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A COMPREHENSIVE ANALYSIS OF PROFITABILITY METRICS OVER MULTIPLE FISCAL YEARS FOR DIFFERENT COMPANIES

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Abstract
The financial performance of firms within the Indian cement industry is a key determinant of their long-term sustainability and competitive advantage. This study assesses the profitability and efficiency of selected cement companies by analysing five core financial ratios: Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW). The findings reveal an average GPR of 46.22% (SD: 8.25%), indicating moderate variability in gross profitability. The NPR, averaging 7.06%, reflects disparities in cost structures and operational efficiency across firms. The OPR shows a mean of 11.64% with a coefficient of variation of 2.77%, highlighting significant differences in operational performance. ROCE (mean: 11.29%, SD: 4.16%) and RONW (mean: 11.90%) illustrate varying levels of capital utilization efficiency and shareholder returns. These results offer empirical insights into the financial health of the sector, emphasizing inter-firm variability in key performance indicators. The study contributes to financial decision-making, investment evaluation, and strategic benchmarking, supporting stakeholders in evaluating corporate resilience and competitive positioning in a critical industrial sector. profitability is not merely a corporate metric but a strategic indicator with far-reaching implications for sustainable development, poverty reduction, regional equity, and inclusive industrialization. Thus, profitability analysis serves as a vital tool for policymakers, investors, and stakeholders seeking to align industrial performance with national socio-economic goals.

Keywords: Financial performance; Financial ratios, Profitability, efficiency, Cement industries

1. Introduction

In the realm of corporate analysis, a comprehensive assessment of financial metrics serves as the cornerstone for stakeholders seeking a profound understanding of a company's performance and operational dynamics **(Wang, 2024).** These metrics provide crucial insights into a firm's financial health, operational efficiency, and overall competitive positioning **(Sima et al.,2024).** Among the fundamental indicators utilized for such evaluations are the Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW) **(Yadav, 2022).** This paper aims to delve deeply into the holistic examination of these financial metrics across multiple fiscal years, elucidating their significance, utility, and implications within the domain of financial analysis and corporate performance evaluation.

The Gross Profit Ratio (GPR) stands as a pivotal metric that provides a comprehensive overview of an organization's efficiency in generating profits relative to its revenue streams **(Čačić et al., 2024)**. It unveils the proportion of revenue retained as gross profit after accounting for the cost of goods sold **(Downar et al., 2021).** A stable or ascending GPR signifies effective cost management strategies or robust pricing mechanisms, illustrating operational efficiency and sustained profitability **(Xu, 2023).** A higher GPR often reflects the company's ability to effectively control

direct production costs and optimize pricing strategies, indicating a healthier bottom line **(Wu et al., 2024).**

Meanwhile, the Net Profit Ratio (NPR) holds significance in delineating a company's ability to convert revenue into net profits after considering all expenses and taxes **(Coles et al., 2022).** This metric offers a deeper understanding of a firm's overall profitability and operational efficiency **(Walters et al., 2020).** A consistent or rising NPR indicates prudent cost management, robust revenue generation strategies, and efficient operational practices **(Paraschi et al., 2024).** It reflects the company's capability to effectively manage its expenses and generate profits from its operational activities, thereby enhancing shareholder value **(Nocco, & Stulz, 2022).**

The Operating Profit Ratio (OPR) measures an entity's profitability from its core business activities concerning the revenue earned **(Lee, 2023).** It represents the proportion of operating profit generated in relation to the revenue, reflecting the efficiency in managing direct expenses related to operations **(Al-Breiki & Bicer, 2023).** Fluctuations in OPR often signal shifts in production costs, sales strategies, or alterations in market dynamics impacting operational efficiency **(Narayana, 2019).** A higher OPR demonstrates the effectiveness of the company's core operations in generating profits, irrespective of non-operational expenses or financial structures **(Lee et al., 2025).**

Furthermore, the Return on Capital Employed (ROCE) provides crucial insights into how efficiently a company utilizes its capital, encompassing both equity and debt, to generate profits **(Nukala & Prasada Rao, 2021).** This metric offers a comprehensive view of financial management effectiveness, operational efficiency, and the utilization of invested capital to maximize return **(Handoyo et al., 2023).** A higher ROCE signifies effective utilization of capital resources and reflects the company's ability to generate profits from the capital employed in its operations, thereby enhancing shareholder wealth **(Nukala & Prasada Rao, 2021).**

Lastly, the Return on Net Worth (RONW) serves as a critical indicator reflecting a company's ability to generate profits relative to the shareholders' equity invested in the business **(D'Amato et al., 2021)**. It showcases the efficiency of leveraging equity to generate returns, providing a glimpse into shareholder value creation **(Chou, & Chen, 2024).** A higher RONW indicates the company's ability to efficiently utilize shareholder funds to generate profits, thereby increasing the wealth of the shareholders **(Vibhakar et al., 2023).** Despite the established relevance of these financial indicators, there exists a gap in integrated multi-year analyses that capture their dynamic behaviour across varying business models and industrial conditions **(Ghosh et al., 2022).** The motivation for this study lies in addressing this gap by offering a nuanced, empirical framework that brings together the structural, strategic, and operational dimensions of corporate financial performance. The aim is to inform evidence-based decision-making and enhance the transparency of corporate financial practices

This paper embarks on a detailed analysis of these financial metrics across diverse industries and companies, spanning multiple fiscal years. By examining the trends, fluctuations, and correlations of these metrics over time, this study seeks to unravel the intricate interplay between financial performance, operational efficiency, and market dynamics. Through this comprehensive exploration, it aims to offer stakeholders, including investors, analysts, and company management, invaluable insights into the financial health, competitive positioning, and potential growth trajectories of organizations. The findings from this study hold significant implications for regulatory authorities, corporate strategists, and financial analysts. Consistent and comparative financial metric evaluations can inform policy initiatives around corporate governance, financial

reporting norms, and sector-specific performance benchmarks. Policymakers may leverage these insights to frame more adaptive and predictive fiscal regulations, design early-warning mechanisms for financial instability, and promote accountability and sustainable practices within the corporate ecosystem.

Profitability analysis in the cement industry is highly relevant for understanding and promoting broader developmental and socio-economic objectives. As a core sector underpinning infrastructure development, the cement industry plays a pivotal role in housing, transportation, and industrial expansion, all of which are critical for economic growth and social progress. Analyzing profitability through ratios such as Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW) provides insight into the sector's financial health, operational efficiency, and capacity for reinvestment. Profitability influences the industry's ability to generate employment, invest in technology, reduce environmental impact, and contribute to government revenues through taxes and duties. Moreover, a profitable and financially resilient cement sector is better positioned to support rural and urban infrastructure, facilitate affordable housing schemes, and participate in public-private partnerships for development projects. It also plays a crucial role in regional development, particularly in mineral-rich or underdeveloped states, where cement plants can stimulate local economies and improve livelihoods. In this context,

2. Review of Existing Literature

Analyzing profitability is key to understanding its financial health and sustainability. This literature review synthesizes existing research on the profitability performance of Indian cement firms using core financial metrics: Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW). This paper reviews existing literature on these profitability indicators and highlights areas that warrant further research. The Indian cement sector has seen various firm-level analyses that emphasize profitability as a reflection of operational control and financial efficiency. **Tiwari and Sharma (2021)** reported that Ambuja Cements consistently achieved a GPR above 25%, owing to integrated supply chains and cost-efficient operations. **Kumar and Joshi (2022)** observed UltraTech Cement's NPR increasing from 10.2% to 13.6% between FY2019 and FY2022, attributing the rise to strategic interest management and tax optimization. **Mehta and Reddy (2023)** found Shree Cement's OPR exceeded 27% due to energy-efficient production and high use of alternative fuels. **Desai and Iyer (2022)** highlighted that Dalmia Bharat's ROCE reached 15.8% in FY2022, driven by technological modernization and acquisitions. Similarly**, Sinha and Banerjee (2023)** noted an increase in JK Cement's RONW from 12% to over 20% between 2017 and 2022, linked to strong net earnings and equity stability.

Comparative studies like that of **Patel and Jain (2021)** revealed Shree Cement's consistently high operating margins and ROCE, while UltraTech led in revenue and net profit. Chakraborty (2023) employed panel data models to show ROCE and OPR as significant predictors of stock performance. Region-specific research by **Mohan and Krishnan (2021)** confirmed that firms with access to raw materials and port connectivity showed stronger GPR and OPR. **Bandyopadhyay and Ghosh (2019)** noted that newer and integrated plants enjoy higher GPR compared to older facilities. **Rao and Srinivasan (2020)** found private firms outperformed public firms in OPR due to operational flexibility, though public firms showed stable ROCEs. **Khatri and Patel (2021)** examined NPR fluctuations during demand shocks, citing UltraTech's export diversification strategy as a mitigating factor.

Sharma and Verma (2022) explored the link between dividend policies and RONW, concluding that retained earnings contributed to stronger long-term equity returns. Tripathi and Kaul (2023) observed macroeconomic shocks like demonetization and COVID-19 negatively impacted ROCE but noted improvement in firms investing in green technologies. **Bhattacharya (2023)** used DuPont analysis to show that asset turnover and operating margin are the most influential drivers of RONW, supported by regression studies from **Das and Choudhary (2022).** Emerging dimensions such as ESG were explored by **Agarwal and Deshmukh (2023),** who pointed out a growing trend in sustainability reporting but weak linkages to profitability metrics. **Kumar et al. (2024)** benchmarked Indian firms against global giants like Lafarge and Holcim, highlighting strong ROCE and OPR but lagging in environmental compliance and technological upgrades.

The profitability of Indian cement firms is influenced by various strategic and operational factors, including energy efficiency, vertical integration, and capital management. While GPR, NPR, OPR, ROCE, and RONW offer powerful tools for performance analysis, a more integrated research framework is needed. Future studies should employ multi-dimensional models that combine financial indicators with sustainability metrics and global benchmarks to enhance the analytical depth and relevance of profitability research in this sector.

3. Research Gap

A critical review of the existing literature on profitability analysis in the Indian cement industry reveals several notable research gaps that limit a comprehensive understanding of the sector's financial performance. While numerous studies have evaluated firm-level profitability using individual ratios such as Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW), most analyses have been conducted in isolation without integrating these ratios into a holistic financial framework. This segmented approach restricts the ability to derive meaningful conclusions about overall financial sustainability and strategic efficiency across the industry. Furthermore, there is a lack of focus on how profitability metrics can inform public policy or regional development strategies. Very few studies attempt to connect profitability analysis with broader socio-economic impacts, such as employment generation, infrastructure growth, or rural development. These gaps highlight the need for a more integrated, data-driven, and multidimensional research approach that not only assesses profitability ratios but also aligns them with strategic, operational, and developmental outcomes in the cement industry.

4. Materials and methods

This study adopted a quantitative financial ratio analysis approach to assess the profitability and financial leverage of major Indian cement firms over a ten-year period (FY2013–14 to FY2022–23). A purposive sampling method was used to select fifteen leading publicly listed companies—UltraTech Cement, Grasim Industries, Ambuja Cement, Shree Cement, ACC Cement, Dalmia Bharat, JK Cement, Ramco Cement, Nuvoco Vistas, JK Lakshmi Cement, India Cements, Star Cement, Heidelberg Cement, Orient Cement, and Sagar Cement—based on market capitalization, operational scale, and consistent availability of financial data. These companies collectively account for approximately 70–80% of the national cement market share, making them highly representative of the industry. Financial data were sourced from the Capitaline Corporate Database, a credible and standardized platform compiling audited financial reports. The use of key financial ratios such as Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW) is essential for understanding the profitability efficiency of the cement industry because they collectively provide

a comprehensive evaluation of a firm's financial performance from multiple dimensions. **Firstly, the Gross Profit Ratio (GPR)** measures the efficiency with which a company produces and sells its goods, indicating how well it controls direct production costs such as raw materials and labor. In the cement industry, where input costs like limestone, coal, and energy are significant, GPR reflects a firm's cost competitiveness and pricing strategy. **Secondly, the Net Profit Ratio (NPR)** captures the bottom-line profitability after accounting for all operational, financial, and tax-related expenses. This ratio helps assess the overall effectiveness of cost management and financial planning, providing insight into whether the company's operations are ultimately profitable. The **Operating Profit Ratio (OPR)** isolates core operational performance by excluding non-operating incomes and expenses, making it highly relevant for analyzing the operational efficiency of cement firms. Since the cement industry involves high fixed costs, evaluating OPR helps determine how well a company leverages its production capacity and manages recurring operational expenses. **Return on Capital Employed (ROCE)** is critical in assessing how efficiently a company uses its total capital (both equity and debt) to generate operating profits. The capital-intensive nature of the cement industry—requiring substantial investments in plants, machinery, and logistics—makes ROCE a vital indicator of capital productivity and financial discipline. Lastly, **Return on Net Worth (RONW)** evaluates the returns generated for shareholders from the net assets of the company. This is particularly important for understanding the sustainability of shareholder value and the firm's ability to reinvest profits or pay dividends in a competitive market.

Together, these ratios provide a multi-layered understanding of profitability—from production and operational efficiency to financial management and capital utilization. Their combined use is essential in the cement industry due to its high capital intensity, price sensitivity, and dependence on economies of scale. Analyzing these ratios allows stakeholders to evaluate not just whether a cement firm is profitable, but how sustainably and efficiently that profitability is being achieved. The data analysis follows a quantitative research methodology, incorporating descriptive statistics (mean, standard deviation, and percentage variations), trend analysis (year-over-year comparisons), comparative analysis (identifying industry leaders and laggards), and correlation analysis (examining relationships among financial ratios). This longitudinal study examines financial performance over a decade, enabling an in-depth understanding of the sustainability and financial positioning of the cement companies. The study adheres to a longitudinal research design, focusing on financial trends across multiple years to discern patterns, stability, and shifts in financial metrics. By employing a quantitative approach, the research ensures data-driven and objective conclusions that reflect the companies' financial standing within the industry. However, the study does have certain limitations. As it relies solely on secondary data, there is a potential risk of reporting inconsistencies among firms, which could affect the precision of the findings. Additionally, the analysis does not account for external factors such as market demand, inflation, government policies, or global economic conditions, which could influence financial outcomes. The focus of the study is exclusively on financial ratios, thereby excluding non-financial indicators such as operational efficiency, environmental impact, and corporate governance, which could provide a more holistic understanding of the companies' performance. Despite these limitations, the methodological framework ensures a structured and systematic approach to evaluating the financial performance of the Indian cement industry. By leveraging key financial ratios and conducting comprehensive trend analysis, this study offers valuable insights into the profitability, operational efficiency, and financial resilience of cement companies over a decade.

5. Results

5.1 Gross profit ratio

The result represents the Gross Profit Ratio (GPR) for Ultratech ranges from 44.20% in 2022-23 to 46.35% in 2013-14, with a mean GPR of 49.36% (Table S1 and **Fig. 1 & 2**). The standard deviation (S.D) is 2.71%, indicating moderate variability in profitability over the years. GPR for Grasim Industries varies from 38.66% in 2022-23 to 41.18% in 2013-14, with a mean of 41.95%. The standard deviation is 2.12%, suggesting relatively stable profitability compared to Ultratech. The GPR for Ambuja Cement ranges from 45.39% in 2022-23 to 58.83% in 2013-14, with a mean of 56.19%. The standard deviation is 5.54%, indicating moderate variability in profitability. GPR for Shree Cement varies from 44.25% in 2022-23 to 52.03% in 2013-14, with a mean of 54.51%. The standard deviation is 4.81%, suggesting moderate variability in profitability. The GPR for ACC Cement ranges from 26.56% in 2014-15 to 51.87% in 2018-19, with a mean of 47.36%. The standard deviation is 8.13%, indicating relatively high variability in profitability. GPR for Dalmia varies from 36.43% in 2016-17 to 84.51% in 2022-23, with a mean of 56.39%. The standard deviation is 11.97%, indicating high variability in profitability. GPR for JK Cement ranges from 37.32% in 2015-16 to 51.79% in 2020-21, with a mean of 46.09%. The standard deviation is 4.17%, suggesting moderate variability in profitability. GPR for Ramco Cement varies from 18.89% in 2022-23 to 55.67% in 2016-17, with a mean of 36.79%. The standard deviation is 12.77%, indicating high variability in profitability. GPR for Nuvoco ranges from 20.07% in 2019-20 to 60.84% in 2013-14, with a mean of 40.69%. The standard deviation is 13.07%, indicating high variability in profitability. GPR for JK Lakshmi Cement varies from 21.76% in 2013-14 to 42.59% in 2015-16, with a mean of 34.23%. The standard deviation is 9.51%, suggesting relatively high variability in profitability. GPR for India Cement ranges from 41.58% in 2021-22 to 80.20% in 2013-14, with a mean of 50.02%. The standard deviation is 11.00%, indicating high variability in profitability. GPR for Star Cement varies from 41.98% in 2021-22 to 76.87% in 2013-14, with a mean of 54.42%. The standard deviation is 10.10%, indicating high variability in profitability. GPR for Heidelberg ranges from 33.29% in 2013-14 to 82.08% in 2022-23, with a mean of 44.34%. The standard deviation is 13.67%, indicating high variability in profitability. GPR for Orient Cement varies from 47.55% in 2016-17 to 58.50% in 2020-21, with a mean of 51.99%. The standard deviation is 3.96%, suggesting relatively stable profitability compared to other companies. GPR for Sagar Cement ranges from 13.31% in 2022-23 to 41.40% in 2017-18, with a mean of 28.98%. The standard deviation is 10.20%, indicating high variability in profitability. The mean GPR for the entire cement industry is 46.22%, with a standard deviation of 8.25% and a coefficient of variation of 7.99%. Based on this analysis, stakeholders can assess individual company performance, identify trends, and make informed decisions regarding investments or strategic initiatives within the cement industry.

5.2 Net profit ratio

The result presents an analysis of the Net Profit Ratio (NPR) for various companies in the cement industry across different years (Table S2 and **Fig. 1 & 2**). Ultratech's NPR ranges from 5.77% in 2018-19 to 13.94% in 2021-22, with a mean NPR of 10.01% and a standard deviation of 2.69%, indicating moderate variability in profitability over the years. Grasim Industries shows NPR ranging from 3.56% in 2018-19 to 11.77% in 2016-17, with a mean of 8.91% and a standard deviation of 2.48%, suggesting relatively stable profitability. Ambuja Cement's NPR ranges from 6.25% in 2015-16 to 13.20% in 2013-14, with a mean of 10.23% and a standard deviation of 2.69%, indicating moderate variability. Shree Cement exhibits NPR ranging from 6.61% in 2015-16 to 20.73% in 2015-16, with a mean of 13.00% and a standard deviation of 4.60%, suggesting

moderate variability. ACC Cement's NPR ranges from 3.73% in 2021-22 to 11.54% in 2020-21, with a mean of 7.63% and a standard deviation of 2.89%, indicating moderate variability. Dalmia's NPR ranges from -2.08% in 2016-17 to 12.40% in 2020-21, with a mean of 3.25% and a standard deviation of 4.34%, showing considerable variability. JK Cement shows NPR ranging from 1.26% in 2016-17 to 10.64% in 2020-21, with a mean of 5.51% and a standard deviation of 2.88%, indicating moderate variability. Ramco Cement's NPR ranges from 3.11% in 2013-14 to 16.49% in 2016-17, with a mean of 10.83% and a standard deviation of 4.75%, indicating moderate variability. Nuvoco's NPR ranges from -0.08% in 2018-19 to 12.97% in 2013-14, with a mean of 4.02% and a standard deviation of 4.18%, showing considerable variability. JK Lakshmi Cement's NPR ranges from 0.16% in 2016-17 to 8.91% in 2020-21, with a mean of 4.33% and a standard deviation of 3.08%, indicating moderate variability. India Cement's NPR ranges from -4.77% in 2013-14 to 4.62% in 2020-21, with a mean of 0.64% and a standard deviation of 2.77%, showing low variability. Star Cement exhibits NPR ranging from -0.34% in 2013-14 to 20.82% in 2017-18, with a mean of 11.36% and a standard deviation of 5.77%, indicating high variability. Heidelberg's NPR ranges from -3.35% in 2013-14 to 14.77% in 2020-21, with a mean of 6.47% and a standard deviation of 5.64%, indicating high variability. Orient Cement's NPR ranges from -1.55% in 2016-17 to 12.22% in 2014-15, with a mean of 4.93% and a standard deviation of 4.05%, showing moderate variability. Sagar Cement's NPR ranges from -5.47% in 2013-14 to 13.74% in 2020-21, with a mean of 4.72% and a standard deviation of 4.97%, indicating considerable variability. The mean NPR for the entire cement industry is 7.06%, with a standard deviation of 3.85%, and a coefficient of variation of 1.96%.

5.3 Operating profit ratio

The result presents an analysis of the Operating Profit Ratio (OPR) for selected companies in the cement industry across different years ((Table S3 and **Fig. 1 & 2**). Ultratech's OPR ranges from 11.73% in 2018-19 to 19.69% in 2020-21, with a mean OPR of 14.65% and a standard deviation of 2.43%, indicating moderate variability in operating profitability over the years. Grasim Industries shows OPR ranging from 8.44% in 2019-20 to 19.39% in 2020-21, with a mean of 14.20% and a standard deviation of 3.27%, suggesting moderate variability. Ambuja Cement's OPR ranges from 7.63% in 2015-16 to 17.12% in 2020-21, with a mean of 12.06% and a standard deviation of 3.48%, indicating moderate variability. Shree Cement exhibits OPR ranging from 6.37% in 2014-15 to 20.80% in 2020-21, with a mean of 14.03% and a standard deviation of 4.94%, showing moderate variability. ACC Cement's OPR ranges from 4.00% in 2021-22 to 14.59% in 2020-21, with a mean of 8.73% and a standard deviation of 3.34%, indicating moderate variability. Dalmia's OPR ranges from 2.43% in 2018-19 to 23.64% in 2015-16, with a mean of 10.34% and a standard deviation of 5.75%, indicating considerable variability. JK Cement shows OPR ranging from 8.15% in 2015-16 to 19.08% in 2020-21, with a mean of 12.39% and a standard deviation of 3.70%, indicating moderate variability. Ramco Cement's OPR ranges from 8.49% in 2013-14 to 23.66% in 2016-17, with a mean of 16.69% and a standard deviation of 5.61%, indicating considerable variability. Nuvoco's OPR ranges from -1.28% in 2022-23 to 21.54% in 2013-14, with a mean of 8.62% and a standard deviation of 5.70%, showing considerable variability. JK Lakshmi Cement's OPR ranges from 4.34% in 2015-16 to 14.46% in 2020-21, with a mean of 8.85% and a standard deviation of 3.35%, indicating moderate variability. India Cement's OPR ranges from -6.46% in 2013-14 to 12.14% in 2020-21, with a mean of 6.85% and a standard deviation of 5.61%, indicating considerable variability. Star Cement exhibits OPR ranging from 7.50% in 2013-14 to 24.99% in 2017-18, with a mean of 14.79% and a standard

deviation of 5.20%, indicating considerable variability. Heidelberg's OPR ranges from 1.48% in 2013-14 to 20.39% in 2020-21, with a mean of 12.80% and a standard deviation of 6.17%, indicating considerable variability. Orient Cement's OPR ranges from 3.32% in 2016-17 to 16.60% in 2014-15, with a mean of 10.20% and a standard deviation of 4.46%, indicating moderate variability. Sagar Cement's OPR ranges from 2.74% in 2013-14 to 23.68% in 2020-21, with a mean of 9.43% and a standard deviation of 6.03%, indicating considerable variability. The mean OPR for the entire cement industry is 11.64%, with a standard deviation of 4.60%, and a coefficient of variation of 2.77%.

5.4 Return on capital employed

The result provides an analysis of the Return On Capital Employed (ROCE) for selected companies in the cement industry across various years ((Table S4 and **Fig. 1 & 2**). Ultratech's ROCE ranges from 9.92% in 2018-19 to 14.62% in 2021-22, with a mean ROCE of 12.72% and a standard deviation of 1.47%, indicating relatively low variability in ROCE over the years. Grasim Industries shows ROCE ranging from 8.08% in 2018-19 to 16.37% in 2017-18, with a mean of 10.44% and a standard deviation of 2.82%, suggesting moderate variability. Ambuja Cement's ROCE ranges from 10.70% in 2022-23 to 21.37% in 2020-21, with a mean of 14.90% and a standard deviation of 3.61%, indicating moderate variability. Shree Cement exhibits ROCE ranging from 7.64% in 2015-16 to 21.24% in 2015-16, with a mean of 14.85% and a standard deviation of 4.39%, showing moderate variability. ACC Cement's ROCE ranges from 7.92% in 2022-23 to 19.05% in 2018-19, with a mean of 14.74% and a standard deviation of 3.62%, indicating moderate variability. Dalmia's ROCE ranges from 2.70% in 2018-19 to 10.48% in 2020-21, with a mean of 6.40% and a standard deviation of 2.53%, indicating relatively low variability. JK Cement shows ROCE ranging from 7.24% in 2013-14 to 18.26% in 2020-21, with a mean of 11.73% and a standard deviation of 3.77%, indicating moderate variability. Ramco Cement's ROCE ranges from 6.47% in 2022-23 to 18.28% in 2017-18, with a mean of 12.10% and a standard deviation of 4.25%, indicating moderate variability. Nuvoco's ROCE ranges from 1.73% in 2022-23 to 15.65% in 2013-14, with a mean of 7.12% and a standard deviation of 3.90%, indicating moderate variability. JK Lakshmi Cement's ROCE ranges from 4.09% in 2015-16 to 18.09% in 2020-21, with a mean of 10.11% and a standard deviation of 5.25%, indicating relatively high variability. India Cement's ROCE ranges from -3.80% in 2022-23 to 7.88% in 2015-16, with a mean of 4.69% and a standard deviation of 3.35%, indicating moderate variability. Star Cement exhibits ROCE ranging from 4.37% in 2013-14 to 19.59% in 2017-18, with a mean of 13.72% and a standard deviation of 4.51%, indicating moderate variability. Heidelberg's ROCE ranges from 1.00% in 2013-14 to 26.40% in 2020-21, with a mean of 14.82% and a standard deviation of 8.60%, indicating high variability. Orient Cement's ROCE ranges from 2.90% in 2016-17 to 22.49% in 2021-22, with a mean of 11.95% and a standard deviation of 6.18%, indicating relatively high variability. Sagar Cement's ROCE ranges from 2.98% in 2013-14 to 21.55% in 2020-21, with a mean of 9.13% and a standard deviation of 5.20%, indicating relatively high variability. The mean ROCE for the entire cement industry is 11.29%, with a standard deviation of 4.23%, and a coefficient of variation of 3.07%.

5.5 Return on net worth

The result presents an analysis of the Return on Net Worth (RONW) for selected companies in the cement industry across different years ((Table S5 and **Fig. 1 & 2**). Ultratech's RONW ranges from 7.98% in 2018-19 to 15.8% in 2019-20, with a mean RONW of 11.90% and a standard deviation of 2.67%, indicating moderate variability. Grasim Industries shows RONW ranging from 7.09%

in 2018-19 to 15.87% in 2021-22, with a mean of 11.94% and a standard deviation of 2.87%, suggesting moderate variability. Ambuja Cement's RONW ranges from 6.94% in 2014-15 to 15.43% in 2020-21, with a mean of 11.72% and a standard deviation of 3.14%, indicating moderate variability. Shree Cement exhibits RONW ranging from 7.03% in 2013-14 to 25.15% in 2016-17, with a mean of 15.05% and a standard deviation of 5.21%, showing relatively high variability. ACC Cement's RONW ranges from 4.54% in 2021-22 to 15.29% in 2018-19, with a mean of 10.41% and a standard deviation of 3.74%, indicating moderate variability. Dalmia's RONW ranges from -0.33% in 2018-19 to 11.28% in 2020-21, with a mean of 2.92% and a standard deviation of 3.90%, indicating relatively high variability. JK Cement shows RONW ranging from 3.42% in 2015-16 to 22.27% in 2020-21, with a mean of 11.75% and a standard deviation of 5.62%, indicating relatively high variability. Ramco Cement's RONW ranges from 4.66% in 2013-14 to 18.88% in 2016-17, with a mean of 12.39% and a standard deviation of 4.85%, indicating moderate variability. Nuvoco's RONW ranges from -0.13% in 2019-20 to 12.25% in 2013-14, with a mean of 4.99% and a standard deviation of 4.54%, indicating moderate variability. JK Lakshmi Cement's RONW ranges from -1.72% in 2015-16 to 22.27% in 2020-21, with a mean of 9.37% and a standard deviation of 8.41%, indicating relatively high variability. India Cement's RONW ranges from -3.03% in 2022-23 to 3.81% in 2020-21, with a mean of 0.85% and a standard deviation of 2.25%, indicating moderate variability. Star Cement exhibits RONW ranging from -0.31% in 2013-14 to 25.64% in 2017-18, with a mean of 14.76% and a standard deviation of 6.66%, indicating relatively high variability. Heidelberg's RONW ranges from -4.86% in 2013-14 to 22.43% in 2020-21, with a mean of 11.10% and a standard deviation of 9.08%, indicating high variability. Orient Cement's RONW ranges from -3.17% in 2016-17 to 21.59% in 2018-19, with a mean of 9.84% and a standard deviation of 7.69%, indicating relatively high variability. Sagar Cement's RONW ranges from -10.08% in 2013-14 to 16.99% in 2020-21, with a mean of 5.10% and a standard deviation of 6.99%, indicating relatively high variability. The mean RONW for the entire cement industry is 9.61%, with a standard deviation of 5.17%, and a coefficient of variation of 2.10%.

6. Discussion

The financial performance of 15 selected cement companies in India over the period from 2013-14 to 2022-23 was analysed using key financial ratios, including Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW) in Table 1. The results indicate that the cement industry exhibits strong gross profitability, with a GPR of 46.22%. However, the standard deviation of 8.25 suggests moderate variability in gross profit margins, while a consistency score of 7.99 reflects a relatively stable trend over time. In contrast, the NPR is significantly lower at 7.06%, indicating that substantial operating, financial, and tax-related expenses reduce final earnings. Despite this, the NPR demonstrates the highest consistency score (1.96) among all financial ratios, suggesting relatively stable net profitability across the industry. The OPR is recorded at 11.64%, with a standard deviation of 4.60 and a consistency score of 2.77, implying moderate stability in operational efficiency. The ROCE, at 11.29%, measures the firms' ability to generate returns from total capital employed. With a standard deviation of 4.23 and a consistency score of 3.07, the findings suggest moderate fluctuations in capital utilization efficiency. The RONW is 9.61%, but it exhibits the highest variability (standard deviation of 5.17), indicating significant fluctuations in shareholder returns. However, a consistency score of 2.10 suggests that, despite these variations, the overall trend remains relatively stable. While the cement industry maintains strong gross

profitability, the relatively low net profit margins highlight the impact of high operational and financial costs. Furthermore, variability in ROCE and RONW suggests disparities in financial performance among firms, reflecting differences in capital structures, cost efficiencies, and profitability management strategies. The consistency scores provide insight into the stability of these financial ratios, with NPR demonstrating the highest predictability, while RONW remains the most volatile measure of financial performance. This analysis underscores the need for firms to optimize cost structures and enhance capital efficiency to improve overall financial sustainability.

The GPR illustrates the efficiency of these companies in generating profits concerning their revenue, showcasing varying degrees of operational adeptness. Ultratech and Grasim Industries display commendable stability in GPR, signaling a consistent ability to manage costs and retain profits despite market fluctuations. On the other end, Ambuja Cement, UltraTech cement, orient cement and Shree Cement demonstrate superior efficiency in retaining gross profits, reflecting their effective cost controls or strong pricing strategies. The substantial fluctuations seen in ACC Cement and Dalmia's GPR values hint at potential challenges in managing costs or strategic shifts impacting profitability. These fluctuations across various companies underscore the influence of multifaceted factors—market competition, operational strategies, and broader industry trends—on their profitability over time.

The NPR analysis reveals a spectrum of profitability and efficiency in managing costs across different cement companies. Ultratech's fluctuations maintain a notable profitability range, reflecting its adaptability to varying market dynamics. Similarly, Ambuja Cement, Grasim industries, ACC cement, Ramco cement and star cement and Shree Cement showcase sustained profitability, emphasizing their effective cost management strategies. However, the varied NPR values across companies like ACC Cement and Dalmia signify potential struggles in maintaining consistent profitability. The presence of negative NPR occasionally for Dalmia underscores significant challenges in managing costs or encountering losses in certain fiscal periods. These fluctuations were influenced by market dynamics and operational strategies, offer insights into the competitive landscape and financial health of these companies.

OPR highlights the operational efficiency and profitability from core business activities. Ultratech's consistently moderate to high OPR indicates effective management of direct expenses, ensuring strong operating profitability. Grasim industries, ambuja cement, Shree cement, Jk cement, Ramco cement. star cement and Heidelberg cement higher opr than the average opr ensures effective management of direct expenses. Meanwhile, fluctuations in Grasim Industries' OPR suggest changes in production costs or market dynamics impacting operational efficiency. The diverse patterns seen in Ambuja Cement, Shree Cement, ACC Cement, and Dalmia's OPR values imply varying levels of operational efficiency and profitability strategies influenced by market conditions, operational changes, or cost structures.

ROCE signifies the effectiveness of utilizing capital to generate profits, reflecting the financial health and operational effectiveness of these companies. Ultratech's consistently moderate to high ROCE figures underscore its efficiency in generating profits from employed capital, reflecting sound financial management. ambuja cement, Shree cement, acc cement and Jk cement are reflecting sound financial management. While Grasim Industries maintains a relatively stable yet conservative trend in ROCE, Ambuja Cement and Shree Cement showcase fluctuations, indicating shifts in operational efficiency and the ability to maximize returns on the capital employed. The

diversified ROCE patterns across companies signify differing levels of efficiency in generating profits from the capital employed, influenced by operational performance and industry dynamics. RONW reflects a company's ability to generate returns for shareholders from the equity invested in the business. Ultratech's consistent RONW figures demonstrate its proficiency in leveraging equity to generate stable returns. The varying RONW values across companies like Ambuja Cement, Grasim industries, acc cement. Ramco cement, star cement and Shree Cement suggest different levels of success in utilizing shareholders' equity to generate profits. These analyses collectively underline the complexities within the cement industry, with companies exhibiting diverse financial performances influenced by operational strategies, market conditions, and financial management practices. Understanding of these trends aids in assessing their competitive positions and shareholder value creation within the industry.

7. Conclusion

The holistic examination of key financial metrics such as GPR, NPR, OPR, ROCE, and RONW across multiple fiscal years offers profound insights into the financial vitality, operational efficacy, and competitive landscape of the Indian cement industry. The analysis of GPR highlights a spectrum of operational efficiency among companies. Ultratech and Grasim Industries exhibit commendable stability, consistently generating profits efficiently relative to revenue. In contrast, Ambuja Cement and Shree Cement demonstrate superior proficiency in preserving gross profits, which may be attributed to effective cost controls or robust pricing strategies. NPR fluctuations reveal varying degrees of profitability and cost management capabilities across firms. Ambuja Cement and Shree Cement maintain relatively stable net profits, whereas ACC Cement and Dalmia encounter challenges in sustaining profitability, suggesting potential issues in managing cost structures effectively. OPR analysis underscores the core operational efficiency of the firms. Ultratech maintains a consistently strong OPR, highlighting its operational robustness, while other companies show more pronounced fluctuations, indicating differing levels of operational adaptability in response to market dynamics and internal operational shifts. ROCE serves as an indicator of capital utilization efficiency. Ultratech once again stands out, consistently demonstrating effective profit generation from capital employed. In contrast, Ambuja Cement and Shree Cement exhibit more variable ROCE values, likely influenced by evolving operational strategies and external market conditions. RONW reflects the ability of firms to deliver returns to shareholders on their equity investments. Ultratech records stable and consistent returns, while other firms display fluctuating but generally moderate to strong RONW values, indicating varied success in leveraging shareholder equity for profit generation.

Thus, financial stability in these ratios typically signals effective cost management and sound operational planning, whereas fluctuations may indicate challenges in cost control, strategic alignment, or response to market volatility. The observed variations in financial ratios across companies underscore the influence of market competition, evolving industry trends, and firm-specific operational strategies on profitability over time. Collectively, the consistency or volatility in these financial indicators provides a comprehensive perspective on each company's financial health, operational efficiency, and competitive positioning. These insights are valuable for stakeholders—including investors, analysts, and policymakers in evaluating firm performance, identifying areas of concern or strength, and envisioning opportunities for sustained growth and strategic advancement within the cement industry. The findings of this study offer critical guidance for policymakers aiming to ensure the financial resilience and global competitiveness of the Indian cement sector. Regulators may consider incentivizing technological innovation, energy efficiency,

and cost optimization measures among firms that demonstrate persistent financial instability. Support for modernization, digitalization, and supply chain improvements particularly for mid-sized players can enhance operational efficiency and equity returns. Moreover, policies promoting financial transparency, benchmarking, and corporate governance standards across the industry can help reduce performance disparities and foster a more resilient and sustainable industrial landscape. Encouraging mergers or strategic collaborations among weaker players may also stabilize the sector and improve capital productivity.

Based on the profitability analysis of the Indian cement industry using core financial ratios—Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW)—several meaningful suggestions for public policy can be proposed. Firstly, the government should promote energy efficiency through tax incentives and subsidies, as firms with high OPR and ROCE often benefit from advanced, sustainable production technologies. Policies such as extending the scope of the Perform, Achieve, and Trade (PAT) scheme or offering accelerated depreciation for green assets can encourage this transition. Secondly, profitability indicators reveal that firms located near raw material sources or with superior logistics enjoy higher margins. Therefore, policy support should include improved rail and road connectivity, integrated logistics hubs, and streamlined freight corridors to reduce transport costs and enhance GPR and OPR. Thirdly, the capital efficiency reflected in ROCE and RONW underscores the need for easier access to finance, particularly for small and mid-sized firms. Government-backed credit schemes, infrastructure bonds, and interest subsidies can support modernisation and capacity expansion. Fourthly, to enhance NPR and overall profitability, policymakers should focus on simplifying the regulatory environment—particularly in the areas of environmental clearances, land acquisition, and taxation—to reduce operational delays and costs. In addition, promoting export competitiveness through port infrastructure development and trade facilitation can further improve margins for export-oriented firms. Lastly, there is a growing need to align ESG (Environmental, Social, Governance) objectives with profitability. Public policy should support mandatory ESG reporting and provide incentives for firms investing in low-carbon technologies and circular economy initiatives, helping link long-term financial performance with sustainable industrial development. These policy measures, grounded in profitability analysis, can enhance not only firm-level financial outcomes but also support broader national goals of economic growth, sustainability, and inclusive industrialization.

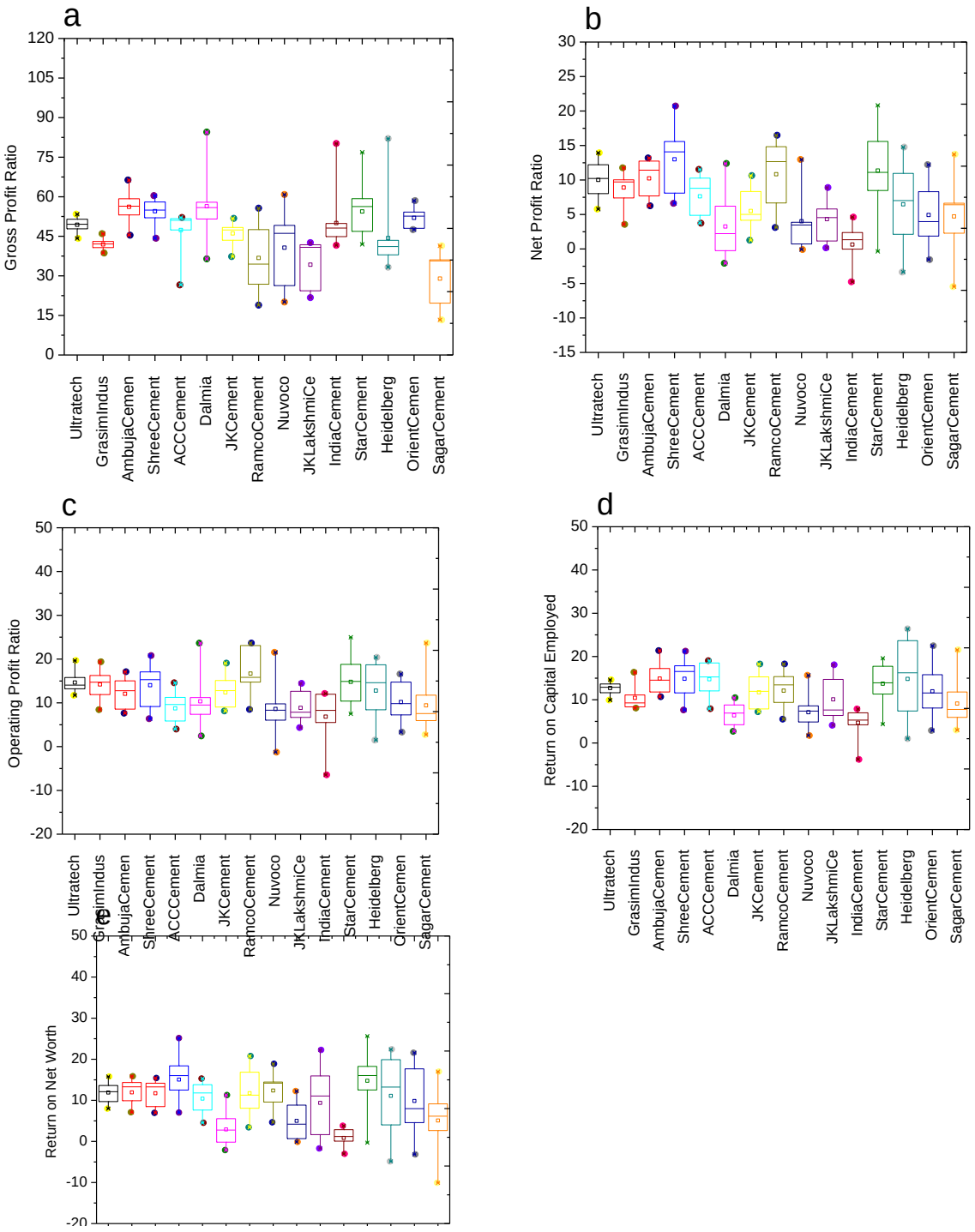

Fig. 1. Box plot representation of key financial ratios including Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW) for 15 selected cement companies in India over the period from 2013 14 to 2022 23. The box plot illustrates the distribution, median, interquartile range, and potential outliers for each ratio.

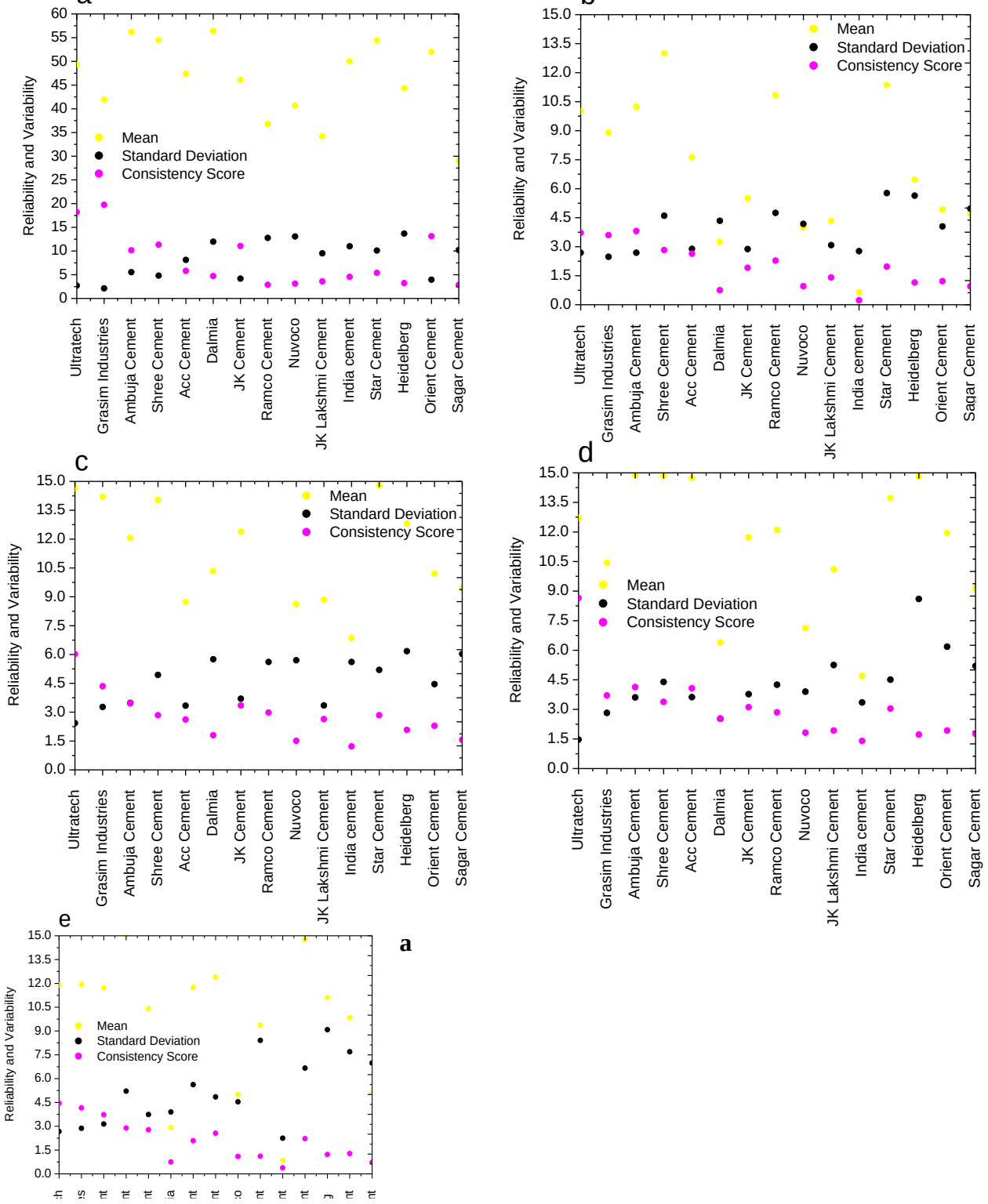

Fig. 2 Box plot representation of key financial ratios including Gross Profit Ratio (GPR), Net Profit Ratio (NPR), Operating Profit Ratio (OPR), Return on Capital Employed (ROCE), and Return on Net Worth (RONW) for 15 selected cement companies in India over the period from 2013 14 to 2022 23. The box plot illustrates the distribution, median, interquartile range, and potential outliers for each ratio.

Table S1

Company Year	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18	2016-17	2015-16	2014-15	2013-14	Mean	S. D	C.S
Ultratech	44.20	49.57	53.41	51.45	47.82	49.25	51.61	50.80	49.13	46.35	49.36	2.71	18.21
Grasim Industries	38.66	42.09	45.98	39.57	42.12	42.04	44.08	43.05	40.72	41.18	41.95	2.12	19.76
Ambuja Cement	45.39	66.34	54.46	55.41	52.67	53.10	56.42	59.23	60.00	58.83	56.19	5.54	10.15
Shree Cement	44.25	53.69	60.41	56.88	53.49	58.02	60.09	54.95	51.24	52.03	54.51	4.81	11.34
ACC Cement	40.27	50.19	51.07	51.71	51.27	51.87	52.13	51.06	26.56	47.42	47.36	8.13	5.82
Dalmia	84.51	51.55	57.92	56.58	53.03	55.90	36.43	61.89	55.26	50.80	56.39	11.97	4.71
JK Cement	43.21	48.12	51.79	50.45	45.99	47.41	48.34	37.32	43.51	44.74	46.09	4.17	11.06
Ramco Cement	18.89	26.82	34.46	28.62	26.25	31.31	55.67	54.47	47.53	43.85	36.79	12.77	2.88
Nuvoco	37.17	42.65	50.50	25.67	20.07	46.12	48.41	26.30	49.14	60.84	40.69	13.07	3.11
JK Lakshmi Cement	21.76	21.97	25.00	24.35	40.03	41.81	42.46	40.81	42.59	41.50	34.23	9.51	3.60
India cement	80.20	41.58	48.67	44.88	43.00	46.84	50.94	49.87	48.13	46.10	50.02	11.00	4.55
Star Cement	76.87	41.98	43.82	46.88	50.21	56.44	52.06	56.27	60.46	59.25	54.42	10.10	5.39
Heidelberg	82.08	37.87	43.48	44.56	43.30	41.10	37.96	39.61	40.14	33.29	44.34	13.67	3.24
Orient Cement	47.75	57.44	58.50	52.73	54.20	52.66	47.55	48.88	52.13	48.01	51.99	3.96	13.13
Sagar Cement	13.31	22.19	33.06	19.66	15.55	41.40	36.06	35.85	35.68	37.00	28.98	10.20	2.84
Cement Industry											46.22	8.25	7.99

Analysis of gross profit ratio of the selected companies

Table S2
Analysis of net profit ratio of the selected companies

Company Year	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18	2016-17	2015-16	2014-15	2013-14	Mean	S. D	C.S
Ultratech	8.02	13.94	12.21	13.55	5.77	7.18	10.69	9.86	8.64	10.22	10.01	2.69	3.72
Grasim Industries	9.42	11.71	9.14	9.73	3.56	6.60	11.77	10.02	7.39	9.72	8.91	2.48	3.60
Ambuja Cement	7.77	12.74	12.81	12.67	10.27	11.42	7.69	6.25	7.49	13.20	10.23	2.69	3.81
Shree Cement	7.11	15.57	16.89	12.00	8.09	14.08	15.58	20.73	6.61	13.37	13.00	4.60	2.83
ACC Cement	3.99	3.73	11.54	10.37	8.80	10.27	6.96	5.99	4.88	9.80	7.63	2.89	2.64
Dalmia	3.84	6.20	12.40	1.11	-0.36	2.22	-2.08	7.25	2.18	-0.24	3.25	4.34	0.75
JK Cement	4.31	8.50	10.64	8.33	5.01	5.88	4.28	1.26	4.17	2.68	5.51	2.88	1.91
Ramco Cement	4.19	14.87	14.43	11.21	9.83	12.67	16.49	14.83	6.67	3.11	10.83	4.75	2.28
Nuvoco	3.77	0.72	0.37	3.48	-0.08	2.21	3.24	3.87	9.65	12.97	4.02	4.18	0.96
JK Lakshmi Cement	5.45	8.81	8.91	5.80	0.94	1.16	2.99	0.16	4.55	4.51	4.33	3.08	1.41
India cement	-3.03	1.36	4.62	1.03	0.44	1.34	3.05	2.38	-0.02	-4.77	0.64	2.77	0.23
Star Cement	9.15	11.11	10.88	15.59	16.66	20.82	13.15	8.12	8.48	-0.34	11.36	5.77	1.97
Heidelberg	4.43	10.96	14.77	12.36	10.34	7.01	4.43	2.12	1.66	-3.35	6.47	5.64	1.15
Orient Cement	3.91	8.54	8.30	3.33	1.78	1.87	-1.55	3.97	12.22	6.88	4.93	4.05	1.22
Sagar Cement	2.04	6.63	13.74	4.07	2.95	6.60	2.29	7.93	6.41	-5.47	4.72	4.97	0.95
Cement Industry											7.06	3.85	1.96

Table S3
Analysis of operating profit ratio of the selected companies

Company Year	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18	2016-17	2015-16	2014-15	2013-14	Mean	S. D	C.S
Ultratech	12.44	17.14	19.69	15.70	11.73	13.21	15.79	14.05	13.29	13.41	14.65	2.43	6.02
Grasim Industries	14.73	17.99	19.39	8.44	13.62	14.95	16.25	13.82	10.92	11.90	14.20	3.27	4.35
Ambuja Cement	8.48	16.96	17.12	15.03	12.78	10.57	10.50	7.63	8.56	12.97	12.06	3.48	3.46
Shree Cement	7.28	17.08	20.80	15.19	9.16	16.58	15.29	19.18	6.37	13.38	14.03	4.94	2.84
ACC Cement	4.66	4.00	14.59	11.25	11.80	9.66	9.63	7.85	5.86	8.06	8.73	3.34	2.62
Dalmia	7.39	9.50	14.79	5.42	2.43	9.22	11.20	23.64	11.10	8.76	10.34	5.75	1.80
JK Cement	9.05	15.10	19.08	16.31	11.96	12.79	13.56	8.15	9.67	8.24	12.39	3.70	3.35
Ramco Cement	8.59	15.05	23.10	15.84	14.74	18.98	23.66	23.43	15.02	8.49	16.69	5.61	2.98
Nuvoco	-1.28	5.41	9.27	11.41	6.04	9.77	7.87	8.33	7.80	21.54	8.62	5.70	1.51
JK Lakshmi Cement	8.41	13.06	14.46	12.64	6.12	6.68	7.20	4.34	7.73	7.86	8.85	3.35	2.64
India cement	-6.46	5.51	12.14	6.45	6.36	8.29	11.98	11.97	9.30	2.99	6.85	5.61	1.22
Star Cement	12.47	10.07	10.40	16.42	18.80	24.99	19.08	13.31	14.89	7.50	14.79	5.20	2.84
Heidelberg	6.10	14.93	19.72	20.39	18.69	14.61	11.65	8.41	12.00	1.48	12.80	6.17	2.08
Orient Cement	7.28	14.74	16.45	9.83	7.13	8.29	3.32	7.25	16.60	11.12	10.20	4.46	2.29

Sagar Cement	4.63	13.22	23.68	7.56	6.18	11.76	5.95	11.57	6.97	2.74	9.43	6.03	1.56
Cement Industry											11.64	4.60	2.77

Table S4
Analysis of return on capital employed of the selected companies

Company Year	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18	2016-17	2015-16	2014-15	2013-14	Mean	S. D	C.S
Ultratech	12.77	14.62	14.54	11.63	9.92	11.45	13.66	12.88	12.18	13.57	12.72	1.47	8.65
Grasim Industries	9.04	8.86	8.36	8.14	8.08	9.27	16.37	14.26	11.11	10.91	10.44	2.82	3.71
Ambuja Cement	10.7	11.8	21.37	17.22	17.2	14.21	14.53	12.34	10.91	18.68	14.90	3.61	4.13
Shree Cement	8.51	16.54	18.5	14.28	11.59	16.83	17.85	21.24	7.64	15.52	14.85	4.39	3.38
Acc Cement	7.92	18.75	18.51	14.24	19.05	15.84	15.27	11.02	12.04	14.76	14.74	3.62	4.07
Dalmia	8.8	6.99	10.48	4.23	2.7	6.93	6.28	9	4.66	3.92	6.40	2.53	2.53
JK Cement	9.66	15.29	18.26	15.59	11.95	12.64	11.27	7.89	7.52	7.24	11.73	3.77	3.11
Ramco Cement	6.47	9.4	14.53	12.13	13.45	16.24	18.28	15.35	9.6	5.51	12.10	4.25	2.85
Nuvoco	1.73	3.87	5.43	8.59	4.86	7.38	5.14	10.1	8.47	15.65	7.12	3.90	1.82
JK Lakshmi Cement	13.8	17.23	18.09	14.71	6.38	5.77	6.52	4.09	7.63	6.84	10.11	5.25	1.93
India cement	-3.8	3.11	6.43	4.22	4.69	5.31	7.41	7.88	6.98	4.62	4.69	3.35	1.40
Star Cement	17.8	11.2	12.79	16.93	17.75	19.59	13.92	11.49	11.33	4.37	13.72	4.51	3.04
Heidelberg	10.8	20.28	24.18	26.4	23.67	16.24	10.99	7.41	7.24	1	14.82	8.60	1.72

Orient Cement	11.57	22.49	18.79	10.88	8.1	8.37	2.9	5.09	15.79	15.52	11.95	6.18	1.93
Sagar Cement	7.59	11.8	21.55	6.12	5.93	9.62	5.79	12.19	7.76	2.98	9.13	5.20	1.76
Cement Industry											11.29	4.23	3.07

Table S5
Analysis of return on net worth of the selected companies

Company Year	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18	2016-17	2015-16	2014-15	2013-14	Mean	S. D	C.S
Ultratech	9.69	15.5	13.13	15.8	7.98	8.76	11.71	12.1	10.71	13.62	11.90	2.67	4.45
Grasim Industries	14.35	15.87	11.44	13.29	7.09	8.31	14.44	13.66	9.91	10.99	11.94	2.87	4.16
Ambuja Cement	8.48	14.17	15.43	13.27	11.98	13.81	9.61	8.26	6.94	15.22	11.72	3.14	3.73
Shree Cement	7.03	14.22	16.03	13.52	12.5	16.68	18.41	25.15	8.54	18.4	15.05	5.21	2.89
ACC Cement	5.65	4.54	13.8	11.8	12.48	15.29	10.18	7.64	8.39	14.36	10.41	3.74	2.78
Dalmia	3.36	5.53	11.28	1.06	-0.33	2.76	-2.11	6.03	1.77	-0.19	2.92	3.90	0.75
JK Cement	9.3	16.85	20.79	16.87	11.27	15.5	10.43	3.42	8.08	5	11.75	5.62	2.09
Ramco Cement	5.07	14.46	14.23	12.67	11.73	14.18	18.88	18.45	9.59	4.66	12.39	4.85	2.56
Nuvoco	3.62	0.68	0.34	4.85	-0.13	3.45	4.2	8.84	11.8	12.25	4.99	4.54	1.10
JK Lakshmi Cement	11.8	20.77	22.27	15.95	1.65	1.64	2.87	-1.72	11.05	7.39	9.37	8.41	1.11

India cement	-3.03	1.2	3.81	1.18	0.53	1.35	3.08	2.86	0.06	-2.55	0.85	2.25	0.38
Star Cement	16.92	11.63	12.52	16.05	19.06	25.64	18.25	14.1	13.75	-0.31	14.76	6.66	2.22
Heidelberg	6.78	16.49	22.43	21.57	19.9	13.23	8.19	4.03	3.24	-4.86	11.10	9.08	1.22
Orient Cement	7.85	18.6	17.67	7.97	4.58	4.4	-3.17	6.19	21.59	12.74	9.84	7.69	1.28
Sagar Cement	2.65	8.34	16.99	3.59	3.09	6.14	1.87	9.15	9.21	-10.08	5.10	6.99	0.73
Cement Industry											9.61	5.17	2.10

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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