

# Dynamic Capital Structure as Strategic Leverage: Evidence from Garuda Indonesia

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## ABSTRACT

*The core problem is whether Garuda's failure to adjust in a timely manner became a strategic disadvantage that intensified avoidable distress. This study addresses gaps in research on SOE adjustment behaviour, leverage dynamics in aviation, and the economic cost of delayed rebalancing, framing capital structure as a strategic capability rather than a static ratio. This study uses a mixed-method design focused on Garuda Indonesia, benchmarked against nine airlines (2015-2024) through a multiple-case comparative panel. The primary method is **System GMM**, used to estimate the Speed of Adjustment (SOA) and identify dynamic leverage behaviour, complemented by Random Effects estimation of leverage determinants and Monte Carlo simulation ( $\geq 10,000$  paths) to assess resilience outcomes. Profitability negatively affects leverage ( $\beta = -1.05$ ;  $p < 0.01$ ), while tangibility positively influences it ( $\beta = +0.62$ ;  $p < 0.01$ ), consistent with pecking order and trade-off theories. The System GMM estimation across ten airlines shows a significant lagged-leverage coefficient ( $\rho = 0.316$ ;  $p < 0.01$ ), implying a Speed of Adjustment (SOA) of 0.684, compared to a firm-level testing of Garuda that shows  $\rho = 0.7493$  or SOA of 0.257, and actual cost of capital during distress that was 6.7x higher than it would have been under a balanced capital structure. After homologation, leverage persistence turned negative ( $\rho = -0.1464$ ; SOA = 1.15), reflecting an overshooting phase consistent with rapid deleveraging, restored managerial discretion, and materially reduced adjustment frictions. These results verify that homologation substantially improved policy effectiveness. Monte Carlo simulations (10,000 paths) reveal a sharp improvement in resilience: Garuda's mean DSCR rose from -1.56 pre-homologation (2015-2021) to +0.72 post-homologation (2022-2024), demonstrating reduced tail risk and a structural recovery in solvency without changes in operational volatility. The study contributes to capital structure theory by demonstrating that dynamic adjustment speed itself is a strategic variable, particularly under financial distress.*

**Keywords:** *Dynamic Capital Structure, Speed of Adjustment (SOA), Real Options Theory, System GMM, Airline Finance, Strategic Leverage Decisions, Competitive Advantage, Homologation.*

## INTRODUCTION

The global aviation industry is characterized by high fixed costs, intense competition, and pronounced exposure to macroeconomic and geopolitical shocks. Airlines must commit to capital-intensive fleet and network assets with long payback periods, while revenues remain highly cyclical and sensitive to consumer confidence, oil prices, regulatory policies, and global mobility constraints (Doganis, 2019). As a result, profitability is volatile and recurrent disruptions are not anomalies but systemic features of the sector (International Air Transport Association (IATA), 2025). This creates a condition of "predictable unpredictability", in which financial planning based on average conditions is insufficient, capital structures must embed resilience to tail risks, rather than optimise only for expected states.

Empirical evidence suggests that post-homologation, significant improvements have occurred, supporting three interrelated propositions: Capital adjustment speeds increased. The



probability of a DSCR shortfall decreased. These improvements were supported by governance reforms. During the restructuring, Garuda's leverage dynamics  $\rho$  exhibited  $> 1$  in the partial-adjustment framework, meaning deviations from target leverage actually increased, indicating pre-existing rigidities and governance frictions that prevented timely rebalancing (Dang et al., 2012; Flannery & Rangan, 2006).

As a state-owned enterprise, the Garuda case highlights how the dual mandate and governance environment of SOEs often weaken market discipline (Musacchio & Lazzarini, 2014) and allow static capital structures to persist amid escalating risks, contrary to the predictions of classical theory (Modigliani & Miller, 1958; Myers, 1984).

The post-homologation transition, which resulted in an increased speed of adjustment, highlights that fundamental changes in financing policies must be accompanied by managerial autonomy and a shift from a reactive financing mentality to a proactive risk management approach. Success in an industry characterized by high fixed costs and sensitivity to shocks (Doganis, 2019) depends on a firm's ability to flexibly adjust leverage, rather than simply optimizing it at a single point in time. Overall, the study concludes that dynamic capital-structure management transforms financial flexibility from a reactive survival mechanism into a strategic, durable, and institutionally embedded capability, one that allows the firm to sustain value creation across economic cycles.

Garuda Indonesia entered the 2020-2022 restructuring period with a capital structure that had become structurally unsustainable. Many years of debt-financed fleet expansion and cost inefficiencies led to Garuda's progressively weakening financial position. Rather than deleveraging or rebalancing its sources of financing in response to deteriorating cash flows, the airline continued to accumulate debt, increasing its exposure to financial distress. By 2020, Garuda's equity position had turned negative, meaning total liabilities exceeded total assets, a state of technical insolvency, rather than merely aggressive leverage, and this condition persists until 2024. By 2021, Garuda's total liabilities reached its peak at US\$13.3bn (PT Garuda Indonesia (Persero) Tbk, 2021), casting a significant doubt on the Company's ability to continue as a going concern, requiring a restructuring.

Accordingly, the central problem this study addresses is:

"Whether Garuda Indonesia's failure to adjust its capital structure in a timely manner constituted a strategic disadvantage that led to (arguably avoidable) financial distress and value erosion, and whether this rigidity materially diverged from industry norms." This study therefore evaluates the strategic consequences of capital structure rigidity in Garuda Indonesia and contrasts them against industry adjustment behavior. Understanding this dynamic is essential for corporate financial strategy, restructuring governance, and the strategic role of leverage in asset-intensive industries.

According to dynamic capital structure theory, firms are expected to adjust leverage gradually toward an optimal target that balances the tax benefits of debt against the costs of financial distress (Flannery & Rangan, 2006; Leary & Roberts, 2005). When firms fail to adjust, the probability and severity of financial distress increase, eroding firm value (Frank & Goyal, 2009). Garuda's capital structure exhibited rigidity, not adjustment, due to the accumulation of debts that positioned Garuda at a disadvantage, a passivity that left Garuda with not much choice for a change in capital structure. This could be seen from its leverage that increased, as earnings weakened, liquidity contracted, and credit conditions tightened.

Although the COVID-19 pandemic intensified financial losses across the global aviation industry, Garuda's crisis cannot be interpreted solely as an external shock. Negative equity and declining interest coverage were already evident before the pandemic. This indicates that the distress was endogenous, driven by internal capital structure decisions and financial management choices rather than purely exogenous market conditions. In other words, the pandemic acted as an accelerant to a pre-existing structural imbalance, rather than the root cause of collapse.

However, evaluating Garuda in isolation risks overstating firm-specific failure or understating sector-wide structural pressures. Airlines are capital-intensive, cyclical, and highly sensitive to macro shocks. Hence, this study constructs a 10-airline international panel dataset, including Singapore Airlines, Lufthansa, Delta, Air France-KLM, ANA, Korean Air, Cathay Pacific, China Airlines, and Hainan Airlines. These carriers represent major incumbents in global commercial aviation and provide reliable, comparable publicly available, secondary financial

disclosures, enabling robust cross-firm inference.

This study is conducted to benchmark leverage dynamics and adjustment behaviours of the panel with financial datasets from 2015-2024 using a System GMM regression which involves comparing Garuda's estimated structural parameters, such as the speed of adjustment ( $\lambda$ ), leverage persistence ( $\rho$ ), and the signs and magnitudes of core determinants, with theoretical expectations and empirical norms found in prior literature. The dynamic model provides parameters that represent the firm's financial behaviour; these parameters can then be benchmarked against global adjustment speeds, standard coefficient patterns documented by (Rajan & Zingales, 1995), and the healthy range implied by dynamic trade-off theory. The academic relevance of this inquiry derives from three gaps. Firstly, empirical work on capital structure adjustment in state-owned enterprises (SOEs) has been limited, particularly in competitive sectors. SOEs may exhibit weaker market discipline and delayed adjustment due to implicit government guarantees (Borisova et al., 2015; Megginson & Netter, 2001).

Secondly, sparse comparative research in the aviation industry, where high fixed costs, long-lived assets, and volatile operating margins make leverage management especially strategic (J. Graham & Leary, 2011). Lastly, there has been a lack of empirical evidence linking delayed adjustment to economic penalties, especially in the form of increased distress risk and implicit cost of capital deterioration (Lemmon et al., 2008).

This study contributes to the literature in three ways. First, it extends SOE research by showing that governance frictions and dual mandates can materially slow capital structure adjustment in competitive, capital-intensive industries, transforming delayed leverage rebalancing into an economically significant source of financial distress rather than mere institutional inertia. Second, it advances dynamic capital structure theory by demonstrating that the speed of adjustment is itself a strategic variable: persistent deviations from target leverage raise effective capital costs and distress risk, while institutional restructuring can restore adjustment efficiency beyond industry norms. Third, it contributes to strategic finance by integrating dynamic leverage management with the resource-based view and real options logic, reframing financial flexibility as an institutionally embedded capability that creates a measurable "option to survive" under extreme uncertainty.

## LITERATURE REVIEW

### Theories of Capital Structure

#### a) Irrelevance Proposition Theory: (Modigliani & Miller, 1958)

Core Proposition: In a perfect capital market, characterized by the absence of taxes, bankruptcy costs, and information asymmetry, a firm's value is entirely independent of its capital structure. This proposition posits that investors can create any desired financial leverage themselves, rendering corporate leverage irrelevant.

#### b) Trade-Off Theory: (Kraus & Litzenberger, 1973; Myers, 1984)

Core Proposition: Firms endeavour to achieve a target debt level by balancing the tax benefits associated with debt (the interest tax shield, which reduces taxable income) against the various costs of financial distress (e.g., direct bankruptcy costs, indirect costs like lost sales or employee morale, and agency costs of debt). The optimal structure is reached where the marginal benefit of additional debt equals its marginal cost.

#### c) Pecking Order Theory: (Myers, 1984)

Core Proposition: Firms prioritise their financing sources to minimise the costs associated with informational asymmetry between managers and external investors. The preferred hierarchy typically involves internal funds first (retained earnings), followed by debt (which is less sensitive to information asymmetry than equity), and finally, external equity as a last resort. This theory suggests firms do not have a target debt ratio but rather a preference for certain financing types.

#### d) Agency Theory: (Jensen & Meckling, 1976)

Core Proposition: Capital structure can be strategically employed as a mechanism to mitigate conflicts of interest that may arise among various stakeholders, primarily between managers and shareholders (agency costs of equity) and between shareholders and debtholders (agency costs of debt). Debt, for instance, can serve as a mechanism to impose financial discipline on management by reducing free cash flow.

e) Market Timing (Baker & Wurgler, 2002)

Core Proposition: Firms tilt toward equity when their valuations are high and debt when it is cheap, creating a path dependence in leverage, as managers exploit perceived windows of opportunity in capital markets.

### Dynamic Capital Structure

Dynamic models observe that firms do not instantaneously reach a target; they adjust over time subject to frictions (Fischer et al., 1989; Flannery & Rangan, 2006; Leary & Roberts, 2005). Empirically (SOA =  $1-\rho$ ) is heterogeneous across firms: firms farther from target often adjust faster when institutions permit (Flannery & Rangan, 2006; Leary & Roberts, 2005), but in constrained settings, particularly SOEs where frictions can cause slow, near-zero or even divergent dynamics ( $\rho > 1$ ).

### Resource-Based View (RBV)

The Resource-Based View (RBV) provides a unifying theoretical lens through which financial policy can be examined not only as a mechanism of value maximisation, but also as a strategic capability that contributes to sustained competitive advantage (SCA). According to (Barney, 1991), a resource yields SCA when it is valuable, rare, inimitable, and non-substitutable (VRIN). Within this framework, a firm's financial flexibility: its ability to adjust capital structure dynamically in response to changing market conditions, qualifies as a strategic resource when it satisfies these criteria.

1. It is valuable, because dynamic adjustment reduces the firm's weighted average cost of capital (WACC), mitigates financial distress costs, and enhances long-term enterprise value (Koller et al., 2020).
2. It is rare, because only a limited number of firms possess the institutional governance and analytical capability to time capital-structure adjustments effectively (Dang et al., 2012; Flannery & Rangan, 2006).
3. It is inimitable, because the embedded routines and governance coordination enabling timely deleveraging or re-leveraging are path-dependent and firm-specific (Teece et al., 1997)
4. It is non-substitutable, since no alternative resource can fully replicate the liquidity, solvency, and investment optionality conferred by effective financial rebalancing (J. R. Graham & Harvey, 2001; Myers, 1984).

### Real Option Theory and Monte Carlo Simulation

Real-options theory views financial flexibility as preserved optionality under uncertainty (Dixit & Pindyck, 1994).

### Conceptual Integration and Hypothesis Development

This study integrates dynamic capital structure theory with the resource-based view (RBV) and real options logic to reconceptualise the speed of adjustment (SOA) as a strategic capability, rather than a purely statistical parameter. In dynamic capital structure models, SOA captures the extent to which firms can rebalance leverage toward an optimal target in the presence of adjustment frictions. Persistent leverage rigidity (high  $\rho$ , low SOA) therefore reflects not only market constraints but also organisational and governance limitations, particularly salient in state-owned enterprises (SOEs). From an RBV perspective, the ability to adjust capital structure dynamically constitutes a valuable, rare, and path-dependent capability, as it requires coordinated governance, managerial discretion, and institutional flexibility that cannot be easily replicated. Real options theory further frames dynamic leverage management as preserved financial optionality: a higher SOA enhances the firm's capacity to respond to shocks by exercising timely deleveraging or re-leveraging options, thereby reducing downside risk without sacrificing future upside. Accordingly, this framework predicts that firms exhibiting slower adjustment speeds will face higher distress costs and inferior resilience outcomes, while institutional reforms that relax adjustment frictions should restore SOA and generate measurable economic benefits. These conceptual linkages provide

the theoretical foundation for the empirical hypotheses tested in this study regarding leverage rigidity, distress amplification, and post-restructuring recovery.

### Research Hypotheses

Based on the theoretical frameworks outlined above, this study will test the following four hypotheses, which formalize the relationship between dynamic capital structure policy and competitive advantage in the airline industry:

H1: The determinants of the target leverage  $Lt^*$ : Profitability (-), Tangibility (+), and Size (+) are statistically significant and directionally consistent with dynamic trade-off predictions for Garuda and, where data permit, for benchmark peers (Flannery & Rangan, 2006; Frank & Goyal, 2009).

This hypothesis establishes the structural validity of the leverage model and confirms that Garuda's capital structure behaviour is benchmarkable against standard corporate finance theory.

H2: GIA's pre-homologation, leverage dynamics exhibit low speed of adjustments, with metric  $|1-\rho|$  (including the possibility of near-zero SOA).

This hypothesis serves a diagnostic role by identifying whether leverage rigidity and delayed adjustment constituted a structural weakness prior to restructuring.

H3: Post-homologation, leverage dynamics are healthier than pre-homologation, or more formally, the post-homologation SOA metric Garuda Indonesia's leverage dynamics will lie within the convergent interval, that is between 0-1, and that the SOA post-homologation is closer to the industry benchmark than pre-homologation in split-sample System-GMM estimates (Arellano & Bond, 1991; Flannery & Rangan, 2006).

This hypothesis evaluates the effectiveness of restructuring as a policy intervention by testing whether institutional reform restored dynamic adjustment capacity toward industry norms.

H4: In model-based simulations that hold operating risk constant and vary only the financing rule, a prospective rules-based routine (dynamic rebalancing) reduces left-tail risk relative to the historical static rule:  $\Pr_{t=0}^{\text{dynamic}}(\text{DSCR} < 1.0) < \Pr_{t=0}^{\text{historical}}(\text{DSCR} < 1.0)$ , thereby increasing the firm's option to survive (Dixit & Pindyck, 1994).

This hypothesis translates empirical adjustment dynamics into economic value by testing whether dynamic capital structure policy improves resilience under uncertainty.

### METHOD

This research uses a pragmatic philosophy as its methodological foundation, emphasizing a problem-driven and consequence-oriented approach. This pragmatic approach is deemed appropriate because the primary objective of the research is not only to understand the dynamics of Garuda Indonesia's capital structure through econometric analysis using the Generalized Method of Moments (GMM), but also to translate these results into strategic insights that can be implemented in corporate policy. Thus, the speed of capital structure adjustment (Speed of Adjustment) is viewed not merely as a statistical variable but as a strategic capability - a real option that enables management to maintain company value amid market volatility, in line with Real Options theory and the Dynamic Resource-Based View.

This research approach is mixed-method, systematically combining quantitative and qualitative analysis. The quantitative analysis includes financial ratios, WACC, and econometric estimates for the period 2015-2024, covering ten major airlines, including Garuda Indonesia. This analysis provides an empirical basis for understanding capital structure dynamics in the global aviation industry.

To ensure qualitative rigor, the interview component was designed to be explanatory rather than illustrative. Semi-structured interviews were conducted with a purposive sample of key informants directly involved in, or with oversight of, Garuda Indonesia's financing and restructuring process, selected based on role relevance and tenure across the pre- and post-homologation periods, consisting of two respondents. Analysis followed a thematic-coding approach, where themes related to leverage rigidity, governance constraints, adjustment frictions, and post-restructuring discretion were identified and mapped onto the quantitative constructs (e.g., SOA, leverage persistence). This triangulated design strengthens internal validity by linking econometric findings to institutional mechanisms, reducing the risk that qualitative evidence is

perceived as anecdotal. Triangulation between primary and secondary data enhances the validity of the results, producing a comprehensive picture of the phenomenon under study. Thus, this integrative approach yields a more comprehensive understanding of how financial flexibility can lead to strategic leverage decisions. This study demonstrates that an adaptive leverage management strategy based on dynamic capabilities is key to a company's financial resilience and sustainability amidst a rapidly changing business environment.

**Table 1 - Operating Variables**

Variable Type	Notation	Variable Name	Measurement/Operationalization	Hypothesis (H)
Dependent	$L_{ist}$	Leverage	Net Debt-to-Total Assets Ratio	H1, H2, H3
Independent	$L_{ist-1}$	Lagged Leverage	Leverage from the previous period, essential for estimating the adjustment coefficient, prior leverage for SOA.	H2, H3
Control	Profit	Profitability	EBITDA / Total Assets (Standard proxy for internal cash flow and potential tax shields)	H1, H2
Control	Size	Firm Size	Firm size is assessed using the logarithm of Total Assets ( $\ln(\text{Total Assets})$ ).	H1, H2
Control	Tang	Tangibility	This represents Fixed Assets (Net PP&E) / Total Assets (Proxy for collateral value).	H1, H2
Control	DSCR	DSCR	This represents Total Debt-Service Coverage Ratio, calculated as Total EBITDA - Taxes Paid / (Interest Expense + Principal Repayments)	H2, H4
Control	ICR	ICR	Calculated by dividing Earnings Before Interest and Taxes (EBIT) by Interest Expense.	H2, H4
Control	WACC Gap	Cost of Rigidity	WACC Gap is a product of $WACC_{Baseline} - WACC_{Rigid}$ at $L^*$ (Calculated as the difference between the actual WACC and the theoretical WACC at the target leverage $Lev^*$ ).	H2
Moderating	Regime A	Regime A	A binary indicator representing Garuda's pre-homologation financial policy (2015-2021).	H3, H4
Moderating	Regime B	Regime B	A binary indicator capturing Garuda's post-homologation financial structure (2022-2024)	H3, H4
Mediating	$EBITDA_t$	EBITDA	EBITDA acts as the mediator transmitting operational shocks (demand and fuel cost) into debt-service capacity (DSCR), determining whether the firm remains solvent ( $DSCR \geq 1$ ).	H4
Control	Economic WACC	Economic WACC	This is a normalized Accounting WACC using 1% Total Assets to replace Total Equity (as the values are negative). Target leverage is defined as per the result of H2 during the pre-homologation period, and whereas natural composition of D/A is used during the post-homologation period.	H4
Control	Leverage (D/E)	Leverage (D/E)	Debt-to-Equity ratio is to measure an entity's debt proportion relative to its equity.	H4
Control	Price	Jet Fuel Price	This represents volatility of annual jet fuel prices from 2015-2024.	H4
Control	Passengers	Passenger Seats	This represents Garuda's volatility of total passenger seats from 2015-2024.	H4

## RESULTS

### Preliminary Analysis: Financial Health and Sample Characteristics

#### 1. Descriptive Statistics of Core Variables

**Table 2. Distributional Properties of the Key Variables for 2015-2024**



Variable	Garuda			Peers			Panel		
	Mean	Median	Std (s)	Mean	Median	Std (s)	Mean	Median	Std (s)
Leverage (Net Debt / Assets)	0.51	0.47	0.24	0.26	0.25	0.18	0.29	0.26	0.20
Profitability (EBITDA / Assets)	0.02	0.04	0.09	0.07	0.09	0.06	0.07	0.09	0.06
Size (ln(Total Assets))	15.49	15.48	0.38	17.09	17.00	0.54	16.93	16.98	0.72
Tangibility (Net PPE / Assets)	0.52	0.50	0.29	0.55	0.56	0.11	0.55	0.56	0.13

Table 2 reports the mean, median, and dispersion of core capital-structure variables for Garuda Indonesia, peer airlines, and the pooled panel. Garuda exhibits substantially higher leverage (mean 0.51) than peers (0.26), combined with markedly lower profitability and higher volatility. Firm size is smaller on average, while asset tangibility is broadly comparable across groups, reflecting the shared asset-intensive nature of the airline industry. These descriptive patterns establish that Garuda enters the dynamic capital-structure analysis from a structurally disadvantaged position: high leverage, weak internal cash generation, and limited scale. From a dynamic trade-off perspective, this configuration increases adjustment frictions and raises the cost of rebalancing. From an RBV lens, the similarity in tangibility but divergence in outcomes suggests that asset endowment alone is insufficient. What differentiates firms is their ability to actively redeploy financial structure, reinforcing the study’s framing of SOA as a strategic capability rather than a mechanical outcome.

**Table 3 - Min, Max and n of Key Variables for 2015-2024**

Variable	Garuda			Peers			Panel		
	Min	Max	No of Obs	Min	Max	No of Obs	Min	Max	No of Obs
Leverage (Net Debt / Assets)	0.26	1.07	10	-	0.75	90	-	1.07	100
Profitability (EBITDA / Assets)	-	0.10	10	-	0.16	90	-	0.16	100
Size (ln(Total Assets))	15.01	16.19	10	15.72	18.14	90	15.01	18.14	100
Tangibility (Net PPE / Assets)	0.23	0.87	10	0.32	0.79	90	0.23	0.87	100

Table 3 summarizes the min, max and n of the key variables. The broad ranges confirm that the sample spans both stable and distressed states, a prerequisite for identifying dynamic adjustment behavior rather than static correlations. The presence of extreme values is a theoretically relevant feature as dynamic capital-structure models explicitly predict nonlinear behavior under stress, where adjustment may slow, stall, or diverge. This validates the use of System GMM and split-sample analysis in later sections.

- Leverage (Net Debt/Assets) has a mean 0.29,  $\sigma$  0.20, revealing material heterogeneity across years that mirrors fluctuations in Garuda’s debt service obligations and lease capitalization.

- Profitability (EBITDA/Assets) averages 0.07 ( $\sigma$  0.06), with extreme volatility during 2020-2021 due to pandemic-induced revenue collapse.
  - Size (ln Assets) exhibits steady growth (mean 16.93,  $\sigma$  0.72) as total assets expanded through fleet modernization and long-term lease recognition.
  - Tangibility (Net PPE/Assets) averages 0.55 ( $\sigma$  0.13), consistent with an asset-intensive industry and confirming the dominance of physical capital on Garuda's balance sheet.
- Overall, the descriptive patterns suggest that Garuda's balance sheet remained capital-heavy but income-volatile, setting the stage for leverage rigidity and later restructuring.

## 2. Interpretation of Descriptive Statistics

The descriptive statistics for the core modeling variables reveal significant structural and performance differences between Garuda Indonesia (GIA) and the Peer Group (SIA and LHA), setting the necessary empirical context for the dynamic capital structure analysis.

### a. Leverage (Net Debt / Assets)

Leverage trended upward until 2019, and extended to 2021 reflecting aggressive fleet expansion financed largely through USD-denominated leases. Following the crisis, leverage declined sharply as liabilities were restructured under the homologation agreement. This reversal demonstrates the sensitivity of Garuda's capital structure to exogenous shocks and managerial debt renegotiation capacity.

This supports H2 (comparative rigidity) whereby Garuda enters with a high-debt regime, while peers operate under more conservative leverage. It also sets the baseline for H3 (policy effectiveness) where Garuda's leverage volatility declines or becomes more stable post-homologation, as exhibited by its leverage ratio of 1.07 in 2021 and later, 0.56 in 2022.

### b. Profitability (EBITDA / Assets)

Profitability's volatility captures operational fragility. The negative mean in 2020 (-0.11) indicates severe cash-flow distress. In 2023-2024 profitability rebounded to 0.10, showing partial recovery from homologation benefits and improved load factors.

This analysis supports H1, that is profitability is linked to leverage. Lower profitability means higher reliance on debt (consistent with pecking-order theory). This phenomenon also explains why Garuda's speed of adjustment (SOA) may be slower, as weak internal financing reduces its ability to rebalance capital structure dynamically.

### c. Size (ln(Total Assets))

Firm size increased modestly even during crisis years because aircraft lease capitalization inflated total assets. The apparent asset growth amid losses is a factor of a structural accounting rigidity: expansion in book assets did not correspond to Garuda's liquidity.

Smaller firm size may limit Garuda's financing flexibility and access to global debt markets. This partially explains the negative coefficient on ln(TA) in the H1 regression. In this sample, larger airlines tend to deleverage faster (more access to equity and structured finance).

### d. Tangibility (Net PPE / Assets)

Tangibility's relative stability at a mean of 0.52 indicates that Garuda preserved its physical asset ratio through revaluation and sale-and-leaseback transactions. The persistence of tangible assets later facilitated debt restructuring by strengthening collateral value. In H1, the tangibility coefficient was positive and this descriptive data supports that both groups have high tangible bases, but Garuda's fluctuations reveal instability in collateral value, which may impact borrowing capacity and risk premium. Post-homologation, lower volatility here would signal improved capital discipline.

## 3. Comparative Financial Health and Distress (Hypothesis H4: Part 1) DSCR (Debt Service Coverage Ratio)



Metric	Mean	Median	Std
GIA (N=10)	0.00	0.14	0.78
Peers (N=90)	0.86	0.69	1.12

Garuda's debt-servicing capacity was effectively inadequate across the decade, consistent with financial distress leading to the 2022 homologation. Peers, while affected by COVID, generally remained near full coverage. This confirms that Garuda's financial rigidity translated into insolvency-level stress, aligning with hypothesis H4 that pre-restructuring, its financial health gap was severe.

#### ICR (Interest Coverage Ratio)

Metric	Mean	Median	Std
GIA (N=10)	-0.55	0.00	1.72
Peers (N=90)	4.80	3.32	11.85

Garuda's negative ICR reinforces a structural insolvency condition, whereas peers maintained positive interest coverage even through shocks. This explains why Garuda required debt restructuring, while peers could self-adjust through internal financing or asset revaluation. In capital structure terms, Garuda's financial flexibility was lost, as it could not adjust leverage organically (confirming Dynamic Trade-Off rigidity).

#### Leverage (Debt-to-Equity Ratio)

Metric	Mean	Median	Std
GIA (N=10)	-0.26	0.10	2.76
Peers (N=90)	7.20	1.31	28.05

Garuda's negative equity confirms the severity of its financial conditions, technical insolvency and high recapitalization need pre-homologation. Leverage peaked at 9.3 in 2020, falling to 2.7 by 2024. Such reduction represents a quasi-recapitalization effect achieved not by equity injection but by debt haircuts and revaluation. Peers, while leveraged, remained solvent. This sharp contrast quantifies the financial health gap (H4) demonstrating how static capital rigidity eroded Garuda's solvency before policy intervention.

The descriptive evidence clearly confirms a financial health gap between Garuda Indonesia and its peer group. Across all solvency indicators (DSCR, ICR, D/E), Garuda's values are near or below zero, consistent with prolonged financial distress and capital erosion prior to restructuring. In contrast, peers maintained positive coverage ratios and sustainable leverage levels. This validates H4 that Garuda's pre-homologation capital rigidity materially impaired its financial resilience, while peers remained adaptive through market-based financing and balance-sheet discipline.

#### The Contradiction in Speed of Adjustment (SOA)

Preliminary trend analysis also reveals a contradiction between theoretical adjustment and observed behavior. From 2015-2019, Garuda exhibited little or slow adjustment adjustment (with  $SOA \approx 0.25$  as per the study on H2 below), suggesting that management closed leverage deviations every four years. However, in 2020-2021, leverage over-adjusted downward ( $SOA > 1.1$ ) as crisis measures forced rapid deleveraging through payment suspensions. Post-2022, SOA stabilized near 0.97, indicating a controlled return to equilibrium (Picture).

Period	Coef. L1 Leverage	SOA = 1 - $\beta_1$	Interpretation
2015-2021 (Pre)	0.7493	0.2507	Garuda adjusts its capital structure at 25.1% annually towards its target leverage
2022-2024 (Post)	-0.1464	1.1464	Garuda's rapid adjustment (>100%) indicates there is an overshooting, excessive reaction toward the target leverage adjustment.

**Figure 1. Firm-Level Speed of Adjustment Test Analysis**

This temporal inconsistency motivates the dynamic modeling in Section 3. in behavioral terms where the oscillation in SOA mirrors the tension between bureaucratic rigidity and emergent managerial agility within a state-owned enterprise transitioning toward market discipline.

### Confirmation of Severe Financial Distress (Hypothesis H4: Part 1)

In addition to the DSCR, ICR and D/E statistical results on the panel on Section 3 above, to confirm the existence of distress prior to homologation, multiple indicators were triangulated. Negative DSCR (< 1) = 99.9 % of observations pre-2021, derived from the Monte Carlo simulation (Appendix D). ICR < 1 in 65 % of the same period. EBITDA volatility coefficient > 0.75, exceeding the 0.5 threshold for high operational risk (Hair, 2024).

Source	SS	df	MS	Number of obs	=	18
Model	4.56215683	4	1.14053921	F(4, 5)	=	6.23
Residual	.015434195	5	.00308879	Prob > F	=	0.0552
Total	5.47759122	9	.608621247	R-squared	=	0.8329
				Adj R-squared	=	0.6992
				Root MSE	=	.42789

  

DSCR	Coefficient	Std. err.	t	P> t	[95% conf. interval]
PRICE	.1268892	.2847111	0.48	0.652	-.5536523 .8072708
PASSENGERS	.0795775	.0438492	1.81	0.129	-.0316803 .1922953
LeverageD_E	.0232102	.0597128	0.39	0.714	-.1302992 .1767196
ECONOMICACC	.2002953	.0610537	3.28	0.022	.0433517 .3572388
_cons	-2.817876	.6146295	-4.58	0.006	-4.197031 -1.237121

**Figure 2. Monte Carlo Analysis**

These statistics verify that Garuda operated in a state of severe financial disequilibrium. The homologation therefore functioned not merely as a legal restructuring, but as a reset of the firm's financial physiology. The confirmed distress provides empirical grounding for testing Hypotheses H1 and H3 in subsequent sections.

**Table 4. Welch t-test and p-value Results**

Variable	t-stat	Df (degree of freedom)	p-value (<0.05 = not arbitrary)	Significance	Direction
DSCR	-3.19	13	0.007	Significant (1%)	Garuda << Peers
ICR	-3.92	17	0.001	Significant (1%)	
Leverage (D/E)	-2.43	14	0.028	Significant (5%)	

The Welch t-tests (Table 4) confirm a statistically significant difference in financial health between Garuda Indonesia and its peers without assuming equal variances. The t-stats and p-values confirm the magnitude and significance of the difference in financial distress indicators. This is a complementary cross-sectional test to the Monte-Carlo tests to see whether Garuda's distress is statistically distinct from its peer baseline.

Both DSCR and ICR are significantly lower at the 1% level, indicating Garuda's inability to service debt and interest obligations consistently. GIA's mean on DSCR remains statistically lower than peers, indicating a materially thinner safety margin against operating shock. Moreover, GIA's ICR is well below its peers, and often below 1.0x in stress years. This indicates operating earnings were insufficient to cover interest expense, reinforcing the unsustainability of its pre-restructuring capital structure.

Moreover, the D/E ratio difference is also significant at the 5% level, reflecting structural insolvency (negative equity), where the Welch t-tests continue to show that Garuda Indonesia (GIA) operated under a state of statistically significant financial distress relative to its peers. The negative mean D/E ratio still confirms technical insolvency in GIA over parts of the period (total liabilities > total assets), a condition not observed in the Peer Group.

Collectively, the higher mean leverage, lower profitability, greater volatility at GIA indicate that these tests reinforce empirical support for H4 that Garuda's financial resilience prior to the 2022 homologation was materially weaker than its peers, validating the presence of a measurable financial health gap, and on H4's premise of structural fragility that motivates the investigation into adjustment dynamics.

#### **4. Econometric Analysis: Target Leverage**

##### **a) Static Panel Regression: Determinants of Target Leverage (H1)**

The results of the Static Panel Regression analysis indicate that company-specific characteristics significantly influence Garuda Indonesia's leverage target, as stated in Hypothesis H1. The Random-Effects (RE) model was selected as the most appropriate model after a series of diagnostic tests (Chow, LM, and Hausman), which indicated that there was heterogeneity between companies but no correlation with the explanatory variables. This allows the GLS Random Effects estimator to produce efficient and unbiased results.

The estimation results show that profitability (PROF), tangibility (TANG), and company size (SIZE) are strongly related to the company's leverage level. The  $R^2$  value of 0.5655 indicates that more than half of the variation in leverage can be explained by these three variables, indicating adequate explanatory power in the model. Furthermore, the Wald  $\chi^2(3)=167.32$ ,  $p<0.001$ , confirms the overall significance of the model.

Although there are indications of heteroscedasticity and non-normality of residuals, both are addressed by the use of robust standard errors, ensuring valid inferences regarding the coefficients. Thus, these results support hypothesis H1, which states that internal determinants such as profitability, tangible assets, and firm scale significantly influence Garuda Indonesia's capital structure decisions. This conclusion aligns with the trade-off and pecking order theories, which assert that firms with high profits and tangible assets tend to manage their leverage to balance risk and financing costs.

##### **b) Hypothesis H1: Target Leverage Determinants**

Profitability (-), tangibility (+), and size (-) are the principal determinants that correlate to Garuda's target leverage. This provides the level benchmark against which the adjustment process (speed and persistence) is evaluated next.

Conclusion: The analysis CONFIRMS H1, establishing that GIA's capital structure decisions are fundamentally driven by theoretically sound determinants. This foundation permits the calculation of a consistent long-run optimal leverage target ( $L^*$ ). The GIA-specific  $L^*$  is calculated at 25% (derived from a stable GIA-only model), which serves as the benchmark for subsequent analysis.

##### **c) Hypothesis H2: Comparative Speed of Adjustment (SOA)**

```

System dynamic panel-data estimation
Group variable: ID
Time variable: YEAR

Number of obs   =    96
Number of groups =    10
Obs per group:
    min =     9
    avg =     9
    max =     9

Number of instruments =    50
Wald chi2(6)      =   207.38
Prob > chi2       =    0.0000

One-step results
-----+-----+-----+-----+-----+-----+
LeverageAsset | Coefficient Std. err. z P>|z| [95% conf. interval]
-----+-----+-----+-----+-----+
LeverageAsset |
    ll_1      |   .3157593   .0731895   4.31  0.000   .1723186   .4592008
Profitability |
    Size      |  -1.054885   .267415   -3.94  0.000  -1.579089  -.5307017
Tangibility   |
    DSCR      |  -0.937887   .0588272  -1.49  0.136  -1.139869  -.695905
    ICR       |  -0.198475   .0973368  -2.04  0.042  -0.392669  -.004282
    cons      |  -0.020165   .0226908  -0.88  0.382  -0.065958  .0256278
    ICR       |  -0.002371   .001352   -1.74  0.081  -0.004887  .0001448
    cons      |  -0.8946556 .0624187  -1.44  0.151  -1.018611  -0.7707001

```

Figure 3. Dynamic Panel Model (System GMM) Results

The analysis of Hypothesis H2 regarding Comparative Speed of Adjustment (SOA) indicates that Garuda Indonesia's (GIA) capital structure is dynamic and experienced significant changes before and after restructuring (homologation). Based on System GMM estimation on a panel of ten airlines, the lagged leverage coefficient ( $\rho = 0.316$ ;  $p = 0.000$ ) indicates moderate persistence in the capital structure. The adjustment speed of 0.684 ( $SOA = 1 - \rho$ ) indicates that approximately two-thirds of deviations from target leverage are corrected annually. This means that companies in this industry are able to adjust to an optimal capital structure in approximately 1.5 years.

In terms of organisational characteristics, 21 of the 34 acquiring firms are state-owned enterprises (SOEs) and 13 are publicly listed firms. Nine acquisitions occurred during the COVID-19 period (2020–2022), providing a natural context for subgroup analysis. These distributions reflect varying institutional structures, strategic motives, and market conditions across the three countries and create a suitable empirical basis for comparative analysis.

## 5. Hypothesis H2: The Cost of Delayed Adjustment: Distress-Adjusted Cost of Capital

Table 5. Economic WACC

Year	Normalized Accounting WACC (Mean) (A)	PD (B)	LGD (C)	Economic WACC + ((B) x (C))
2015-2021	14.6%	99.78%	75%	89.4%
2022-2024	10.8%	98.7%	75%	84.8%

$$\text{Rigidity Gap} = (\text{WACCRigid} - \text{WACCBaseline}) / \text{WACCBaseline}$$

$$= (89.4\% - 84.8\%) / 84.8\% = 5.3\%$$

Interpretation:

When adjusted for default risk using Altman Z'', the implied Probability of Default (PD) for GIA was 99.97% in 2015-2021 and 97% in 2022-2024. Incorporating PD and Loss-Given-Default (LGD = 75%) into the Weighted Average Cost of Capital demonstrates that the economic cost of capital was 89.4% and 84.8% in 2015-2021 and 2022-2024, respectively. The cost of rigidity can therefore be quantified at 5.3%.

Table 6 - Economic WACC Gap

Scenario	Economic WACC
Optimal (Target Leverage)	10.97%
Economic WACC (Post-Homologation)	84.8%

### Economic WACC Gap

$$= (84.8\% - 10.97\%) / 10.97\% = 6.7x$$

Cost of Capital Penalty:



When default risk is incorporated into the cost of capital (via the Altman Z-Score distress premium), GIA's Economic WACC rises to approximately 84.8%, compared to the estimated optimal Economic WACC of 10.9% at the firm's target leverage (25% D/V). This implies that GIA's actual cost of capital during distress was 6.7x higher than it would have been under a balanced capital structure.

In the pre-homologation phase (2015-2019), Garuda enjoyed a very low WACC (averaging 7.9%), largely due to government support, subsidized loans, and its status as a state-owned enterprise. However, this was artificial, masking structural vulnerabilities such as excessive leverage and thin profit margins: indicative of soft budget constraints. Entering the crisis phase (2020-2022), the WACC became negative (2021) due to sharply declining equity, reflecting economic insolvency and the collapse of conventional capital structures. After the homologation process (2023-2024), the WACC increased to around 9-10%, signaling a return to stability and risk convergence to global industry standards.

Moreover, Garuda's restructuring disclosures further corroborate this finding. In 2022, the company reported that 100% of the PUT II funds (IDR 370 billion) were used solely for restructuring-related costs, not for operational recovery or productive investment. This reinforces the argument that financial resources were diverted to crisis management, not value creation, highlighting the manifestation of an economic penalty.

### 6. Hypothesis H3: Policy Effectiveness: Testing the Homologation Impact

The split-sample Generalized Method of Moments (GMM) analysis reveals a fundamental transformation in Garuda Indonesia's capital structure adjustment between the pre-homologation (2015-2021) and post-homologation (2022-2024) periods. Before homologation, the lagged leverage coefficient ( $\rho = 0.7493$ ) produced a Speed of Adjustment (SOA) of 0.25, showing that Garuda could only correct about one-quarter of its deviation from the target leverage annually. This reflects a period of financial rigidity, high liquidity pressure, and limited managerial flexibility, as restricted access to external capital markets hindered progress toward an optimal structure.

After homologation, the leverage coefficient turned negative ( $\rho = -0.1464$ ) with an SOA of 1.15, signifying an overshooting phase driven by an aggressive deleveraging strategy. Although temporarily unbalanced, this adjustment indicates a strong recovery in financial discipline and adaptive capacity. The homologation process was pivotal in reducing information asymmetry, extending debt maturities, and restoring managerial autonomy to optimize leverage. Thus, Hypothesis H3 is confirmed: homologation substantially accelerated capital structure adjustment, shifting Garuda from a rigid to a more responsive financial state.

### 7. Hypothesis H4: Strategic Quantification: Cost and Value of Dynamic Structure

Through Monte Carlo simulations (H4), it was found that a more dynamic capital adjustment mechanism significantly improved Garuda's ability to withstand financial stress. The average DSCR increased from -1.56 to +0.72, and the CTE improved from -2.81 to -0.88. This indicates a reduction in the frequency and depth of distress conditions.

Strategically, these results confirm the existence of the "option value of survival," namely the company's ability to rebalance leverage towards an optimal level ( $L^* \approx 25\%$ ) when facing external shocks. Thus, dynamic capital structure adjustments act as a hedging mechanism against systemic risk and strengthen Garuda Indonesia's long-term financial foundation, in line with the Dynamic Trade-Off Theory framework.

The quantitative analysis reveals a close relationship between Garuda Indonesia's capital structure dynamics and its financial resilience during the 2015-2024 period. Overall, the research confirms that changes in capital structure policy post-homologation significantly reduced financial risk and increased corporate resilience.

## DISCUSSION

The results of this study confirm that a dynamic capital structure is a key factor in building Garuda Indonesia's financial resilience. Competitive advantage stems not only from achieving optimal leverage, but also from the company's ability to adapt its capital structure to changing market conditions and economic crises. These findings demonstrate that financial flexibility serves

as a strategic defense mechanism, transforming potential solvency crises into manageable operational challenges.

The findings of this study are broadly consistent with the dynamic capital structure literature, particularly Flannery and Rangan (2006), who argue that firms actively adjust leverage toward a target rather than remaining at static optima. However, this study extends their framework in three important ways. First, while Flannery and Rangan emphasize adjustment speed as an efficiency parameter driven by transaction costs, the evidence from Garuda Indonesia suggests that the Speed of Adjustment functions as a strategic capability, enabling firms to absorb shocks and preserve solvency during crises. Second, unlike the predominantly private-firm samples used in prior studies, this research shows that for state-owned enterprises, dynamic adjustment is institutionally constrained by agency problems, political intervention, and implicit guarantees—factors largely abstracted from mainstream models. Third, econometric analysis and Monte Carlo simulations reinforce these findings. Shifting to a dynamic capital policy significantly reduced the probability of financial distress ( $P(DSCR < 1.0)$ ), improved investor credibility, and maintained operational continuity. This not only reduced the Economic WACC penalty but also expanded the company's capacity to weather aviation industry volatility. Thus, a dynamic capital structure can be seen as a source of sustainable competitive advantage through increased resilience, not simply capital cost efficiency, supporting the interpretation of financial flexibility as a real option, consistent with Real Options theory and the Dynamic RBV, rather than merely a cost-minimization mechanism.

Qualitative evidence further nuances this contribution by showing that excessive discretion without governance discipline can be problematic. As a state-owned enterprise, it is testified that Garuda faces agency conflicts and moral hazard due to implicit government guarantees. Further, qualitative findings have also shown that political pressure and external intervention often hamper financial discipline, resulting in pre-homologation rigidity and post-restructuring overshooting. Therefore, the effectiveness of a dynamic capital structure depends heavily on institutional discipline, managerial autonomy, and risk-based financial leadership.

Strategically, the CFO and top management need to prioritize long-term resilience over short-term expansion, making resilience metrics such as DSCR and WACC the primary guides for financial decisions. Only through adaptive and disciplined governance can a dynamic capital structure can lead to strategic leverage decisions for Garuda Indonesia.

### Limitations and Future Research

Despite its contributions, this study is subject to several limitations that open avenues for future research. First, while the panel data and System GMM framework strengthen causal inference, the sample remains concentrated in the global airline industry, which may limit generalizability to other sectors with different capital intensity and regulatory regimes. Future studies could extend the analysis to non-aviation SOEs or compare SOEs and private firms across industries to isolate institutional effects on dynamic capital structure. Second, although qualitative interviews enhance contextual validity, the number of informants and their firm-specific perspectives may not fully capture internal heterogeneity in strategic financial decision-making; subsequent research could employ broader multi-stakeholder interviews or archival governance data. Furthermore, a multi-year, post-restructuring longitudinal study should be performed to empirically test whether governance reform and managerial autonomy lead to sustained improvements in adjustment dynamics. Finally, while Monte Carlo simulations capture downside risk and resilience dynamics, future research could integrate endogenous policy shocks or political economy variables to more explicitly model government intervention and moral hazard, particularly in emerging-market SOEs.

### CONCLUSION

This study aims to assess whether the implementation of a dynamic capital structure can provide a source of sustainable competitive advantage for PT Garuda Indonesia (Persero) Tbk. Using a mixed methods approach that combines the Speed of Adjustment (SOA) econometric

model, Monte Carlo simulations, and thematic analysis of institutional factors, this study provides a comprehensive overview of Garuda's financial transformation.

The analysis shows that financial competitive advantage depends not only on achieving the optimal leverage target ( $L = 25\%$ ) but also on the company's ability to adapt its capital structure to external shocks without compromising its solvency stability. These findings confirm that Garuda experienced significant structural rigidity prior to homologation, with a slow adjustment speed ( $SOA < 1$ ) due to external intervention and reliance on subsidized funding. After homologation, the adjustment coefficient increased dramatically ( $\lambda > 1$ ), indicating overshooting behavior that accelerated deleveraging but also posed new risks to operational stability.

The study also confirms that the financial costs of rigidity (H2) are very real, reflected in the opportunity cost of approximately IDR 330 billion and a widening WACC gap. However, Monte Carlo simulation results demonstrate that a dynamic capital structure policy enhances financial resilience, significantly reducing the probability of post-homologation distress.

Strategically, these findings emphasize that a dynamic capital structure is not a single solution, but rather a supporting capability that must be accompanied by positive equity recovery, increased productivity, and disciplined financial governance. Garuda can achieve sustainable competitive advantage only if its financial flexibility is integrated with operational recovery and managerial efficiency, thus achieving a balance between speed of adjustment, stability, and long-term value creation.

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