Manajemen dan Bisnis, Volume 25, No 3 (November 2026)

Financial slack, capital intensity, and firm performance: Evidence from global listed firms

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Received: July 15, 2026; Revised: July 31, 2026;
Accepted: August 5, 2026; Published: November 28, 2026

Abstract

Financial slack may preserve operating continuity and investment capacity, but excess resources can weaken financial discipline. This study examines the within-firm association between financial slack and firm performance and formally tests whether it varies with capital intensity and growth opportunities. We construct a pooled-standardized, equally weighted Financial Slack Index from cash holdings, liquidity, and unused debt capacity for 4,832 firm-year observations from 524 listed firms in 21 countries during 2016-2025. Firm and year fixed-effects models are complemented by country-year effects, country-exclusion and equal-weighting checks, wild-country bootstrap inference, COVID-period tests, alternative index construction, and omitted-variable sensitivity analysis. Financial slack is positively associated with return on assets ($b = 0.0170$, $p < .001$) and market-to-assets. Capital intensity is negatively associated with performance, whereas the continuous financial-slack-by-capital-intensity interaction is insignificant. Formal slope comparisons show weak evidence of a stronger association among high-capital-intensity firms ($p = .099$), but strong evidence among high-growth firms ($p < .001$). The financial-slack slope does not differ across pre-COVID, COVID, and post-COVID periods. Results remain positive under country-year effects and after excluding the two dominant countries. The evidence supports financial slack as conditional financial flexibility, especially for growing firms, while remaining associative rather than causal.

Keywords: *financial slack, financial flexibility, capital intensity, growth opportunities, firm performance, fixed effects.*

Introduction

Financial slack consists of immediately deployable financial resources, including cash holdings, short-term liquidity, and unused borrowing capacity. A modified pecking-order logic predicts that these resources preserve investment and operating continuity when external finance is costly, delayed, or informationally constrained. Yet slack may also remain idle or weaken managerial discipline. The resulting tension makes the performance implication of slack theoretically conditional rather than universally positive (Denis, 2011; Li et al., 2025; Wu et al., 2024; Yung et al., 2015).

Prior research can be organized into four related streams. Measurement studies operationalize slack through cash, liquidity, leverage, or broader resource buffers; performance studies estimate average slack effects; contingency studies examine environmental uncertainty, investment horizons, and operational conditions; and recent cross-country work emphasizes institutional heterogeneity. This literature establishes the importance of slack but leaves two linked gaps. First, single proxies do not capture the combined availability of liquid resources and borrowing headroom. Second, evidence remains limited on whether the within-firm slack-performance association varies

DOI: https://doi.org/10.24123/mabis.v25i3.1247
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systematically with capital intensity and growth opportunities (Bourgeois, 1981; Godoy-Bejarano et al., 2020; Lefebvre, 2024; Liang et al., 2023).

This study addresses these gaps by constructing a transparent Financial Slack Index (FSI) from pooled-standardized cash holdings, liquidity, and unused debt capacity. The analysis covers 524 listed firms during 2016-2025 and uses firm fixed effects to absorb persistent firm heterogeneity. The revision extends the original design with country-year effects, exclusions of the two dominant countries, country-equal weighting, leave-one-country-out analysis, wild-country bootstrap inference, formal slope-difference tests, COVID-period interactions, alternative index construction, and corrected Oster-style sensitivity analysis (Almeida et al., 2004; Bates et al., 2009; Castro et al., 2026; Espenlaub et al., 2025; Gasbarro et al., 2025).

The revised evidence separates three conclusions. First, financial slack is positively associated with current accounting and market-based performance. Second, capital intensity is negatively associated with performance, while its continuous interaction with FSI is not statistically significant. Formal group comparisons provide only weak evidence that the FSI slope is stronger among high-capital-intensity firms, but strong evidence that it is stronger among high-growth firms. Third, the FSI slope does not change significantly across pre-COVID, COVID, and post-COVID periods. These patterns support a conditional-flexibility interpretation without establishing causality.

The study contributes in three ways. First, it provides an auditable composite measure that treats cash, liquidity, and unused debt capacity as distinct but complementary dimensions of financial flexibility. Second, it separates capital intensity from growth opportunities rather than combining them in one broad moderation claim. Third, it evaluates whether cross-country concentration, crisis periods, alternative measurement, excess-slack concerns, and timing materially change the baseline association. The contribution is therefore not a universal prescription to accumulate slack, but evidence about the conditions under which a balanced financial buffer is associated with performance.

The study first tests the within-firm association between FSI and performance. It then evaluates the direct association of capital intensity and separately tests whether capital intensity and growth opportunities condition the FSI slope. Finally, it examines country concentration, COVID-period stability, market-based performance, alternative FSI construction, nonlinear slack effects, and omitted-variable sensitivity. Throughout, the empirical claims are stated as conditional associations.

Under a modified pecking-order perspective, internal liquidity and borrowing headroom reduce dependence on external financing and preserve the ability to fund positive-net-present-value projects. Cash permits immediate deployment, liquidity supports short-term obligations, and unused debt capacity protects future access to finance. Their combination therefore represents option value: the firm can respond without waiting for security issuance or renegotiating finance under unfavorable conditions (Bates et al., 2009; Denis, 2011; Officer, 2007; Yung et al., 2015).

Trade-off and agency arguments qualify this prediction. The benefit of slack should be weighed against carrying costs, lower capital discipline, overinvestment, and managerial discretion. At low or moderate levels, additional slack can reduce distress and adjustment costs; at high levels, its marginal contribution may diminish and potentially become negative. The empirical implication is not that more slack is always better, but that the observed association depends on productive deployment and governance (Chen et al., 2025; Kaplan & Lee, 2024; Liang et al., 2023; Yang et al., 2019).

Recent evidence remains mixed. Studies report benefits for financing efficiency, innovation, crisis resilience, and international performance, while other work identifies context-dependent or adverse operational consequences. The disagreement is consistent with a contingency view: slack is more valuable when financing frictions and resource demands are high, but less valuable when resources lack credible uses or institutional discipline is weak (De Roo et al., 2025; Godoy-Bejarano et al., 2020; Heubeck et al., 2026; Lefebvre, 2024; Teirlinck, 2022).

Capital intensity captures one source of resource demand and adjustment cost. Asset-heavy firms face maintenance commitments, depreciation, operating leverage, and slower capacity adjustment. Financial slack may help these firms maintain operations and finance incremental investment, but a large fixed-asset base can simultaneously depress current profitability. A stronger FSI slope is therefore plausible, although it need not be linear across the full distribution of capital intensity (Banerjee & Deb, 2023; Jalilvand & Kim, 2013; Lefebvre, 2024).

Growth opportunities provide a more direct productive use for slack. Growing firms are more likely to encounter time-sensitive investments for which external finance is costly or slow. In low-growth firms, the same resources may remain unused or intensify agency concerns. The positive association between FSI and performance should therefore be stronger when revenue growth is high (Du et al., 2025; Guo et al., 2025; Heubeck et al., 2026; Kohtamäki et al., 2019). The arguments lead to four hypotheses:

H1: Financial slack is positively associated with firm performance.

H2: Capital intensity is negatively associated with firm performance because fixed commitments and operating rigidity create short-run profitability pressure.

H3a: The positive association between financial slack and firm performance is stronger among firms with higher capital intensity.

H3b: The positive association between financial slack and firm performance is stronger among firms with higher growth opportunities.

Methods

The analysis uses an unbalanced panel of listed firms observed from 2016 to 2025. The initial file contains 5,560 firm-year observations from 556 firms. Accounting-data validation removes observations with missing or non-positive total assets, implausible ROA, invalid leverage, and capital intensity above one. The post-validation dataset contains 5,131 observations from 555 firms.

Financial firms and utilities are excluded because regulation and balance-sheet structure make their leverage and liquidity non-comparable with nonfinancial firms. The final descriptive sample contains 4,832 firm-year observations from 524 firms across 21 countries. Regression samples vary with debt, revenue-growth, and market-value availability.

The country distribution is uneven: South Korea and the United States account for 34.50% and 34.48% of observations, respectively. Ordinary country fixed effects are time invariant and therefore absorbed by firm fixed effects. The revised analysis instead adds country-year fixed effects, excludes the United States and South Korea separately and jointly, applies country-equal weights, conducts leave-one-country-out checks, and uses wild bootstrap inference across 21 country clusters. An Indonesia-specific or developed-versus-emerging subsample is not estimated because LSEG Refinitiv coverage is incomplete and highly uneven for many emerging markets; imposing such a split would create small, selective cells and could reduce rather than improve external validity.

All ratios are reconstructed from raw statement items, and continuous variables are winsorized at the 1st and 99th percentiles after validation. Revenue growth is reconstructed from current and lagged positive revenue and winsorized using the same rule. The variable-selection strategy is kept parsimonious to avoid conditioning on variables that may be consequences of financial slack (Hünermund et al., 2025; Yang et al., 2019).

The primary outcome is ROA, defined as net income divided by total assets. Market-to-assets, defined as market capitalization divided by total assets, is used as an alternative market-based proxy and is not labeled Tobin's Q. Capital intensity equals net property, plant, and equipment divided by total assets. Controls include capital expenditure divided by total assets, the natural logarithm of total assets, and revenue growth (Banerjee & Deb, 2023; Chao & Huang, 2022).

The FSI combines three dimensions. Cash holding equals cash and equivalents divided by total assets. Liquidity equals ln(1 + current ratio). Unused debt capacity equals 1 minus total debt divided by total assets. Higher values of every component indicate greater immediately available financial flexibility (Bates et al., 2009; Castro et al., 2026; Chang et al., 2025; Feng et al., 2026; Gasbarro et al., 2025; Yung et al., 2015).

Each component is standardized over the pooled post-validation dataset before sector exclusion using z(X_it) = [X_it - mean(X)] / SD(X). The main index is FSI_it = [z(Cash_it) + z(Liquidity_it) + z(DebtCapacity_it)] / 3. The equal-weight rule prevents a component from dominating because of scale and facilitates exact replication. A two-component alternative, FSI2_it = [z(Cash_it) + z(Liquidity_it)] / 2, is also estimated (Espenlaub et al., 2025; Li et al., 2025; Yung et al., 2015).

The index is interpreted as broad financial flexibility rather than excess cash. This distinction is important because unused debt capacity may support financing even when cash holdings are modest. The reconstruction audit reproduces the stored FSI to numerical precision, and alternative PCA-, year-standardized, and country-standardized indices are used to assess measurement dependence. Table 1 summarizes all variables.

$$\text{CashHolding}_{it} = \frac{\text{Cash}_{it}}{\text{TotalAssets}_{it}}$$

$$\text{Liquidity}_{it} = \ln(1 + \text{CurrentRatio}_{it})$$

$$\text{DebtCapacity}_{it} = 1 - \frac{\text{TotalDebt}_{it}}{\text{TotalAssets}_{it}}$$

$$Z(X_{it}) = \frac{X_{it} - \bar{X}}{s(X)}$$

$$\text{FSI}_{it} = \frac{Z(\text{CashHolding}_{it}) + Z(\text{Liquidity}_{it}) + Z(\text{DebtCapacity}_{it})}{3}$$

$$\text{FSI2}_{it} = \frac{Z(\text{CashHolding}_{it}) + Z(\text{Liquidity}_{it})}{2}$$

Table 1. Variable Definitions

Variable	Definition	Expected role
ROA	Net income / total assets	Main dependent variable
Market-to-assets	Market capitalization / total assets	Alternative market-based outcome
Cash holding	Cash and equivalents / total assets	FSI component
Liquidity	ln(1 + current ratio)	FSI component
Debt capacity	1 - total debt / total assets	FSI component
FSI	Equal-weight mean of pooled z-scores for cash, liquidity, and debt capacity	Main explanatory variable
FSI2	Equal-weight mean of pooled z-scores for cash and liquidity	Alternative slack measure
Capital intensity	Net PPE / total assets	Conditioning variable
Capex ratio	Capital expenditure / total assets	Control variable
Firm size	ln(total assets)	Control variable
Revenue growth	(Revenue_t - Revenue_t-1) / Revenue_t-1	Growth condition/control

Notes: Variable definitions follow the final Stata specification used in the analysis.

The baseline specification is: Performance_it = beta_1 FSI_it + beta_2 CapInt_it + beta_3(FSI_it x CapInt_it) + gamma'Controls_it + firm_i + year_t + error_it. Performance_it=β_1 FSI_it+β_2 CapInt_it+β_3 (FSI_it×CapInt_it)+γX_it+α_i+τ_t+ε_it. The coefficient beta_1 measures the within-firm FSI association, beta_2 measures the direct capital-intensity association, and beta_3 tests linear moderation. H3a and H3b are additionally evaluated through pooled interaction models that formally test differences between high and low groups, avoiding inference based solely on comparing separate coefficients. Nonlinear capital-intensity terms and marginal effects at selected percentiles provide supplementary evidence (Hünermund et al., 2025).

Firm fixed effects remove time-invariant firm and country characteristics, while year effects absorb shocks common to all firms. Country-year effects absorb country-specific annual macroeconomic and regulatory shocks. Standard errors are clustered by firm; because only 21 countries are represented, the country-level inference is supplemented with Webb-weight wild bootstrap tests. The design does not remove time-varying firm-level omitted variables or reverse adjustment, so coefficients remain associative.

Robustness analyses include country-year effects; exclusions of the United States and South Korea; country-equal weights; leave-one-country-out estimates; wild-country bootstrap inference; COVID interactions and pandemic exclusions; market-to-assets and one- and two-year-ahead outcomes; lagged FSI; two-component, PCA, year-standardized, and country-standardized indices; quadratic and quartile FSI tests; component-level models; and corrected Oster-style sensitivity analysis (Bendig & Hoke, 2024; Clarke, 2019; Oster, 2013). Dynamic system GMM was estimated only as a diagnostic. Significant second-order serial correlation prevents valid reliance on those estimates, so the preferred specification is firm fixed effects with clustered inference (Arellano & Bond, 1991; Blundell & Bond, 1998; Roodman, 2009; Windmeijer, 2005).

Result and Discussions

Table 2 reports the final descriptive sample. Mean ROA is 6.4%, mean capital intensity is 29.2%, and the main FSI is centered near zero by construction. The substantial dispersion of FSI, capital intensity, and market-to-assets provides within- and between-firm variation for the panel analysis. The descriptive counts also show that missing debt data reduce the three-component FSI sample relative to FSI2.

Table 2. Summary Statistics After Validation and Winsorization

	Panel A. Distribution and dispersion					Panel B. Quartile distribution		
Variable	N	Mean	SD	Min	Max	P25	Median	P75
ROA	4,832	0.064	0.051	-0.074	0.221	0.030	0.057	0.089
Market-to-assets	4,813	1.374	1.364	0.069	7.479	0.475	0.918	1.760
FSI	4,160	0.002	0.707	-1.341	2.370	-0.489	-0.097	0.369
FSI2	4,822	0.027	0.812	-1.246	2.989	-0.523	-0.144	0.371
Cash holding	4,825	0.094	0.086	0.001	0.456	0.035	0.070	0.125
Liquidity	4,822	0.950	0.350	0.351	2.258	0.713	0.884	1.112
Debt capacity	4,168	0.742	0.148	0.377	1.000	0.640	0.740	0.855
Capital intensity	4,825	0.292	0.202	0.015	0.868	0.127	0.247	0.415
Leverage	4,168	0.258	0.148	0.000	0.623	0.145	0.260	0.360
Capex ratio	4,821	0.045	0.036	0.002	0.190	0.020	0.035	0.058
Firm size	4,832	22.594	1.773	18.785	26.371	21.351	22.735	23.839
Revenue growth	4,268	0.070	0.174	-0.348	0.789	-0.024	0.051	0.136

Notes: Statistics are calculated after excluding financial firms and utilities and winsorizing continuous variables at the 1st and 99th percentiles. FSI is the three-component financial slack index; FSI2 is the alternative two-component index.

Table 3 shows that FSI is positive in every specification. The FSI-only coefficient is 0.0229 ($p < .001$), and it remains 0.0209 ($p < .001$) after capital intensity is added. In the interaction model, FSI is 0.0170 ($p < .001$), capital intensity is -0.0809 ($p < .001$), and FSI x capital intensity is 0.0102 ($p = .413$). The main effect is therefore robust, whereas linear capital-intensity moderation is not supported (Bagh et al., 2025; Li et al., 2025; Wu et al., 2024). Adding revenue growth produces an FSI coefficient of 0.0193 ($p < .001$), a capital-intensity coefficient of -0.0531 ($p = .015$), and an insignificant interaction. Revenue growth is positive (0.0549, $p < .001$), and the within R-squared rises to 0.192. The audited growth specification contains 3,889 observations because revenue growth is reconstructed from positive current and lagged revenue.

In the interaction specification, a one-standard-deviation increase in FSI (0.707) corresponds to approximately 1.20 percentage points of ROA (0.0170 x 0.707). This magnitude is economically meaningful but remains a conditional association. The negative capital-intensity coefficient indicates that a larger existing fixed-asset base is associated with lower current accounting profitability even after controlling for capital expenditure.

Table 3. Main fixed-effects estimates

Variable	FSI only	Add CapInt	Interaction	Growth control
FSI	0.0229***	0.0209***	0.0170***	0.0193***
	(0.0031)	(0.0032)	(0.0042)	(0.0040)
Capital intensity		-0.0437*	-0.0809***	-0.0531**
		(0.0237)	(0.0224)	(0.0217)
FSI x Capital intensity			0.0102	0.0114
			(0.0125)	(0.0123)
Capex ratio			0.2572***	0.2143***
			(0.0374)	(0.0357)
Firm size			-0.0126***	-0.0151***
			(0.0044)	(0.0048)
Revenue growth				0.0549***
				(0.0047)
Observations	4,160	4,160	4,156	3,889
Within R-squared	0.081	0.084	0.117	0.192
Firm FE / Year FE	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes

*Notes: All models include firm and year fixed effects. Firm-clustered standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels. Revenue growth is reconstructed from positive current and lagged revenue.*

The separate subsamples show larger FSI coefficients among high-capital-intensity firms (0.0354) than low-capital-intensity firms (0.0116), and among high-growth firms (0.0258) than low-growth firms (0.0142) (Du et al., 2025; Guo et al., 2025; Heubeck et al., 2026; Kohtamäki et al., 2019; Teirlinck, 2022). Formal pooled tests qualify these comparisons. The estimated FSI slopes are 0.01957 for low-capital-intensity firms and 0.02658 for high-capital-intensity firms, but their difference is significant only at the 10% level ($p = .0991$). By contrast, the slopes are 0.01551 for low-growth firms and 0.02468 for high-growth firms, and the difference is strongly significant ($p < .001$). The joint nonlinear capital-intensity terms are insignificant ($p = .4611$). H3a therefore receives weak, specification-dependent support, whereas H3b is supported.

Table 4. Heterogeneity Analysis and Formal Slope Comparisons

Variable	High CapInt	Low CapInt	High growth	Low growth
FSI	0.0354***	0.0116***	0.0258***	0.0142***
	(0.0044)	(0.0038)	(0.0047)	(0.0036)
Capital intensity			-0.0825***	-0.0189
			(0.0287)	(0.0272)
Capex ratio	0.2182***	0.2014*	0.2476***	0.1319***
	(0.0402)	(0.1179)	(0.0511)	(0.0471)
Firm size	-0.0146**	-0.0078	-0.0183***	-0.0065
	(0.0057)	(0.0063)	(0.0065)	(0.0050)
Observations	2,076	2,080	1,918	1,971
Within R-squared	0.172	0.049	0.149	0.096
Formal slope-difference p-value	0.0991		< .001	
Firm FE / Year FE	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes

Notes: Subsamples are divided at pooled medians. Formal slope-difference p-values come from pooled interaction models; the value is shown once for each pair. Firm and year fixed effects and firm-clustered standard errors are used.

Country-focused checks directly address sample concentration. The FSI coefficient remains positive with country-year effects (0.0168, $p < .001$), after excluding both the United States and South Korea (0.0287, $p < .001$), and under country-equal weighting (0.0241, $p = .034$). Leave-one-country-out estimates remain positive, and a Webb-weight wild-country bootstrap rejects a zero FSI coefficient ($p = .0203$). The interaction remains insignificant under wild-country inference ($p = .3850$). These results reduce concern that the main association is mechanically driven by the two dominant countries (Chao & Huang, 2022; Chen & Nguyen, 2025; Rehman et al., 2024).

Measurement and outcome checks support the main pattern while refining its interpretation. FSI is positive for current market-to-assets (0.3271, $p = .001$). The two-component FSI is smaller but remains positive after leverage is controlled (0.0081, $p = .039$), while PCA-, year-standardized, and country-standardized indices are also positive. Current FSI does not predict ROA one or two years ahead, but it is positive for market-to-assets one year ahead. These horizon tests are predictive diagnostics and do not establish long-run causal effects.

Table 5. Selected Country, Outcome, and Measurement Robustness Tests

Variable	Country-year FE	Exclude US + Korea	Market-to-assets	Alternative FSI
Slack measure	0.0168***	0.0287***	0.3271***	0.0081**
	(0.0041)	(0.0083)	(0.1022)	(0.0039)
Capital intensity	-0.0838***	-0.0725**	-0.8940**	-0.0659***
	(0.0224)	(0.0346)	(0.3951)	(0.0207)
Slack x Capital	0.0114	-0.0162	-0.2378	-0.0130
intensity	(0.0120)	(0.0261)	(0.2515)	(0.0129)
Leverage				-0.1214***
				(0.0150)
Capex ratio	0.2303***	0.3680***	4.8816***	0.2110***
	(0.0368)	(0.0734)	(0.7952)	(0.0338)
Firm size	-0.0133***	-0.0123	-0.4199***	-0.0155***
	(0.0045)	(0.0083)	(0.1084)	(0.0049)
Revenue growth			0.6531***	0.0527***
			(0.0718)	(0.0047)
Observations	4,156	1,197	3,889	3,889
Within R-squared	0.085	0.177	0.123	0.218
Firm FE	Yes	Yes	Yes	Yes
Year/Country-year FE	Country-year	Year	Year	Year

Notes: Country-year fixed effects absorb country-specific annual shocks. The alternative FSI combines cash and liquidity and controls for leverage. Firm-clustered standard errors are in parentheses.

The nonlinear capital-intensity specification does not provide joint evidence of moderation ($p = .4611$). By contrast, the quadratic FSI term is negative and significant, indicating diminishing marginal returns to additional slack. Quartile estimates nonetheless increase monotonically through the highest observed quartile, so the sample does not show an outright reversal in performance. Component models indicate that unused debt capacity is the strongest contributor, while cash is positive and liquidity is not independently significant (Godoy-Bejarano et al., 2020; Liang et al., 2023).

COVID-period tests do not show a systematic change in the FSI slope. The differences between COVID and pre-COVID (p = .8987), post-COVID and pre-COVID (p = .6004), and COVID and post-COVID (p = .6880) are all insignificant. The positive association remains visible, but the results do not support a claim that the pandemic strengthened it (Chen & Nguyen, 2025; Rehman et al., 2024; Wu et al., 2024). The revised evidence supports a financial-flexibility interpretation while imposing clear boundaries on the moderation and causal claims. The central result is a positive within-firm association between FSI and current performance. The effect survives country-year shocks, exclusions of dominant countries, equal-country weighting, wild-country inference, market-based performance, and several alternative index constructions. This pattern is consistent with the view that cash, liquidity, and borrowing headroom jointly reduce financing frictions and preserve operating and investment flexibility (Bagh et al., 2025; Li et al., 2025; Wu et al., 2024; Yung et al., 2015).

Capital intensity is negatively associated with both ROA and market-to-assets. For ROA, depreciation, maintenance, and slower capacity adjustment provide a direct explanation. The negative market-to-assets result indicates that investors in this sample also discount asset rigidity or lower asset productivity. Because the horizon models do not identify structural long-run returns to investment, the study does not interpret market-to-assets as a long-run causal payoff or as Tobin's Q (Banerjee & Deb, 2023; Jalilvand & Kim, 2013; Jantadej & Kotcharin, 2025).

The moderation evidence is asymmetric. Capital intensity produces a numerically larger FSI slope in the high group, but the formal difference is only weakly significant and the continuous and nonlinear interactions are insignificant. The data therefore do not justify a general statement that capital intensity continuously strengthens the FSI effect. Growth opportunities provide much stronger evidence: the high-growth slope is significantly larger, consistent with slack being more productive when firms have credible uses for available finance (Du et al., 2025; Godoy-Bejarano et al., 2020; Guo et al., 2025; Heubeck et al., 2026; Lefebvre, 2024).

Agency theory remains relevant even though performance does not decline in the highest FSI quartile. The negative quadratic term indicates diminishing returns, and the component analysis shows that the composite is driven more strongly by borrowing headroom than by liquidity alone. The index therefore appears to capture financial flexibility more than excess cash, but the findings do not rule out agency costs outside the observed range or under weaker governance (Chao & Huang, 2022; Chen & Nguyen, 2025; Yung et al., 2015). For managers, the results argue against a universal target for cash or leverage. The desired buffer should be linked to fixed commitments, refinancing risk, investment timing, and realistic external-finance access. Growth firms have the clearest empirical case for maintaining flexibility. Asset-heavy firms may also benefit, but the evidence is weaker and should not be interpreted as support for indiscriminate accumulation. Boards should distinguish deployable flexibility from resources without a credible operating or investment purpose.

The corrected Oster calculation yields a standard delta of approximately 3.03 under Rmax = 1.3 times the controlled within R-squared, while the coefficient adjusted for delta = 1 remains positive at approximately 0.0114. This is more reassuring than the reciprocal value previously reported, but it does not establish causality. Reverse-timing diagnostics also show that lagged ROA predicts subsequent FSI, confirming that performance can influence financial flexibility. Time-varying omitted variables and simultaneity therefore remain material limitations (Bendig & Hoke, 2024; Clarke, 2019; Hünermund et al., 2025; Oster, 2013).

The alternative measurement results show that the conclusion is not unique to one weighting scheme. Nevertheless, unused debt capacity is economically important: it has the strongest component coefficient, and the two-component index is smaller after leverage is controlled. Future validation should therefore retain the distinction between liquid resources and borrowing headroom (Castro et al., 2026; Cerqueiro et al., 2020; Chang et al., 2025; Espenlaub et al., 2025).

The study cannot provide a credible Indonesia-specific or developed-versus-emerging comparison because LSEG Refinitiv coverage is sparse and uneven across several emerging markets. This limitation is now stated explicitly rather than addressed through underpowered subgroup estimates. Future research should validate the FSI using purpose-built Indonesian or emerging-market datasets, private firms and SMEs, ownership and governance data, and exogenous credit-supply or regulatory shocks.

Conclusion

This study develops a transparent three-component FSI and examines 4,832 firm-year observations from 524 listed firms during 2016-2025. Financial slack is positively associated with current accounting and market-based performance, while capital intensity is negatively associated with both outcomes. Country-year effects, exclusions of the United States and South Korea, equal-country weighting, leave-one-country-out checks, and wild-country inference support the main FSI association. Capital-intensity moderation is weak and specification dependent, whereas the stronger slope among high-growth firms is supported. COVID-period slopes do not differ significantly (Liang et al., 2023; Yung et al., 2015).

The contribution is therefore conditional. Financial slack is most defensible when it preserves credible operating or growth options, not when it merely increases idle resources. The evidence does not imply that every firm should raise cash or reduce leverage. It also remains noncausal because fixed effects cannot remove time-varying omitted variables or reverse adjustment. Future studies should use regulatory or credit-supply shocks and balanced datasets designed for Indonesia and other emerging markets.

References

Almeida, H., Campello, M., & Weisbach, M. S. (2004). The cash flow sensitivity of cash. *The Journal of Finance, 59*(4), 1777–1804. https://doi.org/10.1111/j.1540-6261.2004.00679.x

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277. https://doi.org/10.2307/2297968

Bagh, T., Hunjra, A. I., Ntim, C. G., & Naseer, M. M. (2025). Capitalizing on risk: How corporate financial flexibility, investment efficiency, and institutional ownership shape risk-taking dynamics. *International Review of Economics & Finance, 99*, 104068. https://doi.org/10.1016/j.iref.2025.104068

Banerjee, P., & Deb, S. G. (2023). Capital investment, working capital management, and firm performance: Role of managerial ability in U.S. logistics industry. *Transportation*

Research Part E: Logistics and Transportation Review, 176, 103224. https://doi.org/10.1016/j.tre.2023.103224

Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do U.S. firms hold so much more cash than they used to? *The Journal of Finance, 64*(5), 1985–2021. https://doi.org/10.1111/j.1540-6261.2009.01492.x

Bendig, D., & Hoke, J. (2024). Probing for omitted variable bias: The role of the impact threshold of a confounding variable in complementing instrumental variable estimations. *Industrial Marketing Management, 122*, 145–159. https://doi.org/10.1016/j.indmarman.2024.08.009

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115–143. https://doi.org/10.1016/S0304-4076(98)00009-8

Bourgeois, L. J. (1981). On the measurement of organizational slack. *The Academy of Management Review, 6*(1), 29. https://doi.org/10.2307/257138

Castro, P., Amor-Tapia, B., & Tascón, M. T. (2026). Enhancing spare debt capacity via efficient carbon management. *International Review of Economics & Finance, 106*, 104970. https://doi.org/10.1016/j.iref.2026.104970

Cerqueiro, G., Ongena, S., & Roszbach, K. (2020). Collateral damaged? Priority structure, credit supply, and firm performance. *Journal of Financial Intermediation, 44*, 100824. https://doi.org/10.1016/j.jfi.2019.05.001

Chang, C.-C., Kyi, S.-S., Yang, K.-S., & Wu, H.-P. (2025). Zero-leverage and firm performance – Evidence from Taiwan. *Research in International Business and Finance, 73*, 102656. https://doi.org/10.1016/j.ribaf.2024.102656

Chao, C.-H., & Huang, C.-J. (2022). Firm performance following actual share repurchases: Effects of investment crowding out and financial flexibility. *Pacific-Basin Finance Journal, 73*, 101738. https://doi.org/10.1016/j.pacfin.2022.101738

Chen, I.-J., & Nguyen, H. T. D. (2025). Corporate diversification, financial flexibility and firm performance during the COVID-19 pandemic. *The Quarterly Review of Economics and Finance, 104*, 102053. https://doi.org/10.1016/j.qref.2025.102053

Chen, Y., Chen, M., & Huang, Y. (2025). Multiple large shareholders and cash holdings: Evidence from China. *International Review of Financial Analysis, 103*, 104180. https://doi.org/10.1016/j.irfa.2025.104180

Clarke, D. (2019). A convenient omitted variable bias formula for treatment effect models. *Economics Letters, 174*, 84–88. https://doi.org/10.1016/j.econlet.2018.10.035

De Roo, M., Wickert, C., Van Der Laan, G., Elfring, T., & Zapkau, F. B. (2025). Examining the financial slack–corporate social performance relationship across countries: The influence of formal institutions. *Journal of International Management, 31*(6), 101278. https://doi.org/10.1016/j.intman.2025.101278

Denis, D. J. (2011). Financial flexibility and corporate liquidity. *Journal of Corporate Finance, 17*(3), 667–674. https://doi.org/10.1016/j.jcorpfin.2011.03.006

Du, Y., Kim, P. H., Fan, D., & Su, Y. (2025). Zooming in and out for strategic advantage: Slack configurations and R&D investments in high-growth firms. *Journal of Business Research, 201*, 115729. https://doi.org/10.1016/j.jbusres.2025.115729

Espenlaub, S., Khurshed, A., & Neufeld, A. (2025). Loan amendments and capital structure. *International Review of Financial Analysis, 102*, 103924. https://doi.org/10.1016/j.irfa.2025.103924

Feng, X., Hu, M., Luo, C., Yao, J., & Zhang, K. (2026). Labor litigation and corporate cash holdings: Insights from the textual analysis of judicial documents. *The British Accounting Review, 58*(2), 101541. https://doi.org/10.1016/j.bar.2024.101541

Gasbarro, D., Miao, H., Schwebach, R. G., & Zumwalt, J. K. (2025). Cash holdings and risk-adjusted returns: The role of business strategy, life cycle, and managerial ability.

International Review of Financial Analysis, 105, 104376. https://doi.org/10.1016/j.irfa.2025.104376
Godoy-Bejarano, J. M., Ruiz-Pava, G. A., & Téllez-Falla, D. F. (2020). Environmental complexity, slack, and firm performance. *Journal of Economics and Business, 112*, 105933. https://doi.org/10.1016/j.jeconbus.2020.105933
Guo, J., Wang, Y., & Chen, J. (2025). Policy instrument mix, financial slack, and firm innovation performance: Evidence from China's photovoltaic industry. *Technovation, 141*, 103174. https://doi.org/10.1016/j.technovation.2025.103174
Heubeck, T., Held, P., & Meckl, R. (2026). Slack resources and SMEs' international performance: The moderating role of dynamic capabilities. *International Business Review, 35*(5), 102608. https://doi.org/10.1016/j.ibusrev.2026.102608
Hünermund, P., Louw, B., & Rönkkö, M. (2025). The choice of control variables in empirical management research: How causal diagrams can inform the decision. *The Leadership Quarterly, 36*(2), 101845. https://doi.org/10.1016/j.leaqua.2024.101845
Jalilvand, A., & Kim, S. M. (2013). Matching slack resources and investment strategies to achieve long-term performance: New perspectives on corporate adaptability. *The Journal of Economic Asymmetries, 10*(1), 38–52. https://doi.org/10.1016/j.jeca.2013.10.001
Jantadej, K., & Kotcharin, S. (2025). Navigating liquidity in turbulent waters: The impact of global supply chain pressures on maritime working capital management strategies. *Research in Transportation Economics, 112*, 101581. https://doi.org/10.1016/j.retrec.2025.101581
Kaplan, S. E., & Lee, E. Y. (2024). Does tax reform affect labor investment efficiency? *Journal of Corporate Finance, 89*, 102673. https://doi.org/10.1016/j.jcorpfin.2024.102673
Kohtamäki, M., Heimonen, J., & Parida, V. (2019). The nonlinear relationship between entrepreneurial orientation and sales growth: The moderating effects of slack resources and absorptive capacity. *Journal of Business Research, 100*, 100–110. https://doi.org/10.1016/j.jbusres.2019.03.018
Lefebvre, V. (2024). Investment horizon, slack resources, and firm performance: Evidence from privately held European firms. *Long Range Planning, 57*(4), 102449. https://doi.org/10.1016/j.lrp.2024.102449
Li, Z., Hyung, D. E., & Lee, D. Y. (2025). Financial flexibility and corporate financing efficiency. *International Review of Financial Analysis, 98*, 103892. https://doi.org/10.1016/j.irfa.2024.103892
Liang, J., Yang, S., & Xia, Y. (2023). The role of financial slack on the relationship between demand uncertainty and operational efficiency. *International Journal of Production Economics, 262*, 108931. https://doi.org/10.1016/j.ijpe.2023.108931
Officer, M. S. (2007). The price of corporate liquidity: Acquisition discounts for unlisted targets. *Journal of Financial Economics, 83*(3), 571–598. https://doi.org/10.1016/j.jfineco.2006.01.004
Oster, E. (2013). *Unobservable selection and coefficient stability: Theory and validation* (NBER Working Paper No. 19054). National Bureau of Economic Research. https://doi.org/10.3386/w19054
Rehman, O. U., Wu, K., & Liu, J. (2024). COVID-19 exposure, financial flexibility, and corporate leverage adjustment. *International Review of Economics & Finance, 96*, 103651. https://doi.org/10.1016/j.iref.2024.103651
Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal, 9*(1), 86–136. https://doi.org/10.1177/1536867X0900900106
Teirlinck, P. (2022). Enhancing R&D employment slack during environmental turbulence: Triggers and firm performance consequences for R&D-active SMEs. *Technovation, 118*, 102622. https://doi.org/10.1016/j.technovation.2022.102622

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics, 126*(1), 25–51. https://doi.org/10.1016/j.jeconom.2004.02.005

Wu, W., Zhang, S., Fan, Y., & Shi, Y. (2024). Financial flexibility, firm performance, and financial distress: A comparative study of China and the U.S. during pandemics. *International Review of Financial Analysis, 96*, 103706. https://doi.org/10.1016/j.irfa.2024.103706

Yang, J., Guariglia, A., & Guo, J. M. (2019). To what extent does corporate liquidity affect M&A decisions, method of payment and performance? Evidence from China. *Journal of Corporate Finance, 54*, 128–152. https://doi.org/10.1016/j.jcorpfin.2017.09.012

Yung, K., Li, D. D., & Jian, Y. (2015). The value of corporate financial flexibility in emerging countries. *Journal of Multinational Financial Management, 32–33*, 25–41. https://doi.org/10.1016/j.mulfin.2015.07.001