage purposive sampling approach was applied with the following criteria: (1) active and registered in ODS; (2)

submitted complete financial statements for three consecutive years; (3) reachable and willing to participate. The final sample comprised 50 cooperatives (21.5% of the population), spread across 17 districts/cities, yielding 150 balanced panel observations (50×3 years). The willingness to participate may introduce self-selection bias; however, comparisons with aggregate ODS data suggest the sample broadly represents the population in terms of size and sector distribution.

3.2 Operationalization of Variables

Variable	Measurement	Scale
Capital Structure (Y)	DER = Total Debt / Total Equity	Ratio (expressed in percent)
Business Efficiency (X1)	ROA = Net Income (SHU) / Total Assets	Ratio (percent)
Asset Structure (X2)	FAR = Total Fixed Assets / Total Assets	Ratio (percent)
Member Participation as Owner (X3)	OwnerPart = Member Equity / Total Equity	Ratio (percent)
Member Participation as User (X4)	UserPart = (Revenue _t – Revenue _{t-1}) / Revenue _{t-1}	Ratio (percent)

All data were sourced from audited cooperative financial statements for 2021, 2022, and 2023. It is important to note that UserPart, measured as revenue growth, is an imperfect proxy for member user participation because a cooperative's total revenue may include transactions with non-members. The measure captures overall business volume growth rather than strictly member-driven transactions. This limitation is addressed in the discussion.

3.3 Data Analysis Technique

Panel data regression was employed using EViews 13. The general model specification is:

$$\text{DER}_{it} = \beta_0 + \beta_1 \text{ROA}_{it} + \beta_2 \text{FAR}_{it} + \beta_3 \text{OwnerPart}_{it} + \beta_4 \text{UserPart}_{it} + u_i + e_{it}$$

where:

i = cooperative ($i=1, \dots, 50$)

t = year ($t=2021, 2022, 2023$)

u_i = individual-specific effect

e_{it} = error term

Model selection was conducted through Chow, Hausman, and Lagrange Multiplier (LM) tests. Post-estimation diagnostics for panel data followed standard recommendations for the Random Effects Model (REM) estimated via feasible Generalized Least Squares (GLS) (Badawi et al., 2022). Preliminary data screening revealed some extreme values (e.g., DER maximum 825.30%, UserPart maximum 612.80%), but analysis of standardized residuals and leverage statistics indicated that no single observation exerted a disproportionate influence on the

regression coefficients; therefore, all observations were retained. Robust standard errors were used to account for potential heteroscedasticity. Hypothesis testing was performed using t-tests (partial) and F-tests (simultaneous) at the 5% significance level ($\alpha=0.05$).

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics and Initial Observations

Table 1. Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
DER (%)	125.77	69.50	825.30	0.00	164.03
ROA (%)	4.03	2.09	51.25	-3.51	7.06
FAR (%)	29.57	24.71	97.99	0.00	25.84
OwnerPart (%)	42.99	44.24	100.00	1.04	27.24
UserPart (%)	19.55	0.00	612.80	-66.38	76.93

Source: Processed data (2025)

The mean DER of 125.77% (SD = 164.03) indicates that most cooperatives operate with debt exceeding equity, yet the wide standard deviation and minimum DER of 0.00% suggest substantial heterogeneity; some cooperatives rely almost entirely on equity, while others are heavily leveraged. The maximum DER of 825.30% signals extreme debt dependence in a minority of cases, raising potential solvency concerns.

The average ROA of 4.03% (SD = 7.06) with a negative minimum (-3.51%) confirms that some cooperatives are loss-making, which may force them into external debt to cover operational shortfalls—a dynamic consistent with the pecking order's financing deficit logic (Myers, 1984). Notably, the median UserPart of 0.00% and a mean of 19.55% (SD = 76.93) indicate that while a few cooperatives experienced high member-based transaction growth, over half saw no growth at all. This stagnation in user participation critically undermines internal capital generation through retained surpluses.

4.2 Panel Data Regression Results and Model Selection

The Chow test ($p = 0.0000$) rejected the pooled OLS in favor of the Fixed Effects Model (FEM), while the Hausman test ($p = 0.7834$) failed to reject the null, indicating that the Random Effects Model (REM) is more efficient and consistent. The Lagrange Multiplier (LM) test ($p = 0.0000$) confirmed significant random effects across cooperatives. Therefore, REM estimated via feasible GLS was appropriate, accounting for unobserved, time-invariant heterogeneity (e.g., cooperative culture, geographical location, historical performance). The estimation results are presented in Table 2.

Table 2. Random Effects Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C (Constant)	154.072	28.810	5.348	0.0000
ROA (X1)	-4.473	1.461	-3.062	0.0026
FAR (X2)	-1.021	0.580	-1.761	0.0802
OwnerPart (X3)	0.452	0.571	0.792	0.4276
UserPart (X4)	0.022	0.061	0.363	0.7172

R-squared = 0.124; Adjusted R-squared = 0.090; F-statistic = 3.494 (Prob = 0.0093)

The regression equation is:

$$\text{DER} = 154.07 - 4.47 \text{ ROA} - 1.02 \text{ FAR} + 0.45 \text{ OwnerPart} + 0.02 \text{ UserPart}$$

All variables are measured in percentage points, so coefficients represent the change in DER (in percentage points) given a one percentage point change in the independent variable. The adjusted R² of 0.09 suggests that the four independent variables explain only 9% of the variation in capital structure; the remaining 91% is explained by other variables not included in this model.

4.3 Hypothesis Testing and In-Depth Discussion

Table 3. Hypothesis Testing Summary

Hypothesis	Direction	t-stat./F	p-value	Conclusion
H1 (ROA → DER)	Negative	-3.062	0.0026	Accepted
H2 (FAR → DER)	Positive	-1.761	0.0802	Rejected
H3 (OwnerPart → DER)	Negative	0.792	0.4276	Rejected
H4 (UserPart → DER)	Negative	0.363	0.7172	Rejected
H5 (All X → DER) simultaneous	- -	3.494	0.0093	Accepted

4.3.1 H1: Business Efficiency (ROA) → Capital Structure – Accepted

The coefficient of -4.473 ($p = 0.0026$) provides strong support for H1. Economically, a one percentage point increase in ROA reduces DER by approximately 4.47 percentage points, *ceteris paribus*. This finding robustly aligns with the Pecking Order Theory: profitable cooperatives prioritize internal financing (retained earnings) over external debt to avoid monitoring costs and interest burdens. It also corroborates Woldeyohanes (2023) on Ethiopian cooperative unions and Doodoo et al. (2023) on emerging economy firms.

The magnitude of the effect is notable: a 4.47-fold reduction implies ROA is a powerful lever for deleveraging. During the post-pandemic recovery period (2021–2023), cooperatives with

even modest profitability likely redirected surplus to equity buildup rather than distribution, reflecting a conservative financing strategy. Field interviews (e.g., *Koperasi Serba Usaha Rancage*) confirmed that high-ROA cooperatives actively retain SHU to avoid bank loans. Conversely, cooperatives with negative ROA had no retained earnings, forcing them into debt, thereby mechanically increasing DER.

4.3.2 H2: Asset Structure (FAR) → Capital Structure – Rejected

The coefficient of -1.021 ($p = 0.0802$) is not only statistically insignificant at $\alpha=0.05$ but also directionally opposite to H2's predicted positive sign. The near-significant negative coefficient suggests a weak tendency for cooperatives with higher fixed asset ratios to have *lower* debt, contradicting the collateral-based argument of the Trade-Off Theory (Frank & Goyal, 2009).

Three complementary explanations emerge from the context of West Java producer cooperatives:

1. **Low collateralizability:** Many fixed assets (land without certificates, shared buildings, aging machinery) lack formal legal status or market liquidity. Banks rarely accept them as collateral, rendering FAR irrelevant for debt access.
2. **Alternative debt channels:** Cooperatives obtain loans through government soft-loan schemes (e.g., *LPDB-KUMKM*) or trust-based member loans, neither requiring fixed asset collateral. Thus, the asset structure–leverage link is bypassed.
3. **Institutional constraints and reverse causality:** The negative sign might reflect that higher fixed assets indicate past accumulation of debt for asset purchase; current DER may have declined as those assets were acquired, or it may signal that cooperatives with more tangible assets rely on internal funds and prefer to avoid debt due to complex bureaucratic requirements. Institutional theory (Scott, 2014) helps explain why the expected collateral channel is inoperative in a setting with weak property rights and regulatory hurdles.

This finding aligns with Dewi Anggita & Priyanto (2022) for Indonesian manufacturing and Mariani & Suryani (2021), but contrasts with Krasniqi & Koci (2023) for Kosovo SMEs, highlighting the importance of institutional specificity. Future research could explore non-linear effects (e.g., a quadratic FAR term) to test whether asset tangibility only matters beyond a threshold.

4.3.3 H3: Member Participation as Owners → Capital Structure – Rejected

The positive coefficient of 0.452 ($p = 0.4276$) is not significant, and the direction contradicts H3's expected negative effect. While average OwnerPart is 42.99%, the lack of significance arises from the *stagnant* nature of member equity. Most members contribute only initial principal and mandatory savings; voluntary savings and SHU reinvestment are rare. Consequently, member equity does not grow proportionally with cooperative expansion, forcing management to rely on debt to finance asset growth.

An additional explanation is potential reverse causality: cooperatives with already high DER may encourage members to inject more capital to improve the ratio, creating a positive association between OwnerPart and DER. This dynamic partially offsets the expected negative effect. Agency theory (Jensen & Meckling, 1976) further illuminates the problem: dispersed member-owners face free-rider issues in monitoring managers and coordinating additional capital calls, while managers may prefer debt to avoid equity dilution of control or to maintain flexibility. Thus, passive ownership participation without periodic capital injections fails to reduce leverage. This finding critically refines the cooperative identity literature (Novkovic & Webb, 2019) and supports Fitri et al. (2024) and Amilia & Fitrayati (2015).

4.3.4 H4: Member Participation as Users → Capital Structure – Rejected

The coefficient of 0.022 ($p = 0.7172$) is negligible and insignificant, with a sign opposite to H4. The median UserPart of 0.00% is the key diagnostic: most cooperatives experienced zero growth in member-based transaction volume over three years. Low user participation reduces retained earnings generation and forces external borrowing to sustain operations.

Crucially, UserPart measured as total revenue growth is an imperfect proxy because it may include sales to non-members. In some cooperatives, revenue growth could be driven by non-member transactions, which do not reflect true member user participation. This measurement error likely biases the coefficient toward zero and contributes to the non-significance. The rejection of H4 does not mean user participation is theoretically irrelevant; rather, it is empirically irrelevant in this sample because participation levels are too low and poorly measured. As Bunders (2024) found, low affective commitment and limited social capital reduce member engagement. Many West Java members bypass their cooperative to sell directly to middlemen for immediate cash, undermining business volume and internal capital formation. Asbaruna et al. (2025) similarly reported only moderate effects of user participation on equity efficiency.

4.3.5 H5: Simultaneous Effect – Accepted

The F-statistic of 3.494 ($p = 0.0093$) confirms that the four variables jointly explain significant variation in DER. However, the adjusted R^2 of only 0.090 reveals that 91% of capital structure variation remains unexplained. This low explanatory power is not a failure but an important empirical insight: capital structure in producer cooperatives is predominantly driven by factors outside the classic efficiency, asset structure, and participation variables.

What explains the remaining 91%? Based on Brigham & Houston (2019) and Riyanto (2013), candidates include:

- Macro-financial factors: interest rates (subsidized vs. commercial), inflation, and pandemic-related credit moratoria.
- Institutional and governance factors: managerial risk aversion, board competency, RAT compliance, and cooperative size (total assets or member count).
- Lender-side factors: availability of government soft loans, relationship lending, and lender attitudes toward cooperative governance.

- Business risk: volatility in agricultural output or input prices not captured by lagged ROA.

The static linear specification also limits explanatory power; a dynamic panel model (e.g., GMM) could capture the persistence of capital structure and address endogeneity. Furthermore, ROA might mediate the relationship between member participation and DER, a pathway not tested here.

4.4 Synthesis and Theoretical Refinements

The results collectively refine the application of Pecking Order Theory to producer cooperatives in three ways:

1. **Internal financing hierarchy:** Cooperatives exhibit a clear pecking order: retained earnings (ROA-driven) → external debt → member equity (passive). This reverses the conventional order where equity issuance is last. Member equity is not actively managed as a flexible financing tool.
2. **Collateral irrelevance:** Trade-Off Theory's collateral channel does not operate because institutional constraints (land certification, bank acceptance) dominate rational calculation. Institutional theory explains why asset tangibility fails to increase debt capacity in this setting.
3. **Dual identity decoupling:** Although members are legally both owners and users, their economic participation is decoupled from financing decisions. Low user participation and stagnant owner contributions make the dual identity concept empirically weak in influencing capital structure unless actively nurtured. Agency problems further impede members from exercising effective capital governance.

4.5 Methodological Limitations in Interpretation

The adjusted R^2 of 0.09, while low, is plausible given:

- The three-year panel captures a post-pandemic period of unusual credit expansion and equity drawdowns, increasing noise.
- The sample excludes cooperatives that did not report consistently (potential survivorship bias) and those unwilling to participate (self-selection bias).
- UserPart is a rough proxy for member user participation; measurement error attenuates its coefficient and reduces overall model fit.

5. CONCLUSION AND SUGGESTIONS

5.1 Conclusion

This study analyzed the effect of business efficiency (ROA), asset structure (FAR), member participation as owners, and member participation as users on the capital structure (DER) of 50 primary producer cooperatives in West Java for the 2021–2023 period. Using panel data regression with the Random Effects Model, the main conclusions are:

1. **Business efficiency (ROA) has a negative and significant effect on DER.** Higher ROA reduces cooperative reliance on debt, supporting the Pecking Order Theory. Each 1% increase in ROA reduces DER by 4.47 percentage points.
2. **Asset structure (FAR) does not have a significant effect on DER,** and the coefficient is negative, indicating that fixed assets in these cooperatives have not served as effective collateral due to institutional constraints.
3. **Member participation as owners does not have a significant effect on DER,** because member equity is largely stagnant most members do not periodically increase their capital contributions, and potential reverse causality may mask a negative relationship.
4. **Member participation as users does not have a significant effect on DER,** as member-based business volume remains low and stagnant (median growth = 0%), and the proxy used (revenue growth) imperfectly captures true member user participation.
5. **Simultaneously, all four variables have a significant effect on DER** ($F = 3.49$, $p < 0.01$), but they explain only 9% of its variation (adjusted $R^2 = 0.09$), indicating that other factors dominate cooperative capital structure decisions.

5.2 Managerial Implications

For cooperative management:

- Focus on improving **asset management efficiency (ROA)** through operational cost control and revenue optimization, as this is the most effective debt-reduction lever.
- Strengthen **member participation both as owners and as users** through educational programs on cooperative identity, incentive systems (e.g., SHU distribution based on capital contributions and transaction volume), and transparent financial reporting. Consider mandatory periodic capital contributions (e.g., annual voluntary savings targets).
- Develop **strategic partnerships** with microfinance institutions, village-owned enterprises (BUMDes), MSMEs, and the private sector. Formalize fixed assets (land certification, building legalization) to potentially unlock collateral-based debt in the future.

For government and cooperative development agencies:

- Provide **technical assistance** in fixed asset management and facilitate access to soft financing for well-performing cooperatives.
- Design **incentive regulations** for cooperatives with efficient performance, healthy capital structure, and high member participation, such as priority access to low-interest financing or training subsidies.

5.3 Research Limitations and Future Directions

This study has several limitations:

1. The observation period covers only three years (2021–2023), which coincided with post-pandemic recovery; data fluctuations may not reflect normal conditions.
2. The sample was limited to cooperatives that consistently submitted reports and agreed to participate, potentially introducing survivorship and self-selection bias.
3. Member participation variables were measured through secondary data only, with UserPart being a particularly weak proxy for member user participation.
4. The low adjusted R^2 (9%) indicates many omitted variables and possible misspecification (static linear model).

Future research should incorporate additional variables such as cooperative size, business risk, tax position, financial flexibility, lender attitudes, and governance quality. A dynamic panel approach (e.g., system GMM) is recommended to capture capital structure persistence and address endogeneity. Mediation or path analysis could test whether ROA mediates the link between member participation and DER. Qualitative case studies can also explore institutional and agency factors in depth. Finally, comparative studies across different cooperative types (producer vs. consumer vs. credit) and longer time frames (e.g., 2015–2025) would provide more robust conclusions.

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