

A Trend Analysis of Profitability Ratios: A Study of Vinati Organics Limited (2015–16 to 2024–25)

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Abstract—Profitability is the single most durable indicator of a manufacturing enterprise's capacity to survive input-cost shocks, fund capacity expansion from internal accruals, and reward the capital entrusted to it. The Indian specialty chemicals sector, in which Vinati Organics Limited occupies a globally significant niche as a leading producer of 2-Acrylamido-2-Methylpropane Sulphonic Acid (ATBS) and Iso Butyl Benzene (IBB), has passed through an unusually eventful decade marked by crude-linked feedstock volatility, the COVID-19 disruption, the China+1 relocation of global chemical sourcing, and a subsequent phase of margin compression driven by aggressive international price competition. The present study undertakes a ten-year trend analysis of the profitability performance of Vinati Organics Limited over the period 2015–16 to 2024–25 using five indicators: Net Profit Margin, Operating Profit Margin, Return on Assets, Return on Equity and Earnings Per Share. Secondary data drawn from the published annual reports and audited financial statements of the company were analysed using descriptive statistics, coefficient of variation, index numbers with 2015–16 as base, least-squares linear trend equations, Karl Pearson's coefficient of correlation and Student's t-test at the five per cent level of significance. The results reveal a company with structurally high but statistically stable margins: mean Net Profit Margin of 21.74 per cent and mean Operating Profit Margin of 30.12 per cent, neither exhibiting a statistically significant time trend. In contrast, the return-based measures deteriorate steadily, with Return on Equity declining at 0.913 percentage points per annum and Return on Assets at 0.482 percentage points per annum, while Earnings Per Share rises significantly at 5.183 rupees per annum. The study concludes that the divergence between a rising absolute earnings stream and falling ratio-based returns is symptomatic of an equity and asset base expanding faster than profits — a classic dilution-of-return effect arising from debt-free, internally funded capacity creation. Recommendations are advanced on asset-turnover improvement, capital allocation discipline and product-mix diversification.

Index Terms—Earnings Per Share, Financial Performance, Profitability Ratios, Return on Equity,

Specialty Chemicals, Trend Analysis, Vinati Organics Limited. JEL Classification—G32, L65, M41.

I. INTRODUCTION

The Indian chemical industry is the sixth largest producer of chemicals in the world and the third largest in Asia, contributing close to seven per cent of national gross domestic product and providing employment, directly and indirectly, to more than two million persons. Within this broad industry, the specialty chemicals segment has emerged as the most dynamic constituent, distinguished from commodity chemicals by its low-volume, high-value character, its dependence on process know-how and intellectual property rather than on scale alone, and its capacity to command premium realisations from customers in oil and gas, water treatment, personal care, pharmaceuticals and adhesives [1]. The relocation of global chemical sourcing away from a single-country dependence, popularly described as the China+1 strategy, has placed Indian specialty chemical manufacturers in a position of unusual strategic advantage over the last decade.

Vinati Organics Limited, incorporated in 1989 and headquartered in Mumbai, is among the most frequently cited exemplars of this transformation. The company operates manufacturing facilities at Mahad and Lote Parshuram in Maharashtra and is the world's largest manufacturer of 2-Acrylamido-2-Methylpropane Sulphonic Acid, commonly abbreviated as ATBS, and of Iso Butyl Benzene, the key intermediate in ibuprofen manufacture. Its portfolio has progressively widened to include Isobutylene, butyl phenols, antioxidants and, more recently, MEHQ, guaiacol and iso amylen through its

subsidiary operations. The company is notable in Indian manufacturing for having remained virtually debt-free through an extended period of capital expenditure, financing capacity creation almost entirely from internal accruals and reserves [2].

A firm of this description presents a particularly instructive case for profitability analysis. Where a company funds growth through borrowings, financial leverage magnifies the return on shareholders' funds and the trajectory of Return on Equity reflects the interplay of operating performance and capital structure. Where, however, a company funds growth entirely from equity and retained earnings, the denominator of the return ratios expands in lockstep with reinvestment, and Return on Equity becomes an unusually direct measure of the productivity of reinvested profits. Any sustained decline in such a ratio, in the absence of a corresponding decline in operating margins, points not to operational deterioration but to a lag between capital deployment and capital utilisation.

Ratio analysis remains the most widely employed technique for the appraisal of corporate financial performance because it converts absolute accounting magnitudes into relative measures that are comparable across time and across firms of unequal size [3]. Profitability ratios, in particular, occupy a central position in this analytical apparatus because they simultaneously address three distinct constituencies: management, which requires evidence of operational efficiency; shareholders, who require evidence of adequate return on capital contributed; and lenders and analysts, who require evidence of the sustainability of earnings. Trend analysis extends the technique across time, permitting the analyst to separate transitory fluctuation attributable to cyclical or exceptional factors from the underlying secular direction of performance.

The decade selected for this study, extending from the financial year 2015–16 to the financial year 2024–25, encompasses several distinct phases in the operating environment of the Indian specialty chemicals sector. The initial years were characterised by low and stable crude oil prices, which compressed feedstock costs and supported margin expansion. The years 2019–20 and 2020–21 witnessed exceptional realisations as global supply chains were disrupted and Indian producers captured incremental volumes. The subsequent years brought sharp raw-material inflation,

freight escalation, aggressive Chinese price competition in ATBS, and a period of inventory destocking across global chemical value chains. A ten-year window therefore captures at least one complete cycle of expansion and contraction, and permits meaningful inference about the underlying trend as distinct from cyclical noise.

Against this background, the present study examines the direction, magnitude, consistency and statistical significance of the movement in five profitability indicators of Vinati Organics Limited over the ten-year period, and interprets the observed divergence between margin-based and return-based measures of performance.

II. REVIEW OF LITERATURE

The literature on the measurement and determinants of corporate profitability is extensive. Three studies of direct methodological and contextual relevance to the present enquiry are reviewed below.

A. De Wet and Du Toit (2007) — Return on Equity as a Measure of Value

Writing in the *South African Journal of Business Management*, De Wet and Du Toit [4] examined the relationship between popular accounting-based measures of financial performance and shareholders' wealth. The authors specifically weighed Return on Equity against Economic Value Added and its standardised variant, and tested the strength of the linear association between each measure and shareholders' returns, defined as the sum of dividends and changes in share price. Their statistical results found the standardised Economic Value-Added measure to be marginally superior to Return on Equity in explaining changes in shareholders' returns, although the use of same-year data produced very weak linear relationships across all performance measures tested. When five-year medians were substituted for annual observations, significant correlations emerged between current shareholders' returns and future internal performance results, lending support to the expectations theory. The study is important for the present enquiry in two respects. First, it establishes that Return on Equity, despite its popularity, is an imperfect proxy for value creation because it is sensitive to the composition and size of the equity base rather than to operating performance alone. Second, its finding that multi-year medians

outperform single-year observations provides direct methodological justification for adopting a decade-long trend framework rather than a point-in-time appraisal.

B. Ali (2020) — Growth Trend and Size Determinants
In the Humanities and Social Sciences Reviews, Ali [5] investigated the growth trend, similarity in financial performance and the sensitivity of firm-size determinants to profitability in the Indian pharmaceutical industry. Methodologically, the study relied on ratio analysis supported by chain-based index numbers to trace the trend of financial performance and size determinants, and employed analysis of variance together with the coefficient of variation to assess similarity in profitability and liquidity. The principal finding was that the growth trend of profit measures governs the growth trend of size measurements in Indian pharmaceutical companies, and that total resources deployed govern operational profitability, short-term liquidity and long-term liquidity, although they do not affect the short-term movement symmetry of profitability and size determinants. The study further reported no significant difference in the short-term movement or sensitivity of profitability and firm-size determinants. Its relevance to the present study lies chiefly in its analytical design: the combination of index numbers referenced to a base year, the coefficient of variation as a measure of consistency, and formal significance testing constitutes precisely the toolkit required to distinguish a genuine secular trend from year-to-year volatility in a single-firm, multi-year dataset.

C. Shaurav and Rath (2023) — Concentration, Diversification and Performance
Publishing in Science, Technology and Society, Shaurav and Rath [6] examined the effects of market concentration and product diversification on firm performance within the Indian chemical industry specifically. Employing firm-level data, the authors found a positive relationship between market concentration and performance measured in terms of both productivity and profitability. Firm diversification, by contrast, exhibited a negative impact on productivity but a positive impact on profitability. The study concluded that a strategy of market concentration outperformed a strategy of diversification for firms in the Indian chemical

industry. This finding bears directly on the interpretation of the results reported below. Vinati Organics Limited derives a substantial share of its revenue from two concentrated product lines in which it holds a dominant global position, and has more recently pursued measured diversification into MEHQ, guaiacol, iso amylene and antioxidant chemistry. The Shaurav and Rath framework suggests that such diversification may support headline profit margins while simultaneously depressing asset productivity during the gestation period of new capacity — an expectation the present data permit us to examine.

D. Research Gap

The literature reviewed establishes that profitability in the Indian chemical sector is shaped by market structure and diversification choices, that trend and dispersion techniques are appropriate for multi-year single-industry appraisal, and that Return on Equity requires cautious interpretation as a measure of value creation. What the literature does not offer is a firm-specific, decade-long, statistically tested trend appraisal of an individual debt-free Indian specialty chemical manufacturer in which the interaction between stable operating margins and declining return ratios can be isolated and explained. Existing studies on the Indian chemical industry are predominantly panel-based and industry-wide, and consequently average away precisely the firm-level dynamics that are of interest to investors, lenders and management. The present study addresses this gap by applying formal trend and correlation analysis to a single, strategically significant firm over a complete industry cycle.

III. STATEMENT OF THE PROBLEM

Vinati Organics Limited is widely regarded in the Indian capital market as a high-quality specialty chemicals franchise, characterised by superior margins, negligible leverage and strong promoter commitment. Yet a casual inspection of its published financial results over the last decade reveals an apparent inconsistency. Net Profit Margin and Operating Profit Margin have remained at levels substantially above the manufacturing average throughout the period, while Return on Assets and Return on Equity, the ratios that measure the

productivity of capital rather than the profitability of sales, have drifted downward. Simultaneously, Earnings Per Share has advanced steeply. These three movements cannot all be described by a single narrative of improving or deteriorating performance. The problem this study addresses is therefore twofold. First, whether the observed movements in each of the five profitability indicators constitute statistically significant trends or merely random year-to-year fluctuation around a stable mean. Second, if significant trends do exist, whether the divergence between margin-based and return-based measures can be coherently explained by reference to the company's capital deployment strategy and the structural conditions of the specialty chemicals market.

IV. OBJECTIVES OF THE STUDY

1. To examine the trend and magnitude of the profitability performance of Vinati Organics Limited over the period 2015–16 to 2024–25 through Net Profit Margin, Operating Profit Margin, Return on Assets, Return on Equity and Earnings Per Share.
2. To measure the degree of consistency and stability of each profitability indicator using standard deviation and the coefficient of variation.
3. To fit least-squares linear trend equations to each profitability indicator and to test the statistical significance of the estimated trend coefficients.
4. To assess the degree and direction of association among the five profitability indicators using Karl Pearson's coefficient of correlation.
5. To offer suggestions, on the basis of the findings, for strengthening the profitability position of the company.

V. HYPOTHESES OF THE STUDY

The following null hypotheses were framed and tested at the five per cent level of significance.

H₀01: There is no significant trend in the Net Profit Margin of Vinati Organics Limited during the study period.

H₀02: There is no significant trend in the Operating Profit Margin of Vinati Organics Limited during the study period.

H₀03: There is no significant trend in the Return on Assets of Vinati Organics Limited during the study period.

H₀04: There is no significant trend in the Return on Equity of Vinati Organics Limited during the study period.

H₀05: There is no significant trend in the Earnings Per Share of Vinati Organics Limited during the study period.

H₀06: There is no significant relationship among the selected profitability indicators of Vinati Organics Limited during the study period.

VI. RESEARCH METHODOLOGY

A. Nature and Sources of Data

The study is analytical and quantitative in character and is based entirely on secondary data. The profitability ratios analysed were compiled from the audited annual reports, published financial statements and stock exchange filings of Vinati Organics Limited for the ten financial years from 2015–16 to 2024–25 [2]. Supplementary reference was made to the company's investor presentations and to publicly available financial databases for the purpose of verification.

B. Period of Study

The study covers a period of ten financial years commencing 1 April 2015 and ending 31 March 2025. A decade was selected in order to encompass a complete cycle of expansion and contraction in the specialty chemicals sector and to satisfy the minimum observation requirement for reliable least-squares trend estimation.

C. Variables Employed

Five profitability indicators were selected, two measuring the profitability of sales and three measuring the productivity of capital and the return accruing to the individual shareholder. Net Profit Margin expresses profit after tax as a percentage of net sales and measures the proportion of each rupee of revenue retained after all costs, interest and taxes. Operating Profit Margin expresses earnings before interest and tax as a percentage of net sales and isolates core operating efficiency from financing and tax effects. Return on Assets expresses net profit as a percentage of total assets and measures how

productively the total resource base has been employed. Return on Equity expresses net profit as a percentage of shareholders' funds and measures the return earned on capital contributed and retained by owners. Earnings Per Share expresses profit after tax attributable to equity shareholders divided by the weighted average number of equity shares outstanding [7].

D. Tools of Analysis

The data were analysed using the following statistical tools. Descriptive statistics, comprising the arithmetic mean, standard deviation, range, minimum and maximum, were computed for each indicator. The coefficient of variation, expressed as the ratio of the standard deviation to the mean multiplied by one hundred, was computed to measure relative dispersion and thereby the consistency of each indicator. Index numbers were computed with 2015–16 as the base year equal to one hundred in order to display the cumulative movement of each indicator. Least-squares linear trend equations of the form $Y = a + bX$ were fitted to each series, where Y denotes the value of the ratio, X denotes the coded time variable taking values from one to ten, a denotes the intercept and b denotes the annual rate of change [8]. The coefficient of determination was computed to assess goodness of fit. Student's t -test was applied to the estimated slope coefficients to test the statistical significance of the trend, and Karl Pearson's coefficient of correlation was computed for all pairs of indicators with associated probability values [9]. Compound Annual Growth Rate was computed as an additional summary measure of long-run movement. All computations were performed at the five per cent level of significance.

E. Limitations of the Study

The study is confined to a single company and its conclusions are therefore not directly generalisable to the specialty chemicals sector as a whole. It relies exclusively on secondary data, and its accuracy is consequently bounded by the accuracy of the published statements from which the ratios were derived. Only five profitability indicators are examined; liquidity, solvency, efficiency and market valuation ratios fall outside its scope. Accounting ratios are affected by the accounting policies adopted by the company and by changes in reporting standards over the study period, and the analysis makes no

adjustment for inflation or for changes in the number of shares outstanding arising from corporate actions.

VII. DATA ANALYSIS AND INTERPRETATION

A. Profitability Position over the Study Period

Table I presents the raw profitability position of the company over the ten-year period.

TABLE I: PROFITABILITY RATIOS OF VINATI ORGANICS LIMITED, 2015–16 TO 2024–25

Year	Net Profit Margin (%)	Operating Profit Margin (%)	Return on Assets (%)	Return on Equity (%)	Earnings Per Share (₹)
2015-16	14.83	23.47	19.32	26.68	18.06
2016-17	20.65	30.52	19.15	24.33	25.50
2017-18	21.47	31.81	17.08	20.63	27.19
2018-19	18.92	26.90	14.68	18.06	27.93
2019-20	24.39	36.80	23.01	26.87	54.97
2020-21	31.09	39.65	23.13	26.09	32.00
2021-22	27.48	34.23	15.53	17.45	5.14
2022-23	20.68	26.81	16.59	18.96	61.67
2023-24	21.23	28.55	17.98	20.65	66.81
2024-25	16.66	22.47	11.37	14.03	71.95
Average	21.74	30.12	17.78	21.38	39.12

Source: Compiled from the annual reports and audited financial statements of Vinati Organics Limited

Net Profit Margin ranges from a minimum of 14.83 per cent in 2015–16 to a maximum of 31.09 per cent in 2020–21, a spread of 16.26 percentage points. Operating Profit Margin follows a broadly similar path, moving from 23.47 per cent to a peak of 39.65 per cent in the same year. Return on Assets and Return on Equity, however, do not replicate this pattern. Return on Equity opens the period at its second-highest value of 26.68 per cent and closes at its lowest value of 14.03 per cent, notwithstanding that the intervening years included the two most profitable years of the decade. Earnings Per Share displays the widest movement of all, rising from ₹18.06 to ₹71.95, interrupted by a single anomalous observation of ₹5.14 in 2021–22.

The immediate inference from the raw data is that the company's ability to convert sales into profit remained

strong and comparatively stable, while its ability to convert capital into profit weakened. This is the central empirical puzzle that the subsequent tables address.

B. Descriptive Statistics and Consistency

TABLE II: DESCRIPTIVE STATISTICS AND CONSISTENCY OF PROFITABILITY INDICATORS

Indicator	Mean	S.D.	C.V. (%)	Min.	Max.	Range	Level
Net Profit Margin (%)	21.74	4.85	22.30	14.83	31.09	16.26	Moderate
Operating Profit Margin (%)	30.12	5.60	18.58	22.47	39.65	17.18	High
Return on Assets (%)	17.78	3.62	20.35	11.37	23.13	11.76	Moderate
Return on Equity (%)	21.38	4.43	20.72	14.03	26.87	12.84	Moderate
Earnings Per Share (₹)	39.12	22.87	58.45	5.14	71.95	66.81	Low

Source: Computed by the researcher from Table I. S.D. denotes standard deviation and C.V. denotes coefficient of variation

Table II quantifies both the level and the consistency of each indicator. Operating Profit Margin is the most consistent measure with a coefficient of variation of 18.58 per cent, followed by Return on Assets at 20.35 per cent and Return on Equity at 20.72 per cent. Net Profit Margin, at 22.30 per cent, is marginally more volatile than the operating measure, which is expected since it absorbs the additional variability introduced by taxation, other income and exceptional items. All four ratio measures fall within a band of moderate to high consistency by conventional interpretation, in which a coefficient of variation below twenty-five per cent is regarded as indicating a reasonably stable series.

Earnings Per Share is a striking exception. Its coefficient of variation of 58.45 per cent is almost three times that of the ratio measures, and its range of ₹66.81 exceeds its own mean of ₹39.12. This extreme

dispersion arises principally from the observation of ₹5.14 recorded in 2021–22 against a Net Profit Margin of 27.48 per cent in the same year, a combination that is arithmetically difficult to reconcile with the surrounding series and which most probably reflects the effect of a corporate action affecting the share count, such as a bonus issue or share consolidation, or a restatement of the weighted average number of shares. Earnings Per Share, being a per-share rather than a ratio measure, is inherently sensitive to changes in the denominator that carry no information about operating performance. Its high dispersion should therefore not be read as evidence of unstable earnings.

C. Index Number Analysis

TABLE III: INDEX NUMBERS OF PROFITABILITY INDICATORS (BASE YEAR 2015–16 = 100)

Year	NPM	OPM	ROA	ROE	EPS
2015-16	100.0	100.0	100.0	100.0	100.0
2016-17	139.2	130.0	99.1	91.2	141.2
2017-18	144.8	135.5	88.4	77.3	150.6
2018-19	127.6	114.6	76.0	67.7	154.7
2019-20	164.5	156.8	119.1	100.7	304.4
2020-21	209.6	168.9	119.7	97.8	177.2
2021-22	185.3	145.8	80.4	65.4	28.5
2022-23	139.4	114.2	85.9	71.1	341.5
2023-24	143.2	121.6	93.1	77.4	369.9
2024-25	112.3	95.7	58.9	52.6	398.4

Source: Computed by the researcher from Table I

The index numbers in Table III render the divergence unmistakable. By the terminal year, Net Profit Margin stands at 112.3 and Operating Profit Margin at 95.7, indicating that after a decade the company's margin structure had returned approximately to its starting position after a substantial intervening expansion. Return on Assets, however, closes at 58.9 and Return on Equity at 52.6, meaning that the productivity of the asset base and the return to shareholders had both contracted by more than forty per cent relative to the base year. Earnings Per Share closes at 398.4, almost a fourfold increase.

Read together, these three trajectories describe a company whose absolute profit pool grew substantially over the decade while the capital employed to generate that pool grew even faster. The

peak years of 2019–20 and 2020–21 are visible in every series, reflecting the exceptional realisations available during the global supply disruption. The subsequent decline, particularly pronounced in 2024–25, reflects the combined effect of raw-material inflation, competitive pricing pressure in the ATBS segment and the drag on returns exerted by newly

commissioned capacity that had not yet reached optimal utilisation.

D. Least-Squares Trend Analysis

Table IV, presented across both columns owing to its width, provides the formal test of the trend hypotheses.

TABLE IV: LEAST-SQUARES LINEAR TREND ANALYSIS OF PROFITABILITY INDICATORS

Indicator	Trend Equation ($Y = a + bX$)	Slope (b)	R ²	t-value	p-value	CAGR (%)	Result at 5%
Net Profit Margin	$Y = 20.108 + 0.297X$	+0.297	0.034	0.533	0.6083	+1.30	Not significant
Operating Profit Margin	$Y = 30.886 - 0.139X$	-0.139	0.006	-0.213	0.8363	-0.48	Not significant
Return on Assets	$Y = 20.435 - 0.482X$	-0.482	0.163	-1.246	0.2481	-5.72	Not significant
Return on Equity	$Y = 26.394 - 0.913X$	-0.913	0.389	-2.257	0.0539	-6.89	Not significant*
Earnings Per Share	$Y = 10.614 + 5.183X$	+5.183	0.471	2.669	0.0284	+16.60	Significant

Source: Computed by the researcher. X denotes coded time with 2015–16 = 1 and 2024–25 = 10. Degrees of freedom = 8; critical t at 5% (two-tailed) = 2.306. *Return on Equity is significant at the 10 per cent level ($p = 0.0539$) and falls marginally short of significance at 5 per cent.

Net Profit Margin exhibits a positive slope of 0.297 percentage points per annum, but the coefficient of determination of 0.034 indicates that time explains barely three per cent of the variation in the series, and the computed t-value of 0.533 is far below the critical value of 2.306. The null hypothesis H_{01} is accordingly accepted: there is no statistically significant trend in Net Profit Margin. Operating Profit Margin displays a marginally negative slope of -0.139 percentage points per annum with an even weaker fit, and the null hypothesis H_{02} is likewise accepted. These two results are substantively important. They establish that the company's operating and net margin structure has been essentially trendless over the decade — fluctuating cyclically around a high mean but neither systematically improving nor systematically eroding.

Return on Assets declines at 0.482 percentage points per annum with a coefficient of determination of 0.163 and a t-value of -1.246, which does not attain significance at the five per cent level, and H_{03} is accepted. Return on Equity presents the most interesting case. Its slope of -0.913 percentage points per annum is the steepest decline among the ratio measures, its coefficient of determination of 0.389 indicates that time explains nearly thirty-nine per cent of the variation in the series, and its computed t-value

of -2.257 approaches the critical value very closely, with a probability value of 0.0539. Strictly interpreted at the five per cent level, H_{04} is accepted; at the ten per cent level, which is frequently adopted in exploratory single-firm studies with only ten observations, the null hypothesis would be rejected. The finding should therefore be reported as a marginally significant downward trend, and its practical significance is considerable: a decline of 0.913 percentage points per annum, sustained over the decade, corresponds to a cumulative erosion of approximately eight percentage points in the return to shareholders.

Earnings Per Share is the only indicator to record a statistically significant trend. Its slope of ₹5.183 per annum, coefficient of determination of 0.471 and t-value of 2.669 exceed the critical value, and H_{05} is therefore rejected. The compound annual growth rate of 16.60 per cent confirms a robust long-run expansion in absolute earnings attributable to each share. The apparent contradiction between rising Earnings Per Share and falling Return on Equity is not a contradiction at all: the former measures profit relative to the number of shares, which has remained broadly constant, while the latter measures profit relative to shareholders' funds, which have expanded continuously through the retention of earnings. When

a debt-free company reinvests the whole of its profit at a marginal return below its historical average return, absolute earnings rise while the ratio of earnings to equity falls.

E. Correlation Analysis

TABLE V: KARL PEARSON'S CORRELATION MATRIX OF PROFITABILITY INDICATORS

Indicator	NPM	OPM	ROA	ROE	EPS
Net Profit Margin	1.000	0.932**	0.516	0.238	-0.230
Operating Profit Margin	0.932**	1.000	0.704*	0.476	-0.278
Return on Assets	0.516	0.704*	1.000	0.940**	-0.159
Return on Equity	0.238	0.476	0.940**	1.000	-0.258
Earnings Per Share	-0.230	-0.278	-0.159	-0.258	1.000

Source: Computed by the researcher. ** denotes significance at the 1 per cent level and * denotes significance at the 5 per cent level (two-tailed, $n = 10$) Table V reports the degree of association among the five indicators. Three correlations attain statistical significance. The association between Net Profit Margin and Operating Profit Margin is very strong and positive at 0.932 with a probability value of 0.0001, which is expected and confirms that variation in net profitability is driven overwhelmingly by variation at the operating level rather than by financing costs, other income or tax planning — a natural consequence of the company's debt-free capital structure. The association between Return on Assets and Return on

Equity is equally strong at 0.940 with a probability value of 0.0001, again reflecting the absence of leverage: where borrowings are negligible, total assets and shareholders' funds move almost identically, and the two return ratios become near-substitutes. The association between Operating Profit Margin and Return on Assets is positive and significant at 0.704 with a probability value of 0.0229, confirming that operating efficiency transmits to asset productivity, though imperfectly of greater analytical interest are the associations that are not significant. The correlation between Net Profit Margin and Return on Equity is a weak 0.238, and that between Net Profit Margin and Return on Assets is a moderate but insignificant 0.516. In a company with a constant asset base, high margins would translate mechanically into high returns and these correlations would approach unity. Their weakness is direct statistical evidence that the asset and equity denominators were expanding independently of, and faster than, the margin performance. Earnings Per Share is negatively and insignificantly correlated with every ratio measure, a pattern consistent with the interpretation that its movement is dominated by share-count and retained-earnings effects rather than by margin performance. The null hypothesis H_0 is therefore rejected in respect of the pairs Net Profit Margin–Operating Profit Margin, Return on Assets–Return on Equity and Operating Profit Margin–Return on Assets, and accepted in respect of all remaining pairs.

F. Sub-Period Comparison

Table VI divides the decade into two equal halves and compares the mean performance of each indicator.

TABLE VI: SUB-PERIOD COMPARISON OF MEAN PROFITABILITY

Indicator	Period I Mean (2015-16 to 2019-20)	Period II Mean (2020-21 to 2024-25)	Difference	t-value	p-value	Inference
Net Profit Margin (%)	20.05	23.43	+3.38	-1.116	0.2969	No significant change
Operating Profit Margin (%)	29.90	30.34	+0.44	-0.118	0.9091	No significant change
Return on Assets (%)	18.65	16.92	-1.73	0.735	0.4832	No significant change
Return on Equity (%)	23.31	19.44	-3.88	1.471	0.1794	No significant change
Earnings Per Share (₹)	30.73	47.51	+16.78	-1.187	0.2695	No significant change

Source: Computed by the researcher using the independent-samples t-test; degrees of freedom = 8

The direction of change is consistent with the trend results: margins improved marginally in the second half while both return ratios deteriorated and Earnings Per Share rose substantially. None of the differences, however, attains statistical significance at the five per cent level, which is unsurprising given that each sub-period contains only five observations and that within-period dispersion is high. The sub-period comparison therefore corroborates the direction of the trend findings without adding independent statistical confirmation.

G. Summary of Hypothesis Testing

TABLE VII: SUMMARY OF HYPOTHESIS TESTING

Hypothesis	Statement	Test Applied	p-value	Decision
H ₀ 01	No significant trend in NPM	t-test on slope	0.6083	Accepted
H ₀ 02	No significant trend in OPM	t-test on slope	0.8363	Accepted
H ₀ 03	No significant trend in ROA	t-test on slope	0.2481	Accepted
H ₀ 04	No significant trend in ROE	t-test on slope	0.0539	Accepted at 5%; rejected at 10%
H ₀ 05	No significant trend in EPS	t-test on slope	0.0284	Rejected
H ₀ 06	No significant relationship among indicators	Karl Pearson's r	0.0001 – 0.6606	Partially rejected

Source: Compiled by the researcher from Tables IV and V

VIII. MAJOR FINDINGS

1. The company maintained a mean Net Profit Margin of 21.74 per cent and a mean Operating Profit Margin of 30.12 per cent over the decade, both substantially above the typical margin profile of Indian manufacturing and consistent with a specialty rather than commodity chemical business model.
2. Neither margin measure exhibits a statistically significant time trend. Net Profit Margin rose at 0.297 percentage points per annum and Operating Profit Margin fell at 0.139 percentage points per annum, but in both cases time explains less than four per cent of the observed variation.
3. Return on Equity declined at 0.913 percentage points per annum, the steepest and best-fitting of the ratio trends, with time explaining 38.91 per cent of its variation. The trend is significant at the ten per cent level and falls marginally short of significance at the five per cent level.
4. Return on Assets declined at 0.482 percentage points per annum, moving from 19.32 per cent in the base year to 11.37 per cent in the terminal year, a contraction of 41.1 per cent in index terms.
5. Earnings Per Share is the only indicator with a statistically significant trend, rising at ₹5.183 per annum with a compound annual growth rate of 16.60 per cent and a fourfold increase over the base year.
6. Operating Profit Margin is the most consistent indicator with a coefficient of variation of 18.58 per cent; Earnings Per Share is by far the least consistent at 58.45 per cent, distorted by the anomalous observation of ₹5.14 in 2021–22 which is inconsistent with the Net Profit Margin of 27.48 per cent recorded in the same year.
7. The financial years 2019–20 and 2020–21 constitute a clear peak across all margin and return measures, coinciding with global supply-chain disruption and exceptional realisations in the ATBS and Isobutylene segments.
8. The terminal year 2024–25 records the lowest values of Operating Profit Margin, Return on Assets and Return on Equity in the entire decade, indicating that the pressure on profitability was most acute at the close of the study period.
9. Correlation analysis reveals very strong significant associations between Net Profit Margin and

Operating Profit Margin at 0.932, and between Return on Assets and Return on Equity at 0.940, both reflecting the company's negligible financial leverage.

10. The correlations between the margin measures and the return measures are weak and statistically insignificant, providing direct evidence that the asset and equity base expanded independently of, and more rapidly than, profitability.

IX. SUGGESTIONS

1. Improve asset turnover before adding further capacity. The decline in Return on Assets is a denominator problem rather than a margin problem. The company should prioritise raising the utilisation of recently commissioned ATBS, MEHQ, guaiacol and iso amylene capacity to design levels before committing to the next capital expenditure cycle, since each incremental rupee of unutilised gross block directly depresses the return ratios.
2. Introduce a formal hurdle-rate discipline for reinvestment. Because the company is debt-free and retains substantially all earnings, every rupee reinvested at a marginal return below the historical Return on Equity of 21.38 per cent mechanically dilutes shareholder returns. Management should evaluate each project against an explicit hurdle rate and return surplus cash to shareholders through dividends or buy-backs where no project clears it.
3. Reduce dependence on the ATBS product line. The concentration of revenue in a small number of products exposes margins to competitive pricing action by a single overseas competitor. Consistent with the finding of Shaurav and Rath [6] that diversification supports profitability even where it depresses productivity in the short run, the company should accelerate the revenue contribution of its newer downstream products.
4. Strengthen backward integration and raw-material hedging. The margin compression of 2022–23 and 2024–25 is traceable substantially to feedstock and freight inflation. Selective backward integration into key intermediates, together with a structured

procurement and hedging policy, would reduce the amplitude of margin cycles.

5. Widen the geographic and end-use market base. Diversifying the customer base across oil and gas, water treatment, personal care and adhesive applications, and across a wider set of export destinations, would reduce the exposure of realisations to a downturn in any single end-use industry.
6. Reconcile and restate the Earnings Per Share series. The value recorded for 2021–22 is arithmetically inconsistent with the profitability recorded in the same year. Any corporate action affecting the share count should be disclosed prominently and the historical series restated on a comparable basis so that per-share performance remains interpretable to investors.
7. Institute periodic DuPont decomposition. Given that the divergence identified in this study is fundamentally a decomposition problem, management and analysts would benefit from routinely separating Return on Equity into its net margin, asset turnover and equity multiplier components, which would isolate the source of any future deterioration at the point at which it arises.

X. CONCLUSION

The trend analysis of the profitability ratios of Vinati Organics Limited over the decade from 2015–16 to 2024–25 yields a picture that is more nuanced than either an unqualified success narrative or an account of deterioration. On the evidence of the margin ratios, the company retained throughout the period an operating model of considerable strength. A mean Operating Profit Margin above thirty per cent, sustained across a decade that included a pandemic, a commodity price shock and a period of intense import competition, is evidence of genuine pricing power and process advantage in the niches the company occupies. Crucially, the statistical tests establish that neither margin measure trended significantly in either direction, which means that the fluctuations observed were cyclical rather than structural.

On the evidence of the return ratios, however, the decade tells a different story. Return on Equity fell by

nearly half in index terms and its downward trend, at 0.913 percentage points per annum, was the most systematic movement among the ratio measures. Return on Assets followed the same path. Because the correlation analysis demonstrates that these declines are not explained by margin performance, the explanation must lie in the denominators. The company financed a sustained programme of capacity creation entirely from retained earnings, so that shareholders' funds and total assets expanded continuously while the incremental profit generated by that new capacity lagged behind, whether because of gestation periods, commissioning delays or subdued end-market demand at the moment of commissioning. The simultaneous significant rise in Earnings Per Share, at a compound annual growth rate of 16.60 per cent, confirms this interpretation. The absolute profit pool available to each share grew substantially; what fell was the efficiency with which the accumulated capital base generated that pool. This is the characteristic financial signature of a debt-free, high-reinvestment growth company in the middle of a capital expenditure cycle, and it is not in itself evidence of managerial failure. It does, however, place a clear obligation on management. The value of the strategy depends entirely on whether the newly created capacity eventually earns a return at least equal to the historical mean. If asset utilisation improves and the return ratios recover toward their decade averages, the decline documented in this study will prove to have been a transitional cost of growth. If the return ratios continue to fall while margins remain stable, the conclusion will be that capital has been deployed at returns below the cost of equity, and the appropriate response will be a more disciplined allocation policy rather than an operational one.

The study accordingly concludes that Vinati Organics Limited enters the second half of the present decade with an intact and competitive operating model but with a capital productivity position requiring active management attention. Future research might usefully extend the analysis through a full DuPont decomposition, incorporate a peer group of comparable Indian specialty chemical manufacturers to distinguish firm-specific from industry-wide effects, and examine the relationship between the profitability trends documented here and the company's market valuation over the same period.

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