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Disentangling the Concentration-Performance Nexus: An Empirical Study of Indian-Listed Firms Across Diverse Industries

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Abstract

This study examines the relationship between industry concentration and financial performance among Indian-listed firms across various industries. Using a sample of over 2,078 firms from 29 distinct sectors, Herfindahl-Hirschman Index for each company and industry was calculated and categorized into high, medium and low-concentration industry categories. To ensure representativeness and data reliability, 1,583 small companies with HHI scores below 0.6 were excluded from the analysis at the stage of comparative analysis after calculating the industry-wise concentration. The remaining 495 firms were classified and compared using the Student and Welch t-test across three industry concentration groups: high versus medium, medium versus low and high versus low.

The findings revealed heterogeneous relationships between industry concentration and financial performance across various ratios. For instance, return on equity (ROE) and return on assets (ROA) demonstrated a positive relationship with concentration levels, whereas liquidity and solvency ratios showed mixed results. Operating performance, dividend and valuation ratios displayed an inconclusive pattern. These results provide valuable insights into the complex concentration-performance nexus and offer valuable theoretical and managerial implications.

This study contributes to the existing literature by addressing research gaps and inconsistencies concerning the concentration-performance relationship in the context of emerging markets. Additionally, the study offers valuable information to policymakers, investors and managers seeking to better understand the impact of industry concentration on firm performance.

Key terms: industry concentration, financial performance, Herfindahl-Hirschman Index, emerging markets, concentration-performance nexus

JEL Classification: D4, L1, L25

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1. Introduction

Industry concentration, an essential aspect of market structure, has long been a subject of interest for researchers, policymakers, and practitioners alike. The degree of concentration within an industry can have profound implications for firm performance, market competition and economic welfare (Scherer & Ross, 1990; Vives, 2008; Gu *et al.*, 2022). In the context of the Indian economy, understanding that the relationship between

industry concentration and financial performance is crucial, given the rapid pace of market liberalization and increasing globalization (Kumar, 2009; Delios & Beamish, 2004). Existing literature on the concentration-performance nexus presents a rich tapestry of findings, but it also reveals gaps and inconsistencies that require further research. For instance, the impact of industry concentration on financial performance has been examined across various contexts and industries individually, with mixed results (Goddard *et al.*, 2004; Evans & Schmalensee, 2005; Gugler *et al.*, 2004). Moreover, previous studies have often focused on a limited set of financial ratios, leaving room for a more comprehensive analysis encompassing a broader range of performance indicators (Bain, 1951; Boone, 2008).

Motivated by these research gaps, the primary objective of this study is to explore the relationship between industry concentration levels and a diverse set of financial ratios for Indian firms. Specifically, the study addresses the following research questions:

1. How do companies in high-concentration industries compare to those in medium-concentration industries regarding various financial ratios?

2. How do companies in medium-concentration industries compare to those in low-concentration industries regarding various financial ratios?

3. How do companies in high-concentration industries compare to those in low-concentration industries regarding various financial ratios?

In addressing these research questions, the study makes several critical contributions to the literature.

The study provides a more nuanced understanding of the concentration-performance relationship by examining an extensive set of financial ratios, offering a holistic perspective on firm performance. Secondly, it sheds light on the specific implications of varying industry concentration levels within the Indian context, which is particularly relevant given the country's dynamic economic landscape. Finally, the findings have practical implications for managers, investors and policymakers seeking to navigate the complexities of industry concentration and its impact on firm performance.

2. Theoretical background and literature review

The exploration of industry concentration and financial performance has long captivated scholars, emphasizing the significance of discerning their interconnection for stakeholders such as policymakers, regulators, and corporate strategists to make well-founded decisions on market structure, competitive policies and strategic planning (Porter, 1980; Bain, 1951; Shepherd, 1986). Industry concentration embodies the extent to which a handful of firms dominate a significant portion of the aggregate output or sales within a specific industry (Scherer & Ross, 1990). Prevailing gauges of industry concentration encompass concentration ratios (e.g., four-firm and eight-firm concentration ratios) and the Herfindahl-Hirschman Index (HHI) (Rhoades, 1993; Li, 2019; McAuliffe, 2015; Naldi & Flamini, 2014; Werden, 1998). Elements that may sway industry concentration levels include market configuration, entry impediments and industry-specific attributes such as economies of scale, product differentiation and technological advancements.

Financial ratios, as comprehensive and standardized metrics of a firm's fiscal well-being, efficiency and overall performance, are widely employed as performance indicators (Brigham & Houston, 2014; Coates *et al.*, 2012; Oktarina, 2017; Lokanan, 2021). Their applicability is particularly pertinent in examining the association between industry concentration and firm performance. They can reveal patterns and trends in the financial outcomes of firms operating within diverse market structures.

The study assesses 14 financial ratios that can be broadly classified into the following categories: profitability ratios (ROA, ROE), liquidity ratios (current and quick ratios), debt and solvency ratios (debt-to-equity ratio, interest coverage ratio), operating performance ratios (sales and total assets), dividend ratios and valuation ratios (price-to-book ratio). These ratios shed light on various dimensions of firm performance, such as profitability, financial stability and growth potential, which are instrumental in comprehending the influence of industry concentration on firm performance.

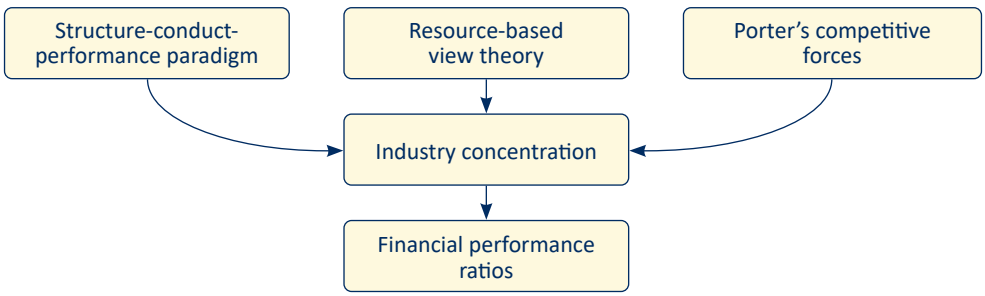

Figure 1. Conceptual framework

This paper's theoretical edifice predates the relations between industry concentration and financial performance. Drawing from theories such as the structure-conduct-performance (SCP) paradigm, the resource-based view (RBV) of the firm competitive forces model. The literature underscores several research gaps, accentuating their pertinence in scrutinizing the concentration-performance relationship within the Indian industries.

The SCP paradigm contends that market structure, influenced by industry concentration, impacts firm conduct, subsequently shaping industry performance. This model suggests that elevated industry concentration typically correlates with higher profitability, as firms in concentrated sectors wield market power, capitalize on economies of scale, and efficiently allocate resources. Nevertheless, some studies contest the SCP paradigm, positing that factors such as firm size, sector-specific conditions and management efficacy wield more significant influence on financial performance (Fama & French, 1992; Porter, 1980).

The RBV posits that firms possessing valuable, scarce, inimitable and non-substitutable resources can attain a sustained competitive advantage and superior financial performance. In the context of industry concentration, highly concentrated sectors may harbor these resources, contributing to enhanced financial performance. However, the RBV literature also signifies accounting for other determinants, such as sector-specific conditions and firm capabilities, in elucidating financial performance. Moreover, the competitive forces model accentuates the role of competitive intensity in shaping industry structure and firm performance. Elevated industry concentration might correlate with diminished competitive intensity, culminating in superior financial performance. This motivates us to construct the conceptual framework, as depicted in Figure 1.

In an industrial organization (IO) and finance, the relationship between industry concentration and financial performance has been a primary focus of academic research (Motta, 2004; Bain, 1951; Porter, 1980). Concentration is measured using the Herfindahl-Hirschman Index and indicates the market power held by firms within an industry (Motta, 2004). Empirical studies have demonstrated that higher industry concentration can increase profitability, market power and economies of scale (Bain, 1951; Porter, 1980). Nevertheless, the relationship between concentration and performance is multifaceted and contingent upon factors such as industry structure, firm size and management efficiency (Goddard *et al.*, 2004).

Limited research has been conducted on the concentration-performance relationship in emerging markets like India (Bhaumik & Selarka, 2012). Bhaumik and Selarka's (2012) study addresses this research gap by investigating the relationship between industry concentration and financial performance among Indian-listed firms across various industries. Previous studies have explored the concentration-performance relationship in different contexts and industries, such as the German manufacturing industry (Schmidt *et al.*, 2007) and European banks (Goddard *et al.*, 2004), yielding mixed or inconclusive results (Motta, 2004; Claessens *et al.*, 2008).

Bhaumik and Selarka's (2012) study contributes to the existing literature by analyzing the concentration-performance relationship among Indian-listed firms across diverse industries. The study (Weiss, 1963) found a heterogeneous relationship between industry concentration and financial performance across various ratios. High-concentration industries generally displayed better financial performance regarding ROA, ROE, liquidity ratios and dividends, potentially due to their more powerful market positions, economies of scale and efficient

resource allocation. However, operating performance ratios and valuation ratios yielded mixed results, indicating that industry-specific conditions, firm size, and management efficiency might play a more significant role in determining financial performance.

This literature review provides a comprehensive overview of research on concentration ratios, emphasizing their importance and implications for policymakers, managers and investors. Concentration ratios are essential in understanding the competitive dynamics of industries and the potential effects on financial performance. By examining the concentration-performance relationship in various contexts and industries, researchers can identify factors that shape this relationship and inform strategic decision-making, economic policies and antitrust regulation.

Future research can delve deeper into the concentration-performance relationship by investigating moderating factors, analyzing different industries and geographical contexts, exploring dynamic aspects of the relationship and examining potential non-linear relationships. By doing so, researchers can offer valuable insights to policymakers, managers and investors, enabling them to make more informed decisions regarding industry concentration and its potential effects on financial performance.

Based on this theoretical framework and literature review, the study formulates three specific hypotheses for each of the three pairs of comparisons:

✓ *H1: Companies in high-concentration industries perform better than companies in medium-concentration industries.*

✓ *H2: Companies in medium-concentration industries perform better than companies in low-concentration industries.*

✓ *H3: Companies in high-concentration industries perform better than companies in low-concentration industries.*

Talpur (2023) investigated the relationship between market concentration and profitability. The study found that higher market concentration levels increased profitability for firms operating within that industry. This research aligns with our study as we also explore the impact of market concentration on firm profitability, adding to the growing body of literature, emphasizing the importance of understanding market structure concerning profitability.

In the research by Rinkevičiūtė and Martinkutė-Kaulienė (2014), the authors examined the impact of market concentration on the profitability of the Lithuanian banking sector. They discovered a positive relationship between market concentration and profitability, indicating that higher market concentration led to increased profitability for banks within the sector. This study's findings support our research, as we aim to understand how market concentration affects profitability in a specific industry context.

The study by Arintoko *et al.* (2021) analyzed the market structure and determinants of firm profitability in the general insurance industry in Indonesia. The results indicated that market concentration played a significant role in determining firm profitability, with higher levels of concentration leading to increased profitability. This research aligns with our study, as we also seek to explore the relationship between market concentration and profitability, contributing to understanding how market structure influences firm performance.

Altuntas and Rauch (2017) investigated market concentration and financial stability in the property-liability insurance industry. The study found that market concentration positively impacted financial stability, suggesting that higher concentration levels could contribute to a more stable industry environment. While our research primarily focuses on the relationship between market concentration and profitability, these findings provide valuable insights into the broader implications of market concentration on industry dynamics.

Finally, the research published in the *Revista de Gestão dos Países de Língua Portuguesa* (2020) examined how market concentration influenced the operational performance of Brazilian firms. The study revealed that market concentration moderated the effect of other factors on operational performance, suggesting that the influence of market concentration could vary depending on the context. This research adds nuance to our understanding of the relationship between market concentration and firm profitability, highlighting the importance of considering the specific industry context when analyzing the impact of market concentration on performance.

This study addresses a research niche by comprehensively examining the relationship between industry concentration and financial performance in the Indian context. This topic has not been extensively explored in emerging markets. By analyzing a diverse sample of 2,078 Indian-listed firms across 29 industries, the study provides a more in-depth understanding of the concentration-performance nexus in a rapidly developing economy. The new contribution of this research to the existing literature lies in its rigorous methodological approach and the exclusion of small companies to ensure representativeness and data reliability. This comprehensive analysis advances our understanding of how concentration levels impact financial performance across different industry settings and offers a unique perspective from an emerging market.

Moreover, the study delves into various financial dimensions, such as ROA, ROE, liquidity ratios, dividends, operating performance ratios and valuation ratios, providing a more nuanced understanding of the concentration-performance relationship. This holistic approach enriches the literature by shedding light on the complex interplay between industry concentration and financial performance. By emphasizing the role of industry-specific factors, firm size and management efficiency in determining financial performance, this study contributes to the literature by highlighting the importance of considering these factors alongside industry concentration. This insight encourages future research to adopt a more multi-faceted approach when examining the drivers of firm performance.

This study fills a research gap by examining the concentration-performance relationship in the Indian context. It offers valuable contributions to the literature by employing a rigorous methodological approach, considering various financial dimensions and emphasizing the role of industry-specific factors, firm size and management efficiency in determining financial performance.

3. Methodology

This study employed a robust methodological approach to investigate the relationship between industry concentration and financial performance among Indian-listed firms. Data was collected for 2,078 firms, categorized into 29 distinct industries: automobiles, banks, chemicals and telecommunications. The study calculated the Herfindahl-Hirschman Index (HHI) for each industry and classified them into high, medium and low-concentrations to measure industry concentration.

Table 1. Variables used

No.	Variable	Definition
1	ROA	The net income ratio to total assets indicates how efficiently a company uses its assets to generate earnings.
2	Current ratio	The ratio of a company's current assets to its current liabilities, measuring its short-term liquidity and ability to cover its obligations.
3	Debt-to-equity	The ratio of a company's total debt to its shareholders' equity indicates the proportion of debt and equity used to finance its assets.
4	Interest coverage	The ratio of a company's earnings before interest and taxes (EBIT) to its interest expenses, measuring its ability to service its debt.
5	Assets	The total resources owned by a company, including tangible and intangible items, that have economic value and can be used to generate future benefits.
6	Sales	The company's total revenue from selling goods or services during a specific period.
7	Dividend	A portion of a company's earnings is distributed to its shareholders, usually as cash payments or additional shares.
8	Price-to-book ratio	The ratio of a company's market value (stock price) to its book value (shareholders' equity) indicates the market's valuation of a company relative to its net asset value.
9	ROE	The ratio of net income to shareholders' equity measures how effectively a company uses its equity to generate profits.
10	Quick ratio	The ratio of a company's liquid assets (excluding inventory) to its current liabilities measures its ability to cover its short-term obligations quickly.

To analyze the financial performance differences among these concentration categories, the study employed the independent Welch t-test for pairwise comparisons of the three groups:

1. high-concentration industries versus medium-concentration industries;
2. medium-concentration industries versus low-concentration industries;
3. high-concentration industries versus low-concentration industries.

In order to ensure the validity and reliability of the analysis, the study excluded small companies with a HHI score lower than 0.6, resulting in a restricted dataset comprising 500 companies in each pairwise comparison. Excluding small companies enhanced the representativeness of the sample, mitigated data availability and reliability concerns, and focused the analysis on firms with greater market power and influence on industry concentration. This approach also minimized the potential confounding effects of firm size on the concentration-performance relationship and improved the statistical power and efficiency of the analysis upon conducting the comparative analysis. The financial data of the company was extracted from the Bloomberg terminal. Return on assets and return on equity were taken for three different durations to understand the short-term and long-term impact.

4. Results

Table 2. The ranking order of industries based on concentration

Rank	Industry	HHI	No. of companies	
1	Jewelry	6,371.73	48	
2	Telecom	5,034.57	13	HIGH-CONCENTRATION INDUSTRIES
3	Electronics	4,690.43	15	
4	Gas distribution	4,091.01	9	
5	Edible oil	2,948.42	41	
6	Glass products	2,489.73	13	
7	Infrastructure	2,144.51	100	
8	Ecom/APP based	2,105.39	14	MEDIUM-CONCENTRATION INDUSTRIES
9	Power	2,012.82	35	
10	Cables	1,899.97	23	
11	Sugar	1,619.93	40	
12	Engineering	1,560.88	41	
13	IT software	1,474.97	225	
14	Mining and oil drilling	1,433.81	70	
15	Health care	1,376.94	48	
16	Cement	1,219.11	36	
17	FMCG	1,076.99	100	
18	Castings, forgings	973.92	51	
19	Banks	947.62	37	
20	Hotels & restaurants	857.65	56	LOW-CONCENTRATION INDUSTRIES
21	Entertainment	833.81	80	
22	Consumer durable	812.88	50	
23	Construction	812.88	122	
24	Automobiles and auto ancillaries	811.43	121	
25	Finance	668.69	131	
26	Pharma	470.78	171	
27	Capital goods	370.64	179	
28	Chemicals	265.79	150	
29	Logistics	108.16	57	

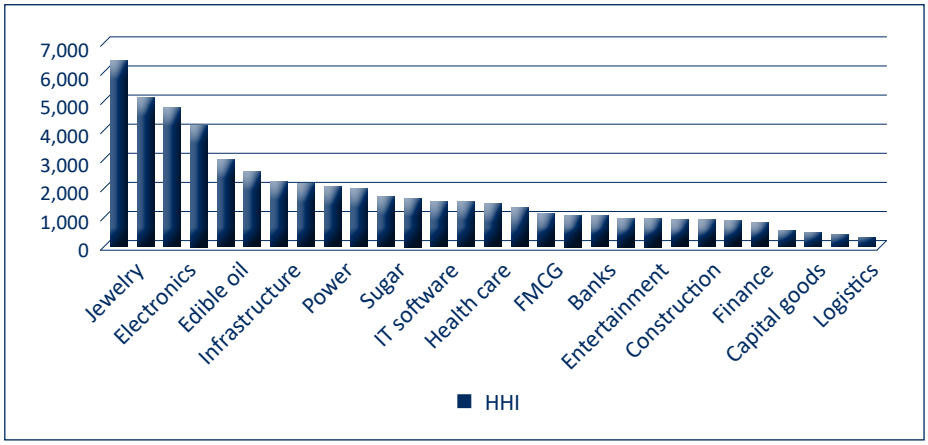

Figure 2. Concentration levels industry wise

Table 3. t-test results of hypothesis 1

Variables	t-test	Statistic	df	p
HHI	Student	3.191	135.000	< 0.001
	Welch	1.984	35.306	0.028
ROA 12M %	Student	4.310	135.000	< 0.001
	Welch	2.560	34.382	0.008
ROA 3Yr %	Student	1.736	132.000	0.042
	Welch	2.255	102.198	0.013
ROA 5Yr %	Student	2.070	125.000	0.020
	Welch	2.704	90.520	0.004
ROE 12M %	Student	2.465	125.000	0.008
	Welch	1.901	39.256	0.032
ROE 3Yr %	Student	3.759	123.000	< 0.001
	Welch	4.069	62.751	< 0.001
ROE 5Yr %	Student	3.381	113.000	< 0.001
	Welch	4.439	82.335	< 0.001
Current ratio	Student	4.528	133.000	< 0.001
	Welch	2.727	33.035	0.005
Quick-to-ratio	Student	0.284	135.000	0.389
	Welch	0.295	63.546	0.384
Debt-to-equity	Student	1.014	126.000	0.156
	Welch	0.833	43.346	0.205
Interest coverage	Student	0.328	133.000	0.372
	Welch	0.375	74.154	0.354
Assets	Student	0.331	135.000	0.370
	Welch	0.291	48.375	0.386
Mar Cap	Student	1.422	135.000	0.079
	Welch	1.077	40.989	0.144

Variables	t-test	Statistic	df	p
CMP/BV	Student	2.654	126.000	0.004
	Welch	1.585	33.000	0.061
Sales	Student	2.019	135.000	0.023
	Welch	1.407	38.171	0.084
Dividend payout %	Student	3.144	135.000	0.001
	Welch	1.829	34.000	0.038

Table 4. t-test results of hypothesis 2

	t-test	Statistic	df	p
HHI	Student	3.210	460.000	< 0.001
	Welch	1.602	120.306	0.019
ROA 12M %	Student	-0.175	460.000	0.570
	Welch	-0.103	106.796	0.541
ROA 3Yr %	Student	2.087	451.000	0.019
	Welch	1.568	120.943	0.060
ROA 5Yr %	Student	3.704	433.000	< 0.001
	Welch	2.931	121.091	0.002
ROE 12M %	Student	2.761	444.000	0.003
	Welch	2.318	119.576	0.011
ROE 3Yr %	Student	1.403	428.000	0.081
	Welch	1.513	161.506	0.066
ROE 5Yr %	Student	2.316	409.000	0.011
	Welch	2.205	125.614	0.015
Current ratio	Student	0.310	457.000	0.378
	Welch	0.516	455.860	0.303
Quick-to-ratio	Student	1.295	460.000	0.098
	Welch	1.371	183.104	0.086
Debt-to-equity	Student	1.610	443.000	0.054
	Welch	2.475	358.604	0.007
Interest coverage	Student	1.035	453.000	0.151
	Welch	1.846	402.078	0.033
Assets	Student	1.558	460.000	0.060
	Welch	2.774	415.635	0.003
Mar Cap	Student	1.746	460.000	0.041
	Welch	2.641	411.326	0.004
CMP/BV	Student	1.127	443.000	0.130
	Welch	2.194	351.008	0.014
Sales	Student	1.048	455.000	0.148
	Welch	1.137	192.094	0.129
Dividend payout %	Student	1.814	460.000	0.035
	Welch	3.368	357.400	< 0.001

Table 5. t-test results of hypothesis 3

	t-test	Statistic	df	p
HHI	Student	7.546	391.000	< 0.001
	Welch	2.385	34.030	0.011
ROA 12M %	Student	8.322	391.000	< 0.001
	Welch	2.585	34.007	0.007
ROA 3Yr %	Student	1.773	383.000	0.039
	Welch	1.805	39.974	0.039
ROA 5Yr %	Student	0.934	366.000	0.176
	Welch	1.032	37.387	0.154
ROE 12M %	Student	2.295	384.000	0.011
	Welch	1.169	33.037	0.125
ROE 3Yr %	Student	2.705	368.000	0.004
	Welch	3.497	42.821	< 0.001
ROE 5Yr %	Student	2.313	351.000	0.011
	Welch	3.524	41.328	< 0.001
Current ratio	Student	3.045	386.000	0.001
	Welch	2.572	36.070	0.007
Quick-to-ratio	Student	-0.390	391.000	0.652
	Welch	-0.454	44.229	0.674
Debt-to-equity	Student	-0.448	384.000	0.673
	Welch	-0.632	49.393	0.735
Interest coverage	Student	-0.505	384.000	0.693
	Welch	-1.513	371.771	0.934
Assets	Student	-0.831	391.000	0.797
	Welch	-2.179	222.572	0.985
Mar Cap	Student	-0.148	391.000	0.559
	Welch	-0.184	46.093	0.572
CMP/BV	Student	3.793	384.000	< 0.001
	Welch	1.431	33.311	0.081
Sales	Student	1.982	386.000	0.024
	Welch	1.125	35.580	0.134
Dividend payout %	Student	4.795	391.000	< 0.001
	Welch	1.661	34.165	0.053

Table 2 illustrates the categorization of industries based on their division. The outcomes of the independent t-test for high-medium concentration firms, medium-low concentration industries and high-low concentration industries are presented in Tables 3, 4 and 5, respectively.

The ROA analysis consistently showed that high-concentration industries had greater ROA than medium-concentration industries for the 12-month, 3-year and 5-year averages, supporting hypothesis H1. For H2, there was no significant relationship between medium and low-concentration industries in the 12-month and 3-year averages, while medium-concentration industries had a higher ROA in the 5-year average. For P3, high-concentration industries outperformed medium-concentration industries in the 12-month and 3-year averages, but no significant relationship was found for the 5-year average.

Regarding liquidity ratios, the current and quick ratios analysis revealed that high-concentration industries consistently had more excellent liquidity ratios than medium-concentration industries, supporting H1. However, there were no significant relationships between the other concentration levels (H2 and H3) in these liquidity ratios.

The debt and solvency ratios results showed that high-concentration industries had a higher debt-to-equity ratio than medium-concentration industries, supporting H1. Medium-concentration industries outperformed low-concentration industries, supporting H2. However, no significant relationship was found between high and low-concentration industries, leaving H3 unsupported. In the case of the interest coverage ratio, no significant relationships were observed between the different concentration levels (H1, H2 and H3).

The results indicate that high-concentration industries generally exhibit better financial performance regarding ROA and liquidity ratios, potentially due to their more powerful market positions, economies of scale and better resource allocation. The mixed findings for H2 and H3 suggest that industry-specific factors, firm size, and management efficiency significantly impact medium and low-concentration industries and their liquidity and solvency ratios.

In the analysis of operating performance ratios, such as sales and total assets, the results showed no significant relationships between the different concentration levels (H1, H2 and H3). This suggests that concentration levels might not strongly impact operating performance ratios and other factors, such as industry-specific conditions, firm size and management efficiency, could be more influential.

Concerning dividend and valuation ratios, the results for the dividend revealed that high-concentration industries had higher dividends than medium-concentration industries, supporting P1. Medium-concentration industries had more significant dividends than low-concentration industries, supporting H2. However, there was no significant relationship between high and low-concentration industries, leaving H3 unsupported. In the case of the price-to-book ratio, no significant relationship was observed between high and medium-concentration industries, rendering H1 unsupported. Medium-concentration industries had a higher price-to-book ratio than low-concentration industries, supporting H2. For H3, no significant relationship was found between high and low-concentration industries.

The dividend and valuation ratios results indicate that high-concentration industries might have better financial performance in terms of dividends, which could be attributed to their more powerful market positions, economies of scale and better resource allocation (Scherer & Ross, 1990). The mixed findings for H1 and H3 in the price-to-book ratio suggest that factors other than industry concentration, such as market sentiment, growth prospects and industry-specific conditions, may have a more significant impact on the valuation ratios of firms.

In the analysis of ROE, the results for the 12-month average indicated that high-concentration industries had greater ROE than medium-concentration industries, supporting hypothesis H1. Additionally, medium-concentration industries demonstrated a higher ROE than low-concentration industries, supporting hypothesis H2. However, there was no significant relationship between high and low-concentration industries, leaving hypothesis P3 unsupported. High-concentration industries outperformed medium-concentration industries for the 3-year average ROE, supporting H1. Conversely, no significant relationship between medium and low-concentration industries was observed, rendering H2 unsupported. High-concentration industries also had a greater ROE than medium-concentration industries, supporting H3. In the case of the 5-year average ROE, high-concentration industries significantly outperformed medium-concentration industries, supporting H1. Interestingly, medium-concentration industries had a higher ROE than high-concentration industries, providing a contrary result for H2. Finally, high-concentration industries showed a significantly higher ROE than medium-concentration industries, supporting H3.

The findings for H1 suggest that high-concentration industries benefit from greater control over resources, better economies of scale, and increased market power, which can lead to higher profitability, as indicated by ROE. The mixed results for H2 could be because medium-concentration industries face more competition and possess less market power, leading to variations in profitability. Factors such as industry-specific conditions, firm size, and management efficiency might also influence the ROE of medium-concentration industries. The lack of a significant relationship between high and low-concentration industries in the 12-month ROE (H3 not supported) might indicate that other factors, such as economic cycles, short-term market fluctuations, and firm-specific factors, play a more significant role in determining the ROE for these industries.

5. Discussions and conclusions

The current study's findings diverge from previous research that posited a robust positive correlation between industry concentration and profitability (Bain, 1951; Shepherd, 1986). While our study corroborates the superior financial performance of high-concentration industries regarding ROA, ROE, liquidity ratios and dividends, it presents mixed outcomes for H2 and H3. It reveals no significant associations between operating performance ratios and selected valuation ratios. These disparities might stem from differences in the industries analyzed or the timeframes considered. The observed relationships between operating performance ratios and some valuation ratios deviate from the conventional view that highly concentrated industries consistently outperform in all financial dimensions, highlighting the importance of considering other determinants such as industry-specific conditions, firm size and management efficiency when explaining financial performance.

In the context of the Indian market, our study's findings on the connection between industry concentration and various financial ratios complement and enrich existing literature. We observe that firms in high-concentration sectors demonstrate superior financial ratios, particularly ROA and ROE, compared to those in medium or low-concentration sectors. This observation aligns with Goddard *et al.*'s (2004) finding of profitability persistence over time, influenced by European banks' size, market power and efficiency. Our study identifies a similar pattern in the Indian context, with firms in high-concentration industries consistently outperforming their counterparts across various financial ratios, including ROA and ROE, suggesting the potential impact of market power and efficiency on the performance of Indian firms.

Our research is consistent with the findings of several studies that underscore the significance of market concentration in determining financial performance. Bhattacharyya and Nanda (2000) emphasized the role of client discretion and switching costs in shaping financial performance in industrial markets, underlining the importance of market power and resource allocation for high-concentration industries in our study. Gilo *et al.* (2006) reported that increased concentration in search markets led to higher profitability, supporting our conclusion that high-concentration industries exhibit better financial performance regarding ROA and liquidity ratios.

Goddard *et al.* (2004) found that market concentration significantly contributed to the profitability of European banks in their cross-sectional and dynamic panel analysis, aligning with our results of higher ROA and liquidity ratios for high-concentration industries. Bruneau and Sghaier (2014) investigated market concentration and financial stability in the property-liability insurance industry, discovering a positive relationship between increased concentration and financial performance. This supports our conclusion that high-concentration industries generally display better financial performance regarding ROA, liquidity ratios and dividends.

Lourenço *et al.* (2020) analyzed the influence of market concentration on Brazilian firms' operational performance, identifying that concentration levels moderated performance. This finding is consistent with our results, which indicate that high-concentration industries exhibit better financial performance regarding dividends and ROA. However, our study also emphasizes the potential role of other factors, such as industry-specific conditions, firm size and management efficiency, in determining operating performance ratios.

Collectively, the findings of the cited studies reinforce our results, suggesting that market concentration plays a crucial role in shaping the financial performance of industries. High-concentration industries exhibit superior financial performance concerning ROA, liquidity ratios and dividends due to their more powerful market positions, economies of scale and efficient resource allocation.

5.1. Theoretical findings

This study contributes significantly to industrial organization and corporate finance by investigating the intricate linkages between industry concentration and financial performance in the Indian context. The research employs a comprehensive set of financial ratios to enhance the understanding of how market structure may impact various aspects of firm performance. The study expands the scope of analysis beyond the traditional focus on profitability measures, such as return on assets and returns on equity, by incorporating various financial ratios that elucidate the multidimensional nature of financial performance. This holistic approach sheds light

on factors such as liquidity, solvency, operating efficiency and valuation, which are crucial to a firm's competitive standing.

Moreover, the study illuminates the heterogeneity of concentration effects by unveiling varying degrees of association between industry concentration and financial ratios. The study underscores the complexity of the concentration-performance nexus by delineating distinct patterns across different financial metrics. It highlights the importance of considering the specific attributes of each ratio when evaluating the impact of market structure on firm performance.

Furthermore, the research enhances the external validity of existing findings by examining the Indian context, a dynamic and emerging economy, which augments the generalizability of extant literature that has predominantly focused on developed markets. The findings corroborate and extend previous studies by demonstrating the salience of industry concentration in shaping financial outcomes within a distinct economic environment.

Finally, the study bolsters the theoretical underpinnings of the concentration-performance relationship by reinforcing that firms in highly concentrated industries may benefit from market power, economies of scale and enhanced efficiency, leading to superior financial outcomes. The empirical evidence from the Indian context substantiates this theoretical foundation of the positive association between industry concentration and financial performance. Overall, this study provides valuable insights into the nuances of the concentration-performance relationship in the Indian context, offering a significant contribution to the academic discourse in industrial organization and corporate finance.

5.2. Managerial implications

This study's findings have significant implications for managers, policymakers and industry stakeholders operating on the Indian market. The research sheds light on the relationship between industry concentration and financial ratios, offering valuable insights for guiding strategic decision-making and resource allocation in a competitive environment.

Firstly, managers should consider the concentration levels of their respective industries when making strategic decisions regarding resource allocation and competitive positioning. Recognizing the implications of industry concentration on various financial ratios can help managers better allocate resources and position their firms to capitalize on opportunities or mitigate risks related to market power, economies of scale and operational efficiency. Secondly, the study provides a valuable benchmark for managers to assess their firms' performance relative to competitors by examining the impact of industry concentration on a comprehensive set of financial ratios. By monitoring the financial ratios in which concentration levels significantly impact, managers can better understand their competitive position and identify areas for improvement or strategic adjustment. Thirdly, the study's findings can inform entrepreneurs and investors when contemplating entry or exit decisions in specific industries. Understanding the financial performance implications of industry concentration levels can help identify industries with more favorable prospects, guiding decisions about entering, exiting or diversifying across industries. Finally, the research has implications for policymakers and regulators seeking to promote healthy competition and sustainable growth within the Indian economy. By understanding the impact of industry concentration on various financial ratios, policymakers can make informed decisions about market interventions, competition policies and industry regulations that stimulate innovation, ensure fair competition and foster economic development.

6. Conclusion

This study offers valuable insights into the complex relationship between industry concentration and financial performance among 2,078 Indian-listed firms across 29 diverse industries. The study comprehensively analyzed the concentration-performance nexus by employing a rigorous methodological approach and excluding small companies to ensure representativeness and data reliability. The study's findings contribute to the theoretical and empirical literature, enhancing an understanding of the underlying mechanisms driving firm performance in various industry settings.

The research has several critical implications for policymakers, regulators and industry stakeholders. It underscores the importance of striking an optimal balance between promoting competition and fostering an environment conducive to efficient market functioning. Moreover, the study highlights the need for tailored regulatory frameworks that consider the specific characteristics of each industry, as well as the potential trade-offs between industry concentration and financial performance.

While this study significantly advances the literature on industry concentration and financial performance, it acknowledges several limitations that provide avenues for future research. These include exploring the potential moderating effects of macroeconomic factors, investigating the role of firm-level strategic decisions, and delving deeper into the impact of industry-specific factors on the concentration-performance relationship. Additionally, future research could extend this analysis to other emerging markets, shedding light on the generalizability of the findings and facilitating cross-country comparisons.

■ Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author used Writesonic in order to write the text for better readability and vocabulary of the text. After using this tool/service, the author reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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