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Analysis of Financial Indicators of Stocks in 2014

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Subject, Research Question, & Motivation

Subject:

- We are going to an analysis of publicly traded companies in 2014 through key indicators like R&D expenditure, revenue, and profit to find what it can tell us about stock movement and future projections

Motivation:

- Our motivation is to better understand how countries and economies are able to best recover in a post-recession economy through hypothesis testing and regression analysis

Research Question:

- How do financial indicators like R&D expenditure, revenue, and profit relate to stock returns in 2014 and what can it tell us about post-recession economies?



2014 Financial Indicator Dataset

Data Set:

- Financial dataset of 700+ publicly traded companies from 2014
- Includes 10+ column of quantitative data including:
 - Revenue
 - Profit Margin
 - Gross Profit
 - R&D expenditure

Data Processing:

- Removed duplicates and missing values
- Included only active companies during 2014
- Analysis will be made through RStudio and made reproducible through GitHub

Descriptive Statistics

Variables:

- Outcome Variable, y :
 - Stock Return (%)
- Predictor Variables:
 - R&D
 - Profit
 - Market Capitalization
 - Revenue
 - Earnings per share (EPS)
 - Operating Expenses
- $n = 788$ (*before processing),
- $k = 6$
- Skewness can help identify strong or weak correlation

Hypothesis:

- H_0 - No correlation between predictor variables and stock return,
- H_1 - The predictor variables are correlated to stock return,
- Simple linear regression performed on all six predictors, then drop one iteratively and perform t-test for $\alpha=0.05$.

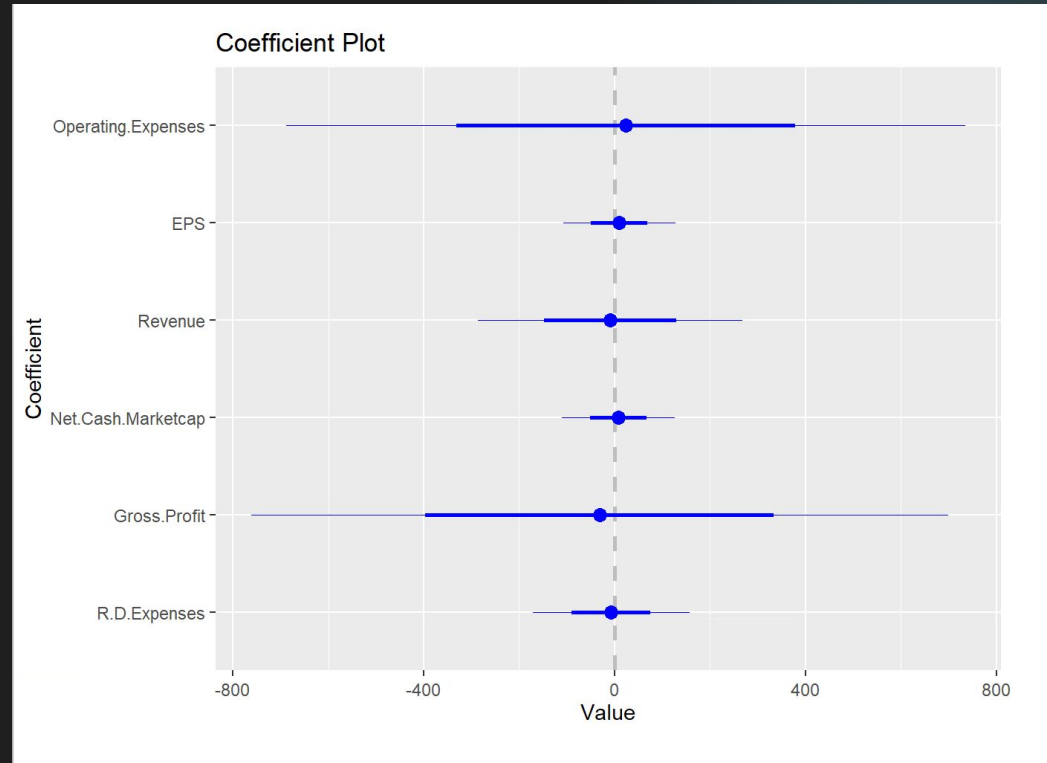
$$y = \alpha + \beta x$$

$$Var(\hat{\beta}) = \sigma^2(\mathbf{X}'\mathbf{X})^{-1}$$

$$t = \frac{\hat{\beta}}{SE(\hat{\beta})}$$

Results

- The coefficient plot displays each predictor's estimated effect on stock returns with confidence intervals.
- All of the coefficients are very close to zero and all of the confidence intervals cross zero.
- None of the financial indicators are statistically significant (all p-values > 0.86).
- The regression model has virtually no explanatory power ($R^2 \approx 0.002$).
- Overall, the plot suggested that the selected financial indicators did not significantly influence stock returns in 2014.



Next Steps

1. Expand the Data To Gain More In-Depth Conclusions

Incorporate additional financial indicators such as:

- Debt-to-equity ratio
- Cash flow
- Price-to-earnings (P/E) ratio
- Dividend yield

2. Conduct Time-Series or Multi-Year Analysis

- Compare financial indicators across several years (2010–2020).
- Examine how predictor importance changes pre- and post-recession.
- Use lagged variables to test delayed effects on stock returns.

3. Explore Causal Inference

- Use instrumental variables, matching, or other testing if needed.
- Evaluate whether R&D or profit *causally* affects returns rather than merely correlating.
- Look into potential confounding variables that may have affected the results