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Vertical Integration as a Driver of Investment Efficiency: Evidence from China's Food and Beverage Sector

Xuxi Xu

Faculty of Business, Design and Arts, Swinburne University of Technology Sarawak Campus, Jalan Simpang 3, 93350, Kuching, Sarawak, Malaysia

ABSTRACT

Vertical integration is widely used in China's food and beverage sector to secure supply and quality control, yet evidence on its financial benefits remains mixed and the mechanisms linking integration to stock-market outcomes are underexplored. Using a 15-year panel of 50 Chinese listed food and beverage firms (2008–2022; 750 firm-year observations), this study examines whether vertical integration affects stock yield directly and indirectly through firms' investment behaviour. Employing firm and year fixed effects and mediation analysis, we find that higher vertical integration is associated with greater investment intensity, and that investment intensity is positively related to stock yield. Once the investment channel is accounted for, the direct effect of vertical integration on stock yield becomes statistically insignificant, suggesting that the stock-market relevance of integration primarily operates through investment. These results refine Transaction Cost Economics and the Resource-Based View by showing that integration creates shareholder value not automatically, but when translated into disciplined capital allocation in a regulation-intensive, perishable-goods industry. The study offers a mechanism-based empirical framework for evaluating integration strategies in emerging-market settings.

*Corresponding author

Xuxi Xu, Faculty of Business, Design and Arts, Swinburne University of Technology Sarawak Campus, Jalan Simpang 3, 93350, Kuching, Sarawak, Malaysia.

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Introduction

Amid intense competition and stringent regulatory oversight, vertical integration has become a prominent strategic choice in China's food and beverage (F&B) sector, where firms seek to secure supply chain stability, ensure food safety, and maintain quality control. Despite its widespread adoption, empirical evidence on the performance consequences of vertical integration remains inconclusive. While some studies associate vertical integration with cost reduction, coordination efficiency others emphasise bureaucratic rigidity, reduced flexibility, and potential inefficiencies. These conflicting findings suggest that the effects of vertical integration are theoretically unresolved rather than uniformly positive or negative [1–14].

A key limitation of existing research lies in its focus on outcomes rather than mechanisms. Prior studies predominantly examine operational or accounting-based performance indicators, offering limited insight into how vertical integration translates into capital market outcomes such as stock yield. In particular, little attention has been paid to firms' investment behaviour as a potential transmission channel linking organisational structure to market valuation. This omission is notable, as investment decisions reflect both capital allocation efficiency and managerial expectations about future growth, factors that are closely scrutinised by investors [15–17].

China's institutional context further complicates this relationship [18]. Regulatory fragmentation across regions, uneven enforcement of food safety standards, and varying local governance practices shape firms' strategic incentives and constrain market transactions [19,20]. In such an environment, vertical integration may primarily influence firms' investment intensity rather than directly improving short-term profitability or stock returns [21]. These institutional features help explain why prior empirical findings remain mixed and underscore the need for mechanism-centred analysis in context-specific settings, particularly within China's highly regulated and perishable-goods-oriented F&B industry [22,23].

Against this backdrop, this study examines whether and how vertical integration affects stock yield among publicly listed Chinese F&B firms. Specifically, it investigates whether vertical integration influences firms' investment behaviour and whether this investment factor mediates the relationship between integration and stock yield. By focusing on listed firms over a long-time horizon, the analysis connects strategic management perspectives with asset-pricing insights, offering a more nuanced understanding of how organisational choices are translated into investor-relevant outcomes.

Research Questions

This study addresses the following interrelated research questions. First, does vertical integration affect corporate performance as reflected in firms' investment behaviour? Second, how does investment behaviour influence stock yield in China's listed food and beverage firms? Third, does vertical integration exert a direct

effect on stock yield? Finally, does investment behaviour mediate the relationship between vertical integration and stock yield?

At its core, the study asks whether vertical integration matters for stock market performance and, if so, through which mechanism this effect operates.

Research Contribution and Significance

This research contributes to the literature in three main respects. Theoretically, it refines Transaction Cost Economics and the Resource-Based View by demonstrating that vertical integration does not automatically generate shareholder value. Instead, its financial relevance depends on how integration shapes firms' investment behaviour under specific institutional conditions. By identifying investment intensity as a mediating mechanism, the study clarifies why integration may improve strategic capacity without necessarily yielding immediate stock market rewards.

Second, the study connects strategic management research with asset-pricing perspectives by operationalising an investment-based performance channel. While prior work has examined investment factors largely in developed markets or multi-industry settings, this research shows how investment behaviour functions differently in an emerging market characterised by regulatory complexity and growth-oriented investor expectations [24,25].

Methodologically, the study employs a 15-year panel dataset of 50 publicly listed Chinese F&B firms (2008-2022), using fixed-effects panel regressions and mediation analysis to trace both direct and indirect effects. This approach strengthens empirical understanding of integration strategies in dynamic emerging-market contexts.

From a managerial perspective, the findings suggest that vertical integration can increase investment commitment but does not guarantee higher stock yield unless accompanied by disciplined and efficient capital allocation [27,28]. Managers should therefore balance integration depth with investment flexibility, potentially adopting hybrid governance structures that internalise critical activities while retaining adaptability through selective outsourcing [29].

Literature Review Background

Amid supply chain volatility, geopolitical risks and regulatory shifts, vertical integration, entailing control over multiple value chain stages, has regained strategic relevance [29]. Grounded in transaction cost economics, the strategy enhances operational oversight, secures critical inputs and reduces transaction costs, while aligning stakeholder incentives and facilitating specialised asset investment [30,31].

Within China's food and beverage sector, such integration is particularly critical given product perishability, stringent regulations and traceability demands, factors making quality control and logistics coordination prerequisites for market access [32]. While it may boost margins and innovation, overextension risks rigidity and inefficiency, demanding careful calibration. Notably, recent trends highlight hybrid governance models (selective integration blended with outsourcing) balancing control and flexibility, with ESG pressures framing integration as a sustainable supply chain tool [33]. However, while vertical integration has been extensively discussed as an operational strategy, far less is known about how it shapes firms' investment behaviour and how this investment channel translates into stock market outcomes [34].

Theories

This research draws on several theoretical lenses to clarify how vertical integration strategies shape firms' investment behaviour and stock yield. Among these are Transaction Cost Economics and Resource-Based View. Each of these theories will be examined in the following sections.

Transaction Cost Economics

From a TCE (Transaction Cost Economics) perspective, vertical integration primarily matters not because it directly increases profitability, but because it reduces investment uncertainty and facilitates capital commitment to relationship-specific assets [35-37]. Especially, such internalization addresses critical market imperfections, particularly asset specificity risks that often deter relationship-specific investments, as well as reducing information asymmetry and contractual uncertainty issues acutely felt in sectors like food and beverage. By streamlining coordination via unified ownership, internal governance lowers adaptation costs and facilitates optimal capital deployment, mitigating market-based disincentives to invest. This reasoning underpins the theoretical basis for H1 (vertical integration correlates positively with investment factors) and H4 (this investment channel mediates the integration-stock yield relationship) [39-41].

Resource-Based View

Drawing on Penrose's (1959) Resource-Based View, vertical integration enables firms to recombine previously fragmented resources into an integrated asset base, thereby enhancing investment capacity rather than directly generating market returns. Especially, by reconfiguring fragmented value chain assets, consistent with Teece's (2014) insights, firms develop integrated resource bases that generate "excess resources" [42,43]. These resources, in turn, foster operational synergies, reduce transaction costs, and improve information flows to support strategic redeployment.

Particularly in China's fragmented food and beverage sector, such integration converts dispersed inputs into coherent portfolios for instance, dairy firms controlling farms and logistics secure supply and data, freeing resources for innovation and market expansion [44-48]. This consolidated platform strengthens investment capability by enabling stable, information-rich operations, critical amid regulatory complexity and shifting consumer demands [49,50].

In this sense, vertical integration amplifies long-term growth potential via resource recombination, which directly supports H1 (positive integration-investment link) and the mediating role proposed in H4 (investment-driven stock yield effects).

Literature Review on Variables Stock Yield

Within the realm of corporate finance, stock yield, defined as the total return from capital gains and dividends, reflects firm performance through market valuation [51,52]. Notably, vertical integration is likely to affect stock yield not directly, but by altering firms' exposure to investment-related risk factors, particularly via the investment factor in asset-pricing models such as the Fama-French five-factor framework [53].

This integration tends to heighten sensitivity to the investment factor due to capital-intensive asset commitments, which to some extent reduces future investment flexibility while boosting asset tangibility [30-56]. Concurrently, it recalibrates risk profiles:

mitigating supply chain uncertainties (potentially lowering market beta) yet amplifying operational leverage and exposure to financial distress [57-64].

Especially in dynamic emerging markets like China, empirical scrutiny remains limited, few studies examine how integration modulates investment factor sensitivity or trace the full pathway from integration through corporate performance to realised stock yield. This gap underscores the need for focused analysis to quantify vertical integration's financial market effects in institutional contexts marked by regulatory volatility and evolving investor expectations.

Relationship between Investment Factor and Stock Yield

In developed markets, the investment factor, a core component of asset pricing, generally exhibits an inverse relationship with stock returns, with high capital expenditure predicting lower future returns [65-67]. Notably, China's institutional context may invert this link policy-driven expansions in state-owned enterprises, for instance, signal growth credibility amid economic transition, potentially tying higher investment intensity to positive stock yields [68-71]. Particularly in China's food and beverage sector, where vertical integration mitigates supply chain vulnerabilities and regulatory pressures, existing research overlooks how integration mediates the investment factor-stock yield pathway [72-73]. This gap is notable, as dynamic emerging markets like China lack empirical work tracing the full chain from integration through corporate performance to stock returns [74]. This study addresses this by quantifying vertical integration's effects on the investment factor and subsequent yields in Chinese food/beverage firms, advancing relevant theories in institutionally volatile emerging contexts. This institutional divergence suggests that investment behaviour may serve as a positive signal of growth rather than overinvestment in China's capital markets.

Relationship between Vertical Integration and Investment Factor
Rooted in transaction cost economics, vertical integration mitigates market uncertainties in China's regulated food sector by internalizing supply chains, safeguarding relationship-specific investments and enhancing control. Notably, it tends to incur trade-offs such as bureaucratic inertia, capital rigidity and reduced market adaptability, with its impact on corporate performance and stock yield remaining ambiguous, demanding nuanced analysis of value translation in emerging markets [75-77].

Across academic debates on vertical integration's implications for investment efficiency, two perspectives stand out: transaction cost economics frames integration as a means to mitigate transaction costs and asset-specific risks, while the resource-based view centres on resource bundling to optimize strategic capital allocation. Notably, empirical findings are highly context-contingent, positive in emerging economies like China's A-share market non-linear when moderate integration fails to generate significant synergies, and industry-specific, favouring capital-intensive sectors such as automotive yet posing risks in fragmented retail where coordination challenges loom. Particularly, prior research overlooks how integration specifically affects the investment factor (a metric of capital expenditure efficiency) and whether this factor mediates the integration-stock yield link. This study addresses this gap by testing how vertical integration shapes stock returns through the investment factor's mediation, clarifying the strategic pathway to financial performance in emerging markets [78-80].

Conceptual Framework

Building on the above theoretical and empirical review, we specify four hypotheses:

H1: Vertical Integration positively influences the Investment Factor.

H2: Investment Factor positively influences Stock Yield.

H3: Vertical Integration positively influences Stock Yield.

H4: Investment Factor mediates the relationship between Vertical Integration and Stock Yield.

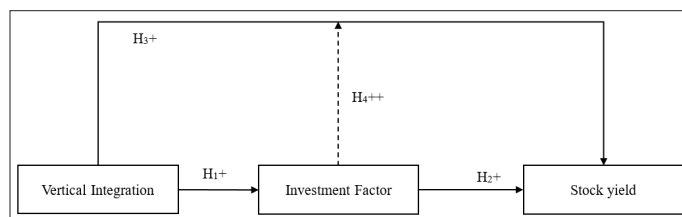


Figure 2.1: Vertical integration strategy adoption Model

Source: Authors' own creation

Summary

From this review, vertical integration's strategic rationale, transaction cost reduction, supply chain control, is confirmed, yet performance outcomes remain inconsistent, yielding operational benefits but risking rigidity and overcapitalisation contingent on context. Notably, a critical gap emerges: no established mechanism links integration to stock yields via investment behaviour (a core asset-pricing determinant), particularly in regulated sectors like China's F&B industry. To address this, we propose and test an integrated mediation model using longitudinal Chinese F&B data, with the following chapter detailing the methodology.

Research Methodology

Research Design

Through quantitative panel data analysis, this study explores linkages between vertical integration, corporate performance and stock yield, focusing on 50 listed Chinese food and beverage firms over 2008-2022 (750 firm-year observations). Notably, we incorporate firm and year fixed effects to mitigate unobserved time-invariant heterogeneity and common temporal shocks, while clustering robust standard errors at the firm level to account for heteroscedasticity and serial correlation.

Data

To meet the research goals, the main data sources used for this study are the publicly available financial reports and databases of companies in China's food and beverage sector.

Data Sources and Sample Selection

Using annual secondary data spanning 2008-2022, this study draws primarily on financial information from listed Chinese food and beverage firms. Notably, this firm-level core dataset is supplemented with macroeconomic and industry data from Wind, Guotai Junan Securities, and the National Bureau of Statistics' Input-Output (I-O) Tables. After refining the sample by excluding ST/PT, delisted, reclassified firms and observations with missing key variables, the final balanced panel comprises 50 firms (750 firm-year observations). Core corporate performance metrics draw directly on firms' income statements, balance sheets and cash flow statements (sourced from Wind/Guotai Junan), while constructing the vertical integration index requires integrating these financial data with sectoral linkage data from the I-O Tables, matching firms' reported business segments and industry classifications to I-O sector categories for accurate upstream-downstream integration intensity measurement.

Time Period

Over a 15-year longitudinal span (2008-2022), this study deploys panel data tailored to the protracted nature of vertical integration strategies and China's food and beverage sector dynamics. Notably, vertical integration entails heavy strategic commitments, whose operational and financial ramifications usually unfold over a decade or more, making the 15-year window critical for exploring strategy evolution and firm performance links. Particularly, this period captures pivotal regulatory shifts (2009 Food Safety Law and amendments) and COVID-19 disruptions, allowing assessments of integration efficacy amid institutional and economic volatility. Importantly, the extended timeframe bolsters sample robustness amid high sector turnover, securing 50 consistently listed firms with unbroken data for reliable longitudinal analysis. This design underpins rigorous investigations of performance and stock yield variations, strengthens findings on integration's long-term value, and aligns with established methodological frameworks for industry dynamic studies.

Industry Focus

Amid China's national economic landscape, the food and beverage sector, large, regulation-heavy, and dynamically evolving, holds considerable strategic significance. Notably, its structurally intricate supply chains, stringent quality-safety regulations, and inherent perishability challenges make it a particularly compelling setting to examine vertical integration. Against this backdrop, firms often adopt such integration to enhance operational control, mitigate supply risks, and ensure compliance, bolstering overall resilience. To reflect sectoral diversity, this study samples listed firms across key subsectors (dairy, non-alcoholic/alcoholic beverages), enabling analysis of varied business models [81-83].

Variable Definition and Measurement

Stock Yield

Stock yield (SY) is defined as the annual total return to shareholders, including capital gains and dividends (Fama & French, 1996):

$$SY_{it}=\frac{(P_{it}-P_{i,t-1})+D_{it}}{P_{i,t-1}}$$

Where SY_{it} is the stock yield of firm i at year t . P_{it} is the year-end share price of firm i in year t , $P_{i,t-1}$ is the previous year-end price, and D_{it} is the cash dividend per share during year t .

Vertical Integration

Vertical integration (VI) is measured using an input-output based index following Fan et al. (2017). For each firm, we first compute the vertical relatedness V_{ij} between industry i and industry j from the national input-output tables. The firm-level vertical integration index is then:

$$V_{ij} = \max (V_{ij}, V_{ji})$$

$$V_{max}=\frac{1}{n-1} \sum_{i=1}^n w_i \cdot \sum_{j \neq i} V_{ij} \delta_{i,j}=\sum_{i \neq j} w_i \cdot \frac{V_{ij}}{n-1}$$

Where, V_{ij} represents the variable of the integration relationship between two industries, which can be obtained from the Chinese input-output table of the National Bureau of Statistics. V_{max} is the level of vertical integration, with a data range of 0 to 1. For example, a company operating in only one industry will be assigned a value of 0. and $\max (V_{ij}, V_{ji})$ captures the strongest vertical link between any two industries. The index ranges from 0 (single-segment firm) to 1 (highly integrated across vertically

related segments). w_i is the share of the firm's sales in industry i . n is the number of industries in which the firm operates, the sum of the weights divided by $n-1$ is used to calculate the mechanical increase in a company's sector number. $\delta_{i,j}$ is an indicator.

Investment Factor

The Investment Factor in this study will be defined as the growth rate of total asset. This measure follows the asset-growth concept used in the investment factor of Fama and French (2015), capturing the firm's investment intensity in a given year.

$$IF_{it} = \frac{\text{Total Assets}_{it}-\text{Total Assets}_{i,t-1}}{\text{Total Assets}_{i,t-1}} \times 100\%$$

All the variables are defined as following table:

Table 3. 1: Operationalized Definition and Source of Data

Variable	Symbol	Operational Definition	Source
Stock Yield	SY	Annual stock return including dividends	Wind & Guotai Junan Fama and French (1996)
Vertical Integration	VI	IO-based vertical integration index (0–1)	Wind Database, Guotai Junan & National Bureau of Statistics Fan et al. (2017)
Investment Factor	IF	Total asset growth	Wind & Guotai Junan Fama and French (2015)

Source(s): Authors' own creation

Model (Estimation Equation)

To test the hypothesised mediation of the investment factor, we estimate the following panel regressions:

- (1) $IF_{it} = \alpha_0 + \alpha_1 VI_{it} + \alpha_2 \lambda_i \delta_t + \mu_{it}$
- (2) $SY_{it} = \beta_0 + \beta_1 IF_{it} + \beta_2 \lambda_i \delta_t + \varepsilon_{it}$
- (3) $SY_{it} = \gamma_0 + \gamma_1 VI_{it} + \gamma_2 IF_{it} + \gamma_3 \lambda_i \delta_t + v_{it}$

Where: $\alpha_0, \beta_0, \gamma_0$ = the constant term, $\alpha_1, \alpha_2, \beta_1, \beta_2, \gamma_1, \gamma_2, \gamma_3$ = the parameters for the explanatory variables, IF_{it} = Investment Factor of Company i in year t , SY_{it} = Stock Yield of Company i in year t , VI_{it} = Vertical Integration of Company i in year t , λ_i = firm fixed effects, δ_t = year fixed effects,, $\mu_{it}, \varepsilon_{it}, v_{it}$ = error clustered by firm. All models include firm and year fixed effects.

In this study, the mediating effect is tested according to the methods of Baron.

Data Quality

To enhance data reliability, we standardise the extraction of financial variables based on the unified reporting standards for Chinese listed firms and cross-check key items across annual reports, Wind and Guotai Junan databases. We screen for outliers, address missing values using standard panel-data techniques (listwise deletion). While secondary financial data may suffer from reporting inconsistencies and survivorship bias, triangulation across sources and sensitivity analyses help mitigate these concerns.

Summary

Within this chapter, we outline the quantitative panel-data research design (data sources, variables, models) for exploring hypothesised links, with the next chapter presenting empirical findings.

Analyses and Findings

This section reports descriptive statistics, baseline fixed-effects estimates, and mediation tests examining the relationship between vertical integration (VI), investment factor (IF), and stock yield (SY).

Descriptive Statistics and Correlations

The average vertical integration level of every company has been calculated due to the complexity involved in considering prior years. Vertical integration indices are computed annually for every firm over 2008-2022 using input-output tables, for illustration, Figure 4.1 plots the distribution:

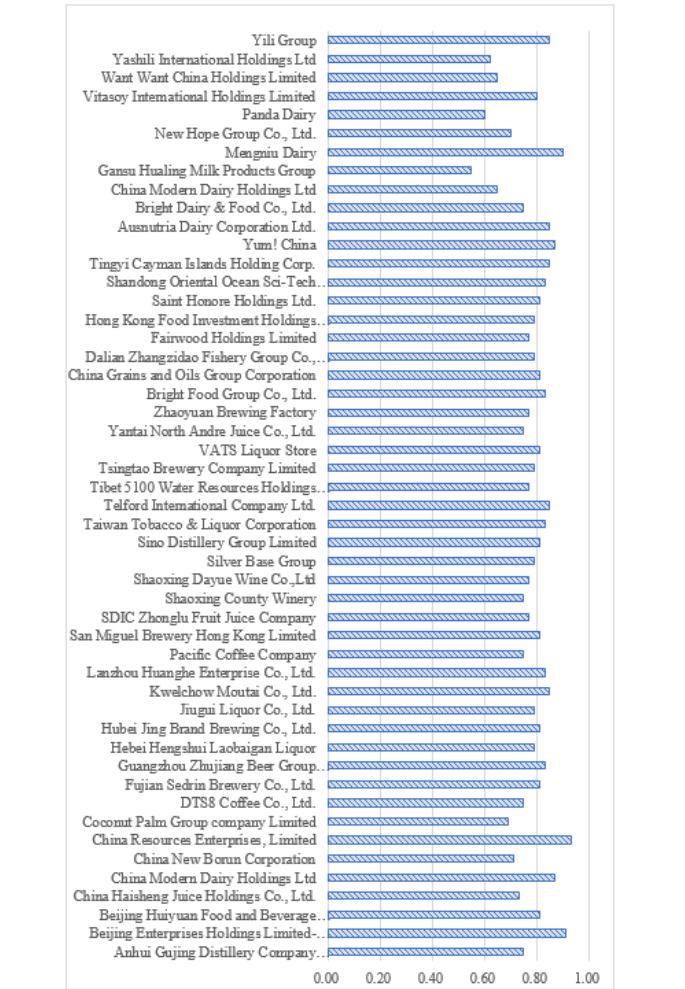


Figure 4. 1: The average Sample Companies' Vertical Integration Level
Source: Authors' own creation

Figure 4.1 presents the distribution of average VI level for illustration; VI is constructed for each firm-year in the panel.

Table 4.1: Statistical Characteristics of Variables					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
VI	750	0.748	0.070	0.350	0.930
IF	750	2.637	1.161	0.800	5.700
SY	750	0.032	0.012	0.002	0.063

Note(s): VI denotes vertical integration, IF denotes investment factor, SY denotes stock yield. * The Unit of CS is RMB 100 million
Source(s): Authors' own creation

Table 4.1 reports summary statistics. VI has a mean of 0.748 and varies from 0.350 to 0.930, indicating substantial heterogeneity in integration intensity. IF exhibits the largest dispersion, consistent with cross-firm differences in growth strategies. SY averages 0.032 with wide variation, suggesting heterogeneous market performance across firm-years.

The investment factor (IF) exhibits the largest dispersion (SD = 1.161), indicating substantial heterogeneity in investment intensity across firms. This heterogeneity is consistent with differing growth strategies and risk appetites within the sector.

Table 4. 2: Pearson and Spearman correlation matrix on the relationships between VI and SY

	lnSY	lnVI	lnIF
lnSY	1.0000		
lnVI	0.0432	1.0000	
lnIF	0.1230**	0.1466***	1.0000
VIF		1.04	1.44

Note(s): VI denotes vertical integration, IF denotes investment factor, SY denotes stock yield. ***, **, and * denote the level of significance at 1%, 5%, and 10%, respectively.
Source(s): Authors' own creation

The table above indicates that no severe multicollinearity issues are present in the model.

Baseline Regression Results

The focus now turns to descriptive statistics. Table 4.3 reports descriptive statistics for the key variables.

Table 4.3: Test results of H1, H2 and H3			
	H1(VI→IF)	H2(IF→SY)	H3(VI→SY Direct)
Coefficients	0 .032 ***	0.114**	0.150
P-value	0.000	0.016	0.426
Number of observations	750		

Note(s): VI denotes vertical integration, IF denotes investment factor, SY denotes stock yield. ***, ** and * denote correlations are significant at the 1%, 5% and 10% level, respectively.
Source(s): Authors' own creation

H1: Vertical Integration has a positive influence on Investment Factor

The coefficient on VI in the IF regression is positive and highly significant ($\beta = 0.032$, $p < 0.01$), indicating that more vertically integrated firms exhibit higher investment intensity. Economically, a 10% increase in vertical integration is associated with approximately 3.2% higher asset growth, consistent with the view that integration requires and induces greater capital commitment.

H2: Investment Factor has a positive influence on Stock Yield

The coefficient on IF in the SY regression is positive and significant ($\beta = 0.114$, $p < 0.05$), indicating that more investing firms exhibit higher stock yield. Economically, a 10% increase in investment is associated with approximately 11.4% higher stock yield increase, consistent with the view that investment brings more benefits on stock market.

H3: Vertical Integration has a positive influence on Stock Yield
From the regression results, the coefficient for vertical integration in relation to stock yield is positive yet statistically non-significant ($\beta = 0.015$, $p > 0.10$). Particularly, this result fails to support the hypothesis that vertical integration exerts a direct positive effect on stock yield.

Mediation Analysis
Table 4.4: Mediating effect of investment factor in the relationship between VI and SY (IF)

Estimates	Significance testing of indirect effect (unstandardised)	
Sobel	0.079**	0.038
Monte Carlo	0.080**	0.038
Mediating testing method	Baron and Kenny	
lnIF:lnVI (X→M)	0.032***	0.000
lnSY:lnIF (M→Y)	0.115**	0.016
Result	Partial Mediation	
Mediating testing method	Zhao, Lynch & Chen	
lnSY:lnVI (X→Y)	0.150	0.426
Monte Carlo test	0.080**	0.038
Result	Indirect-only mediation (full mediation)	
RIT = (indirect effect/total effect)	(0.079 / 0.229) = 0.345	
RID = (indirect effect/direct effect)	(0.079 / 0.150) = 0.527	

Note(s): VI denotes vertical integration, IF denotes investment factor, SY denotes stock yield. ***, ** and * denote correlations are significant at the 1%, 5% and 10% level, respectively.
Source(s): Authors' own creation

H4: Investment Factor mediates the relationship between Vertical Integration and Stock Yield
The mediation test indicates a statistically significant indirect effect of VI on SY through IF (indirect effect = 0.08, $p = 0.038$). Consistent with an “indirect-only” pattern, the direct effect of VI on SY becomes statistically insignificant once IF is included, suggesting that the market impact of integration operates primarily through firms' investment behaviour.

Robustness and Diagnostics
For panel data analysis robustness, we first rule out cross-sectional dependence, establish stationarity and cointegration. Especially, cross-sectional dependence justifies clustered standard errors; VIF rules out multicollinearity, with details in the Appendix.

Summary
The results support H1 and H2, while H3 is not supported once IF is controlled for. Consistent with H4, the mediation analysis suggests that vertical integration affects stock yield primarily through firms' investment behaviour.
The test results of the hypotheses and answers to research questions and objects are presented below:

Table 4. 13: Test results of hypotheses

No	Hypothesis	Coefficient	Sig. Value	Results
1	Vertical Integration positively influences the Investment Factor.	0.032	0.000	Supported
2	Investment Factor positively influences Stock Yield.	0.114	0.016	Supported
3	Vertical Integration positively influences Stock Yield.	0.150	0.426	Not Supported
4	Investment Factor mediates the relationship between Vertical Integration and Stock Yield.	0.032; 0.115	0.000; 0.016	Supported

Source(s): Authors' Own creation

Overall, the results indicate that vertical integration significantly increases firms' investment intensity (H1), and that higher investment is associated with higher stock yield in China's listed food and beverage firms (H2). Vertical integration has no direct effect on stock yield once investment is accounted for (H3), but exerts an indirect effect via the investment factor (H4), consistent with our mediation hypothesis.

Discussions and Recommendations
This chapter discusses four hypotheses based on empirical results.

Discussion
Core Findings and Scholarly Contributions
At the core of this study's findings lies the observation that the relationship between vertical integration and stock yield among listed Chinese food and beverage (F&B) firms is not direct, but rather fully mediated by corporate investment behaviour. Notably, vertical integration does enhance firms' strategic investment capacity, supporting H1, and this investment is subsequently priced positively by the market, as H2 confirms. Vertical integration itself, however, fails to secure an independent premium in stock returns, with H3 thus not supported. The significant mediation effect (H4 supported) reveals that the primary financial market impact of vertical integration is channelled through its role as an enabler of credible, long-term capital allocation. This mediation framework forms the study's core theoretical contribution: it shifts scholarly focus away from debating the static performance effects of vertical integration, towards unpacking the dynamic investment pathways through which vertical integration may, or may not, create shareholder value in institutionally distinct contexts such as China.

Mechanisms Underpinning Vertical Integration's Positive Impact on Investment
The confirmation of H1 finds its clearest explanation in the intersection of transaction cost economics and the resource-based view. From a transaction cost economics perspective, vertical integration internalises transaction partners in a sector frequently plagued by supplier unreliability, common in a sector handling perishable goods, and regulatory volatility, alongside high asset specificity (for instance, investments in traceability systems or cold chain infrastructure) [84,85]. By mitigating these external hazards, vertical integration reduces the perceived risk of committing to long-term, relationship-specific investments; such investments, under arm's-length contracting, would often be prohibitively risky given the potential for supply disruptions or regulatory shifts.

Complementing this transaction cost economics-driven logic, the resource-based view clarifies a second, complementary mechanism: vertical integration consolidates control over strategic, scarce resources, including organic certification or exclusive distribution networks. Securing such resources generates both the imperative and the opportunity to invest in complementary capabilities, ensuring full exploitation of their value. This creates a self-reinforcing cycle: integration protects key resources, which in turn justifies further investment to enhance those resources, deepening competitive advantage. Particularly in China's F&B sector, where contract enforcement can be weak and market fragmentation pronounced the transaction cost economics motive of uncertainty reduction and the resource-based view motive of resource control converge with particular acuteness, jointly driving the strong observed link between vertical integration and elevated investment levels [86-88].

Institutional Context Explaining the Positive Pricing of Investment in China

The validation of H₂, the positive relationship between investment and stock yield, offers a notable contrast to findings in developed Western markets, where the investment factor often carries a negative premium, linked to concerns over overinvestment. In China's growth-centric capital markets, this relationship is reversed: strategic investment is interpreted by investors as a credible signal of a firm's commitment to capturing future growth in a still-consolidating F&B sector. This signal is amplified by sector-specific pressures: stringent food safety regulations (such as the 2023 Edible Agricultural Products Regulation) and shifting consumer demands for safer, higher-quality products mandate continuous investment in research and development and supply chain upgrades for firms to survive and expand [89-92].

Consequently, capital allocation in this context is scrutinised less as a potential symptom of agency problems, a common framing in mature markets, and more as a direct gauge of a firm's adaptive capacity and long-term viability (Zhang, 2025). Investors, embedded within China's broader growth narrative, are primed to reward observable investment that signals ambition to capture market share and resilience amid regulatory and consumer shifts, pricing in anticipated future cash flows from these expansion efforts [93,94]. This reflects a market stage where the promise of growth through capital deployment often outweighs concerns over immediate profitability, thereby explaining the positive pricing of the investment factor.

Why Vertical Integration Lacks Direct Effects and Mediation Dominates

The combined results for H₃ (no direct effect) and H₄ (significant indirect mediation) converge to form a coherent, critical insight: vertical integration is a structural strategy whose financial market value is contingent on its execution, not merely its adoption [95]. The absence of a direct effect (H₃) is theoretically consistent. While vertical integration can reduce external transaction costs, it simultaneously introduces countervailing pressures: internal coordination costs, increased managerial complexity, and asset rigidity [29]. For investors, the net effect of these countervailing forces on overall firm efficiency and risk profiles remains ambiguous.

Moreover, in China's F&B sector, a primary driver of vertical integration often lies in risk mitigation and regulatory compliance, objectives that enhance operational resilience but do not directly translate into the revenue growth or margin expansion that investors immediately reward. Vertical integration's influence

on stock yield is thus not automatic; rather, it is filtered through and dependent upon its intermediate outcomes. This is where the supported H₄ provides the crucial link: vertical integration creates the conditions, stable supply chains, controlled critical resources, reduced operational uncertainty, that facilitate higher-quality, more strategic investment (as H₁ confirms). It is this subsequent investment behaviour, the reallocation of capital into efficiency upgrades, technological advancement, and market expansion, that the market directly values (H₂). Mediation thus dominates because the market prices the tangible output of the integrated structure, disciplined, growth-oriented investment, rather than the integrated structure itself [29]. This delineation clarifies that vertical integration's contribution to shareholder value is indirect and conditional, effectively serving as a strategic enabler whose ultimate worth is determined by the quality of the investment pathway it unlocks.

Conclusion

Summary of Research

Using 2008-2022 panel data from 50 Chinese food and beverage firms, this study investigates vertical integration's impacts on corporate performance and stock yield. Drawing on transaction cost economics and resource-based view frameworks with panel regression and mediation analysis, it tests direct and investment-mediated effects. Notably, results show integration significantly boosts investment intensity, which in turn drives stock yield; the indirect channel prevails, with no significant direct effect once investment is controlled.

Theoretical Contributions

In terms of theoretical and empirical contributions, this research advances transaction cost economics by linking vertical integration in China's F&B sector to investment efficiency, an underexamined emerging market outcome. Especially, it extends the resource-based view by testing a mediation mechanism (from vertical integration to investment efficiency to stock yield) that reconciles mixed evidence. Particularly, it targets the literature gap by validating this pathway to stock yield, clarifying integration's financial impacts in China's unique F&B context.

Practical Contributions

For stakeholders in the food and beverage sector, these findings carry practical implications. Firms should view vertical integration not as a guaranteed path to equity appreciation, but as a means to secure supply chain stability and, notably, enhance capital allocation visibility and efficiency. While integration mitigates operational risks like input price volatility, its market valuation hinges on disciplined, productive, and well-communicated capital investments [30-100]. Managers should instead emphasize integration-driven transparent capital deployment regulators, meanwhile, need to extend governance frameworks to assess underlying investment quality, aiding reliable long-term strategic pricing.

Limitations and Future Research

In its focus on vertical integration among Chinese food and beverage firms, this study exhibits key limitations that can guide future research. Particularly, reliance on a single ratio as a proxy overlooks strategic nuances, such as upstream raw material sourcing depth or downstream distribution control, a gap particularly critical in food and beverage sectors where supply chain resilience directly shapes product quality and safety standards. Equally, findings are context-specific to China's regulated and fragmented market, a constraint that limits generalizability to economies with liberalized regulatory frameworks or consolidated

industry structures. Importantly, residual endogeneity remains, including potential reverse causality (where firm performance drives integration decisions rather than the other way around), a factor that demands caution when inferring causal relationships.

Future research could usefully address these gaps by first adopting multi-dimensional metrics, for instance, segment-level classifications or contractual intensity indices, to capture the heterogeneity of integration strategies. It should also analyse longer-term effects, such as two to three-year stock returns, to distinguish short-term cost burdens from enduring strategic benefits. Applying quasi-experimental designs leveraging regulatory shocks, like the 2023 initial public offering reforms, would further strengthen causal identification. Finally, disaggregating samples by ownership (SOE versus private enterprises), sub-sectors (processed foods as opposed to beverages), and regional institutional development could yield targeted strategic insights [110].

Figure Appendix



Figure 1: The Industry Chain of food and beverage industry

Source: Authors' own creation

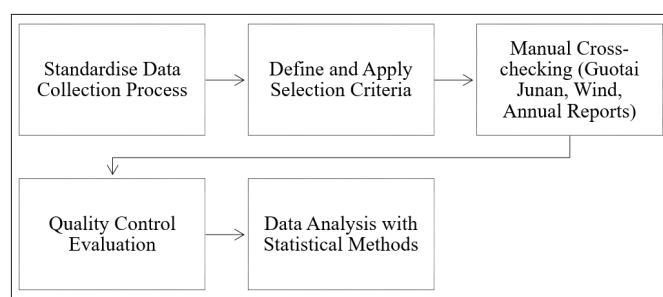


Figure 2: Methodology to Ensure Data Reliability and Validity

Source: Authors' own creation

Prior to estimation, standard panel diagnostics (Pesaran's 2004 CD test, CIPS/PESCADF unit root, Westerlund's 2007 cointegration) were conducted

CSD Test Results

Table 2: Cross sectional dependence (CSD) test results

Variable	CD test	p-value
lnSY	22.41***	0.000
lnVI	27.23***	0.000
lnIF	88.15***	0.000

Note(s): VI denotes vertical integration, IF denotes investment factor, SY denotes stock yield. ***, **, and * denote the level of significance at 1%, 5%, and 10%, respectively.

Source(s): Authors' own creation

Unit root test

Table 3: Panel unit root test results

Cross-sectionally augmented IPS (CIPS) Pesaran (2007)				
Variables	Level		First-difference	
	Constant	Trend and constant	Constant	Trend and constant
lnVI	-2.078*	-2.445	-3.903***	-4.021***
lnIF	-2.021*	-2.623*	-3.511***	-3.467***
lnSY	-1.771	-2.205	-3.961***	-3.869***
Pesaran cross-sectional augmented dickey fuller (PESCADF)				
lnVI	-1.471	-1.699	-2.796***	-3.167***
lnIF	-1.733	-1.888	-3.800***	-3.650***
lnSY	-0.831	-1.153	-2.535***	-2.611*

Note(s): VI denotes vertical integration, IF denotes investment factor, SY denotes stock yield. ***, **, and * denote the level of significance at 1%, 5%, and 10%, respectively.

Source(s): Authors' own creation

Table 4: Pearson and Spearman correlation matrix on the relationships between VI and SY

	lnSY	lnVI	lnIF
lnSY	1.0000		
lnVI	0.0432	1.0000	
lnIF	0.1230**	0.1466***	1.0000
VIF		1.04	1.44

Note(s): VI denotes vertical integration, IF denotes investment factor, SY denotes stock yield. ***, **, and * denote the level of significance at 1%, 5%, and 10%, respectively.

Source(s): Authors' own creation

Westerlund Panel Cointegration Results

Table 5: Westerlund panel cointegration results

Gt	-4.291***
Ga	-3.746
Pt	-23.967***
Pa	-3.709

Notes: ***, ** and * denote significance level at 1%, 5%, and 10%, respectively. Coefficients for Westerlund test indicates the Z-value.

Source(s): Authors' own creation

Table 6: Slope heterogeneity results

Dependent variable: lnSY	Model 1	Model 2	Model 3	Model 4
Delta tilde	-2.221** (0.026)	-1.954* (0.051)	-2.151** (0.031)	2.538** (0.011)
Delta tilde adjusted	-2.770*** (0.006)	-2.438** (0.015)	-2.682*** (0.007)	3.165*** (0.002)

Note: ***, **, and * denote the level of significance at 1%, 5%, and 10%, respectively. () indicates p-value.

References

- Huang M, Xu M, Shi J (2012) Internationalisation, vertical integration and performance: a case study of BOE. *International journal of networking and virtual organisations* 10: 346-360.
- Shi J, Lu Y, Gao Z, Wang J (2023) Test and Analysis of the Leading Factor of Excess Return of Industry Sector in China Stock Market. In *Proceedings of the 2nd International Academic Conference on Blockchain, Information Technology and Smart Finance (ICBIS 2023)*. Atlantis Press: 1336-1343.
- Hansman C, Hjort J, León CG, Teachout M (2020) Vertical integration, supplier behavior, and quality upgrading among exporters. *Journal of Political Economy* 128: 3570-3625.
- Li Y, Zhang CJ (2021) Vertical Integration of Agricultural products supply chain and quality Safety of Agricultural products. In *E3S Web of Conferences*. EDP Sciences 275: 02048.
- Shu H, Wang Y, Yuan J (2022) Evaluating the Performance of Factor Pricing Models for Different Stock Market Trends: Evidence from China. *Emerging Markets Finance and Trade* 58: 2153-2180.
- Zhao JJ, Zhang GT, Guo SJ, Huo GY (2025) Enhancing Fresh Supply Chain Performance: Examining Vertical Integration Strategies Through the Implementation of Blockchain Technology. *Economic Computation & Economic Cybernetics Studies & Research* 59: 274-292.
- Li Y, Wang A, Wu Q, Zhou Z (2025) Vertical integration, supply chain disruptions, and corporate yield spreads. *The British Accounting Review*: 101639.
- Yang Z, Liu W, Ni H, Lan H (2025) Tax reform and corporate vertical integration: evidence from China. *Post-Communist Economies* 37: 75-105.
- Fan JP, Huang J, Morck R, Yeung B (2017) Institutional determinants of vertical integration in China. *Journal of Corporate Finance* 44: 524-539.
- Spieth P, Breitenmoser P, Röth T (2025) Business model innovation: Integrative review, framework, and agenda for future innovation management research. *Journal of Product Innovation Management* 42: 166-193
- Zhang H, Xiao H, Wang Y, Shareef MA, Akram MS, et al. (2021) An integration of antecedents and outcomes of business model innovation: A meta-analytic review. *Journal of Business Research* 131: 803-814.
- Yuan C, Geng C, Sun J, Cui H (2022) Vertical integration and corporate value under uncertainty shock: evidence from the COVID-19 pandemic. *China Economic Quarterly International* 2: 239-251.
- Pereira JA, Guimarães AF, Santos RHD, Schiavi SMDA, Souza JPD (2021) Governance structures in cooperative slaughterhouses: a study on the chain of differentiated beef in the state of Paraná. *Revista de Economia e Sociologia Rural* 60: 233496.
- Ghosh D, Dutta P, Maheshwari S, Mahida J, Sutariya H (2026) Enhancing perishable food supply chains through industry 4.0 technologies: review, challenges and opportunities. *Int J Syst Assur Eng Manag*. <https://doi.org/10.1007/s13198-025-03128-1>.
- Gofman M, Segal G, Wu Y (2020) Production networks and stock returns: The role of vertical creative destruction. *The Review of Financial Studies* 33: 5856-5905.
- Devos E, Li H (2021) Vertical integration to mitigate internal capital market inefficiencies. *Journal of Corporate Finance* 69: 101994.
- Shao YT, Wang YP, Yuan YW (2021) Food safety and government regulation in rural China. *Journal of agriculture and food research* 5: 100170.
- Lin W, Liang J (2025) Regulatory decentralization and food safety: evidence from China. *American Journal of Agricultural Economics* 107: 54-80.
- Holtkamp N, Liu P, McGuire W (2014) Regional patterns of food safety in China: What can we learn from media data? *China Economic Review* 30: 459-468.
- Cao J, Cui W, Luo L, Xie G (2026) Collaborative Supervision for Sustainable Governance of the Prepared Food Industry in China: An Evolutionary Game and Markov Chain Approach. *Sustainability* 18: 615.
- Gao Y, Zong Y, Qian C, Bai L, Ni J (2025) Relationship quality in the vertical collaboration of vegetable farmers: evidence from the North China Plain. *Frontiers in Sustainable Food Systems* 9: 1567495.
- Fama EF, French KR (2018) Choosing factors. *Journal of financial economics* 128: 234-252.
- Walkshäusl C (2020) Piotroski's FSCORE: international evidence. *Journal of Asset Management* 21: 106-118.
- Allain ML, Chambolle C, Rey P, Teyssier S (2021) Vertical integration as a source of hold-up: An experiment. *European Economic Review* 137: 103783.
- Milliou C (2020) Vertical integration without intrafirm trade. *Economics Letters* 192: 109180.
- Arora K, Singh A, Sahare M (2025) Vertical integration and market power in supply networks. *Manufacturing & Service Operations Management* 27: 1939-1958.
- Ersahin N, Giannetti M, Huang R (2024) Supply chain risk: Changes in supplier composition and vertical integration. *Journal of International Economics* 147: 103854.
- Wu F, Zhu J, Xie Q (2025) Strategic Trade-Offs in Forward and Backward Integration: Evidence of Organizational Resilience from Systemic Supply Chain Disruptions. *Sustainability* 17: 9182.
- Luck P (2019) Global supply chains, firm scope and vertical integration: evidence from China. *Journal of Economic Geography* 19: 173-198.
- Yuan Y, Dai H, Ma J (2025) The Impact of Corporate ESG Performance on Supply Chain Resilience: A Mediation Analysis Based on New Quality Productive Forces. *Sustainability* 17: 4418.
- Fan D, Zhou Y, Yeung AC, Lo CK, Tang C (2022) Impact of the US-China trade war on the operating performance of US firms: The role of outsourcing and supply base complexity. *Journal of Operations Management* 68: 928-962.
- Coase RH (1937) The nature of the firm. *Economica* 4: 386-405.
- Williamson OE (1985) The economic institutions of capitalism. *Free Press* 65-77.
- Klein B, Crawford RG, Alchian AA (1978) Vertical integration, appropriable rents, and the competitive contracting process. *The journal of Law and Economics* 21: 297-326.
- Jacobides MG, Winter SG (2005) The co-evolution of capabilities and transaction costs: Explaining the institutional structure of production. *Strategic management journal* 26: 395-413.
- Pishchulov G, Richter K, Goleorkhi S (2023) Supply chain coordination under asymmetric information and partial vertical integration. *Annals of Operations Research* 329: 1315-1356.
- Schrobback, P, Zhang A, Loechel B, Ricketts K, Ingham A (2023) Food credence attributes: A conceptual framework of supply chain stakeholders, their motives, and mechanisms to address information asymmetry. *Foods* 12: 538.
- Ketokivi M, Mahoney JT (2020) Transaction cost economics

- as a theory of supply chain efficiency. *Production and Operations Management* 29: 1011-1031.
39. Penrose ET (1959) The theory of the growth of the firm. Wiley: 32-45.
40. Kor YY, Mahoney JT (2004) Edith Penrose's (1959) contributions to the resource-based view of strategic management. *Journal of management studies* 41: 183-191.
41. Yi J, Gerbens-Leenes PW, Guzmán-Luna P (2023) Water, land and carbon footprints of Chinese dairy in the past and future. *Sustainable Production and Consumption* 38: 186-198.
42. Miao Z, Huo D, Li Y (2025) A review of multi-factor footprints: A Bibliometric Perspective. *Carbon Footprints* 4: 6.
43. Palhares JCP, De Souza DP, Carra SHZ, Drastig K (2025) How do production practices and climate change impact the water footprint of dairy farms? *Science of The Total Environment* 998: 180243.
44. Bayatzadeh S (2025) An Evaluation of Traceability Dynamics in Dairy Supply Chains Through Causal Modeling in Emerging Economies. *Supply Chain Analytics*: 100156.
45. Zhao X, Wang P, Pal R (2021) The effects of agro-food supply chain integration on product quality and financial performance: Evidence from Chinese agro-food processing business. *International Journal of Production Economics* 231: 107832.
46. Langley P, Leyshon A (2021) The platform political economy of FinTech: Reintermediation, consolidation and capitalisation. *New political economy* 26: 376-388.
47. Charoenwong B, Kowaleski ZT, Kwan A, Sutherland AG (2024) RegTech: Technology-driven compliance and its effects on profitability, operations, and market structure. *Journal of Financial Economics* 154: 103792.
48. James HL, Ngo T, Wang H (2024) Firm-level regulatory intensity and labor investment efficiency. *Journal of Risk and Financial Management* 18: 6.
49. Yuan C, Geng C, Sun J, Cui H (2022) Vertical integration and corporate value under uncertainty shock: evidence from the COVID-19 pandemic. *China Economic Quarterly International* 2: 239-251.
50. Hall TW (2012) The collateral channel: Evidence on leverage and asset tangibility. *Journal of Corporate Finance* 18: 570-583.
51. Mugoša A (2015) The determinants of capital structure choice. *Business and Economic Horizons* 11: 76-95.
52. Chien CC, Chen S, Chang MJ (2023) Financial constraints on credit ratings and cash-flow sensitivity. *International Review of Financial Analysis* 88: 102630.
53. Bai X, Fernández-Villaverde J, Li Y, Zanetti F (2024) The causal effects of global supply chain disruptions on macroeconomic outcomes: evidence and theory. *Nber Working Paper Series* 1-54.
54. Nguemgaing HF, Sant'Anna AC (2022) The impact of supply chain disruptions on stock market returns during COVID-19. *Agricultural Finance Review* 82: 732-764.
55. Rakiman SU, Yun WJ, Rasi RZ, Ithnin HS (2023) Supply Chain Disruptions: Challenges and Mitigation Strategies in Manufacturing Companies. *International Journal of Business and Social Science* 14: 45-65.
56. Almeida H, Campello M (2007) Financial constraints, asset tangibility, and corporate investment. *The Review of Financial Studies* 20: 1429-1460.
57. Liu E, Liu Y, Smirnyagin V, Tsyvinski A (2025) Supply Chain Disruptions, Supplier Capital, and Financial Constraints. *Cowles Foundation Discussion Papers* 2851: 1-66.
58. Song K, Lee YS, Koo MS (2025) Stock Market Reactions to Supply Chain Disruptions and Recovery from the 2022 Shanghai Lockdown. *Asia-Pacific Journal of Financial Studies* 54: 152-187.
59. Aalamifar S, Khani A, Amiri H (2022) Developing Q-factor and Adjusted Q-factor Pricing Models by the Expected Investment Growth Factor using an Expected Return Factor. *Financial Research Journal* 23: 593-624.
60. Lehnert T (2022) Corporate managers, price noise and the investment factor. *Financial Innovation* 8: 1-18.
61. Wang H, Wang W, Alhaleh SEA (2021) Mixed ownership and financial investment: Evidence from Chinese state-owned enterprises. *Economic Analysis and Policy* 70: 159-171.
62. Zhang J, Quan X (2025) Reform of state-owned capital authorised operation system and expense stickiness: evidence from state-owned listed companies. *China Journal of Accounting Studies*: 1-30.
63. Fang M, Ruan R (2023) State-owned enterprises in China as macroeconomic stabilizers: Their special function in times of economic policy uncertainty. *China & World Economy* 31: 87-115.
64. Wang H, Li Z, Wang HH (2022) Does Backward Integration Improve Food Safety of the Tea Industry in China in the Post-COVID-19 Era? *Sustainability* 14: 2323.
65. Beal-Partyka R, Laureano-Paiva E (2024) Bridging the gap: state-of-the-art on vertical integration. *RAUSP Management Journal* 59: 229-255.
66. Li P, Tan D, Wang G, Wei H, Wu J (2021) Retailer's vertical integration strategies under different business modes. *European Journal of Operational Research* 294: 965-975.
67. Wu X, Yang Z, Liu W (2025) Accelerated Depreciation Policies and Corporate Vertical Integration: Evidence from China. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*: 1-24.
68. Wang G, Wang J, Chen S, Zhao CE (2023) Vertical integration selection of Chinese pig industry chain under African swine fever-From the perspective of stable pig supply. *Plos one* 18: 0280626.
69. Wu Y, Liu Q, Guo Q (2025) Can Vertical Mergers and Acquisitions of Renewable Energy Enterprises Enhance Supply Chain Resilience? -Empirical Verification Based on Multi-Period Difference-in-Differences Model. *Sustainability* 17: 3211.
70. Yu H, Cheng X, Sun Q, Shen X (2025) Does vertical integration reduce the cost of equity? *International Review of Financial Analysis* 97: 103811.
71. Yang Z (2025) Firm climate risk and vertical integration: Evidence from China. *Investment Analysts Journal*: 1-19.
72. Kaiser F, Obermaier R (2020) Vertical (dis-) integration and firm performance: A management paradigm revisited. *Schmalenbach Business Review* 72: 1-37.
73. Sun D, Liu Y, Grant J, Long Y, Wang X, et al. (2021) Impact of food safety regulations on agricultural trade: Evidence from China's import refusal data. *Food Policy* 105: 102185.
74. Zhao T, Li T, Liu D, Luo Y (2024) The impact of food safety regulatory information intervention on enterprises' production violations in China: a randomized intervention experiment. *Frontiers in Sustainable Food Systems* 7: 1245773.
75. Yu Z, Li Y, Ouyang Z (2021) Economic policy uncertainty, hold-up risk and vertical integration: Evidence from China. *Pacific-Basin Finance Journal* 68: 101625.
76. Fahmy SA, Zaki AM, Gaber YH (2023) Optimal locations and flow allocations for aggregation hubs in supply chain networks of perishable products. *Socio-Economic Planning Sciences* 86: 101500.
77. Hemmati H, Baradaran Kazemzadeh R, Nikbaksh E, Nakhai Kamalabadi I (2022) Designing an agile supply chain network

- for perishable products with resilient suppliers. *Journal of Industrial and Systems Engineering* 14: 121-148.
78. Guanqi Z, Husnain M (2022) Assessing the role of organic food supply chain traceability on food safety and consumer wellbeing: A mediated-moderation investigation. *Frontiers in Psychology* 13: 1073376.
79. Sy Jr MA (2024) Motivations for Vertical Integration Adoption of the Restaurant Industry in a Disruptive Business Environment: A Structural Equation Model. *International Journal of Commerce and Business Studies (IJCBS)* 6: 36-51.
80. Liu Y, Garnevska E, Shadbolt N (2025) The Role of Agriculture Cooperatives in Green Agri-Food Value Chains in China: Cases in Shandong Province. *Sustainability* 17: 7343.
81. Blitz D (2020) Factor performance 2010-2019: A lost decade? Available at SSRN 3562242. *The Journal of Index Investing*: 1-11.
82. Chen S, Liu X, Xue S (2025) The Positive Investment Premium in China. Available at SSRN 4547695: 1-35.
83. Khan N, Afeef M, Zada H (2025) Does Human Capital Six-Factor Asset Pricing Model Explain the Variability in Asset Returns? A Lesson from the Normal and Crisis Periods in China. *The Chinese Economy*: 1-28.
84. Tang N, Gao M, Zhou Y, Zhou F, Zhu J (2024) Firm-level productivity and stock return: New evidence from China. *International Review of Economics & Finance* 96: 103557.
85. Zhang J (2025) Fintech and green innovation-evidence from Chinese listed firms. In *Proceedings of the 2025 2nd International Conference on Digital Economy, Blockchain and Artificial Intelligence*: 164-169.
86. Chen D, Shen X, Liu T (2021) Taming the factor zoo: New evidence from China. *Discrete Dynamics in Nature and Society* <https://ideas.repec.org/a/hin/jnddns/9592906.html>.
87. Döpper H, Sapi G, Wey C (2024) A bargaining perspective on vertical integration. *Canadian Journal of Economics/Revue canadienne d'économie* 57: 199-224.
88. Altieri M, Schnitzler J (2023) Quarterly investment spikes, stock returns, and the investment factor. *Journal of Financial Markets* 66: 1-40.
89. Altomonte C, Ottaviano GI, Rungi A, Sonno T (2021) Business groups as knowledge-based hierarchies of firms. *Working Paper*: 1-33.
90. Bakshi N, Swinney R, Tuna AK (2023) Building supply chain resilience through vertical control. Available at SSRN 4511024: 1-30.
91. Baron RM, Kenny DA (1986) 'The moderator-mediator variable distinction in social psychological research. Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* 51: 6-1173.
92. Bi Y, Lei Z, Petmezas D, Yang C (2024) The bright side of regulatory fragmentation: evidence from earnings management. *Working paper*: 1-56.
93. Boasiako KA, Manu SA, Antwi-Darko NY (2022) Does financing influence the sensitivity of cash and investment to asset tangibility? *International Review of Financial Analysis* 80: 102055.
94. Cheng F, Kang Y, Huang J (2024) Registration System Reform and Enterprise Innovation: Evidence from a Quasi-Natural Experiment of the Registration-Based IPO System Reform Pilot in China. *Sustainability* 16: 7761.
95. Davis KF, Downs S, Gephart JA (2021) Towards food supply chain resilience to environmental shocks. *Nature Food* 2: 54-65.
96. Do HX, Nguyen NH, Nguyen QM (2022) Multinationals and stock return comovement. *Global Finance Journal* 52: 100714.
97. Doruk ÖT (2025) The investment-cash flow sensitivity and the financing constraints hypothesis for emerging markets: a bibliometric and systematic literature review. *Journal of Business and Socio-economic Development* 5: 122-138.
98. Fama EF, French KR (1996) Multifactor Explanations of Asset Pricing Anomalies. *Journal of Finance* 51: 55-84.
99. Fama EF, French KR (2015) A five-factor asset pricing model. *Journal of Financial Economics* 116: 1-22.
100. Zhao X, Lynch JG, Chen Q (2010) 'Reconsidering Baron and Kenny: myths and truths about mediation analysis'. *Journal of Consumer Research* 37: 197-206.
101. Zhan J, Zhu J (2021) The effects of state ownership on innovation: evidence from the state-owned enterprises reform in China. *Applied Economics* 53: 145-163.
102. Yu Z, Feng G, Liu H, Peng H, Dong X (2024) Sustainable market? The impact of downstream market concentration on high-quality agricultural development: Evidence from China's dairy industry. *Frontiers in Sustainable Food Systems* 8: 1453115.
103. Wang X, Wu H, Li L (2022) Risks and firms' decision making on outward foreign direct investment: an empirical analysis of China's state-owned enterprises. *China & World Economy* 30: 163-182.
104. Teece DJ (2014) The foundations of enterprise performance: Dynamic and ordinary capabilities in an (economic) theory of firms. *Academy of management perspectives* 28: 328-352.
105. Sun L, Xu L, Reed MR (2025) The impact of domestic market fragmentation on China's food import prices. *Asian-Pacific Economic Literature* 39: 216-236.
106. Nyamah EY, Attatsi PB, Nyamah EY, Opoku RK (2022) Agri-food value chain transparency and firm performance: the role of institutional quality. *Production & Manufacturing Research* 10: 62-88.
107. Machado Parente R, Pienknagura S, Baquie S, Huang Y, Jaumotte F, et al. (2025). *Industrial Policies and Firm Performance: A Nuanced Relationship*. Available at SSRN 5479992: 1-56.
108. Le Thi Kim N, Duvernay D, Le Thanh H (2021) Determinants of financial performance of listed firms manufacturing food products in Vietnam: regression analysis and Blinder-Oaxaca decomposition analysis. *Journal of Economics and Development* 23: 267-283.
109. Hu G, Li B, Lai J (2025) The impact of environmental tax policies on artificial intelligence investment: evidence from agri-food, food processing, and other industries. *Frontiers in Sustainable Food Systems* 9: 1618551.
110. Garg S, Ghosh P, Tan BJ (2023) Within firm supply chains: Evidence from India. *Journal of International Economics* 144: 103793.

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