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Sector-Wise Investment Return Dispersion in Indian CPSEs: A Comprehensive Study of Aggregation Methods

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ABSTRACT

Central Public Sector Enterprises (CPSEs) are integral to India's economic framework, providing critical goods and services. To ensure long-term sustainability, CPSEs must consistently generate reasonable profits. A higher dispersion in investment returns indicates greater risk. Therefore, this study analyses the industry-wise dispersion of investment returns in Indian CPSEs over the period from 2010-11 to 2019-20. Secondary data was utilized for the study. Dispersion in investment returns was assessed using the Coefficient of Variation (CV). Additionally, a paired t-test was employed to identify significant changes in average dispersion across the selected period, and one-way ANOVA was used to examine differences in investment returns among various industries. The findings show significant variability in the rate of investment returns across industries, with some industries displaying better consistency in returns during the first sub-period compared to the second. The study also revealed significant differences in investment returns across industries, underscoring the impact of each industry's performance on the overall investment returns of CPSEs. This study provides valuable insights into the dispersion of investment returns in CPSEs, offering a clearer understanding of the inherent risks across different industries and their cumulative effect on the financial health of CPSEs.

1. Introduction

The current research provides the industry-wise dispersion of investment returns in Indian Central Public Sector Enterprises (CPSEs) during the years 2010-11 to 2019-20. Continuous profitability is key to the continuation of long-run economic contributions on the part of CPSEs. The core research question investigates the variability in investment returns across industries, with sub-questions focusing on the extent of return dispersion, differences between sub-periods, industry-specific impacts on aggregate returns, and the statistical significance of these variations. The study employs a quantitative methodology, utilizing secondary data, with investment ratios as the core variables. The article is structured to progress from a literature review to methodology, results, and conclusion, systematically addressing the significance of return dispersion in CPSEs.

2. Literature Review

This section reviews previous studies on the dispersion of investment returns in CPSEs, arranged around five sub-research questions. It measures the variability of investment returns, differences between sub-periods, industry-specific impacts, and statistical significance of such variations. Reviewing the research gaps, including the need for detailed industry-specific analyses and long-term trend evaluation, it outlines hypotheses to address these gaps.

2.1 Variability of Investment Returns

Most previous research has discussed only general trends and patterns of the returns of investments in CPSEs and left out industry-specific variations. Initially, there was a pattern followed by some

later detailed methodologies; however, the results with regard to each industry remained pretty vague. Presently, much research is attempting to bridge that gap, and still, for longitudinal data it is still lacking robustness. Hypothesis 1: There exists vast variability in different industries of the investment returns under CPSEs.

2.2 Differences Among Sub-Periods

Investment return studies early on did not account for changes over time. The subsequent studies then started to factor in the sub-period differences and found some, but not uniform, patterns. The latest research tries to incorporate more temporal variables but still cannot achieve comprehensive analysis across periods. Hypothesis 2: Investment returns exhibit significant differences between the 1st and 2nd sub-periods in CPSEs.

2.3 Industry Effects on Aggregate Returns

To some limited extent, specific industry influences on aggregate CPSE returns have been covered by few studies. Most such research has narrowed its focus and lacks a wide-angle view of coverage. While mid-term work improved upon these efforts, more recent work continues to fail in correlating industry-specific returns with robust measures of aggregate CPSE performance. Hypothesis 3: Specific industries are significant factors for aggregate CPSE investment returns.

2.4 Statistical Significance of Variation

Statistical significance of variations in returns was less researched; earlier works mainly provided descriptive statistics. Inferential statistics started appearing in later works, and a few works are seen that sometimes did not come up with sound conclusions. More rigorous research in the field has recently been carried out. Hypothesis 4: Variations in returns between industries are statistically significant.

2.5 Long-Term Trends in CPSE Returns

Long-term trends in CPSE returns have not been adequately explored, and early studies were mainly concerned with short-term fluctuations. Mid-term research provided more longitudinal data but lacked depth in trend analysis. Recent efforts have improved the scope but still need more robust frameworks for long-term evaluation. Hypothesis 5: Long-term trends in CPSE investment returns reveal significant industry-wise dispersion.

3. Method

This section details the quantitative research methodology used to analyze industry-wise dispersion of investment returns in Indian CPSEs. The study relies on secondary data and employs statistical techniques such as coefficient of variation, paired 't' test, and one-way ANOVA to evaluate the research hypotheses.

3.1 Data

The study involves secondary data gathering from the annual financial reports of Indian CPSEs for the period 2010-11 to 2019-20. Data on investment returns is garnered across different industries in which the samples are selected for the availability of consistent financial statements. The gathered data is therefore processed to measure dispersion and tests of statistical for a robust inference of investment return variability.

3.2 Variables

The study variables are investment ratios as independent variables and dispersion measures as dependent variables. The control variables used are the type of industry and sub-period classification. Coefficient of variation is used as a measure of dispersion, while paired 't' tests and one-way ANOVA assess the statistical significance. These variables are chosen in relation to the hypotheses of the study and have been validated using the existing literature on financial performance analysis.

4 Result

The analysis starts by qualitatively interpreting the distribution of return data between the years 2010-11 and 2019-20. Tests based on statistics further confirm these hypotheses: Hypothesis 1 is accepted that returns do have significant industry-to-industry variations; Hypothesis 2 validates the hypothesis by showing variation across sub-periods; Hypothesis 3 confirms variations caused by individual industries in the aggregated returns; Hypothesis 4 confirmed that these variations in return are statistically significant; and Hypothesis 5 has demonstrated long-run variation in the dispersions. These findings highlight the relevance of industry-specific factors in investment performance of CPSEs and elucidate the underlying dynamics of return variability.

4.1 Inter-Industry Variation in Investment Returns

This is consistent with Hypothesis 1, wherein it was contended that CPSEs' returns are highly variant across industries. Using data over the period of 2010-11 to 2019-20, statistical analysis does reveal considerable variance in returns across industries. Further, coefficients of variation show substantial variance across industries. Important factors include industry, as well as investment ratios and patterns of significant disparity. Thus, the results in terms of empirical significance infer that industry-related factors are strong in determining investments that must be different as each industry necessitates a certain kind of investment. This thus concludes the work based on industry-specific dynamics required in CPSE investments.

4.2 There exists a vast difference in the return between different sub-periods

This finding supports Hypothesis 2, indicating significant differences in investment returns between the 1st and 2nd sub-periods within CPSEs. Analyzing data across these periods, statistical tests reveal notable shifts in return patterns, with paired ‘t’ tests confirming significant transformations. Key variables include sub-period classification and return metrics, with marked changes observed in industry performance over time. The empirical significance underscores the influence of temporal factors on investment returns, highlighting the need for adaptive strategies across different periods. By addressing gaps in temporal analysis, this finding emphasizes the importance of considering sub-period dynamics in CPSE investment studies.

4.3 Industry-Specific Impacts on Aggregate Returns

This finding validates Hypothesis 3, highlighting significant industry-specific impacts on aggregate investment returns of CPSEs. Statistical analysis of data from 2010-11 to 2019-20 shows that some industries significantly impact the overall performance of CPSEs. One-way ANOVA tests confirm that the variations are statistically significant. Industry type and aggregate return metrics are the key variables, and differences in industry contributions to overall returns are notable. The empirical

significance implies that understanding the industry-specific impacts is important for optimizing CPSE investment strategies and, therefore, calls for targeted analysis. Through addressing industry impact gaps within studies, this finding strengthens the consideration of industry-specific factors while analyzing CPSE returns.

4.4 Statistical Significance of Return Variations

The finding also supports Hypothesis 4 and establishes that the differences in investment returns are statistically significant among the industries analyzed. Using one-way ANOVA tests, the statistical difference in return patterns among the industries is established, and the variations are confirmed in every industry. The key variables involved are industry classification and return metrics, with large differences observed in statistical significance. Empirical significance underlines the need for careful statistical analysis to understand return variability, with a strong call for thorough assessment. Addressing gaps in studies on statistical significance, this finding underscores the critical role of robust analysis in CPSE investment research.

5. Conclusion

This study synthesizes findings on industry-wise dispersion of investment returns in Indian CPSEs, which have significant variability across industries, temporal differences between sub-periods, and industry-specific impacts on aggregate returns. The study, therefore, establishes the importance of return variability dynamics in understanding factors that shape investment performance in CPSEs. However, some limitations have been observed: dependence on past data that may not reflect future patterns and data limitations in some industries. Future studies should expand the scope into more industries and longer periods to provide a full expression of the investment dynamics in CPSEs. Addressing these areas will help future studies improve the practical applications of CPSE investment analysis, hence optimizing financial strategies across industries.

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