# Giorgi's Capstone Oral Defense

Navigating Corporate Turbulence: a Causal Inference Study of Negative Market Performance and Its Influence on Involuntary CEO Dismissal

MINERVA UNIVERSITY

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CP 194

- Gentry et al. 2020 CEO dismissal dataset
  - Lacks context
  - No financial information

Deliverables:

1. Dataset with CEO Dismissal and financial performance of the S&P 500 companies from 2008 up until 2023.
2. Researching causal question:

How does financial performance impact involuntary CEO Dismissal?

#rightproblem

#constraints

# Dataset:

| Statistic | N | Mean | St. Dev. | Min | Max |
|---|---|---|---|---|---|
| Net Income | 4,332 | 26.579 | 1,740.912 | −7.997 | 114,583.300 |
| Operating Income | 4,332 | 8.252 | 537.140 | −9.495 | 35,353.540 |
| EPS Basic | 4,332 | 0.980 | 1.848 | −39.030 | 19.850 |
| CEO Dismissal | 4,332 | 0.044 | 0.205 | 0 | 1 |
| 10 Year Treasury Yield | 4,332 | 2.397 | 0.816 | 0.650 | 4.440 |
| 3 Month Treasury Yield | 4,332 | 0.907 | 1.343 | 0.013 | 5.290 |
| 3 Month Treasury Yield Bond Equivalent Basis | 4,332 | 0.927 | 1.377 | 0.014 | 5.436 |
| Spread | 4,332 | 1.470 | 1.157 | −1.617 | 3.608 |
| Recession Probability | 4,332 | 0.086 | 0.087 | 0.002 | 0.399 |
| Recession | 4,332 | 0.052 | 0.202 | 0.000 | 1.000 |
| Adjusted Close Price | 4,332 | 64.875 | 65.410 | 1.720 | 536.139 |

***Figure 1.*** **Descriptive statistics for observed variables present in the dataset.**

**#ss154-Data**

**#variables**

# Further Specified Causal Question

*What is the effect of earnings per share on involuntary CEO dismissal in the given S&P 500 company per quarter?*

*Based on data from 2008 up until 2023*

*Treatment Variable: Average Earnings Per Share*

*Outcome Variable: Involuntary CEO Dismissal*

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# Causal Question

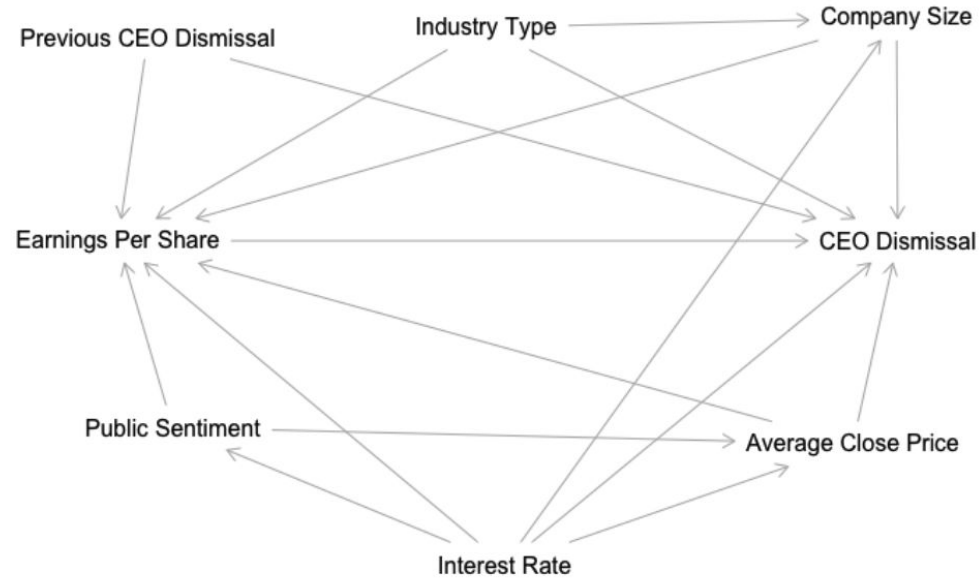


***Figure 1.*** Causal Graph Mapping the Confounding Variables Between Earnings Per Share [Treatment] and CEO Dismissal [Outcome].

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# Causal Question

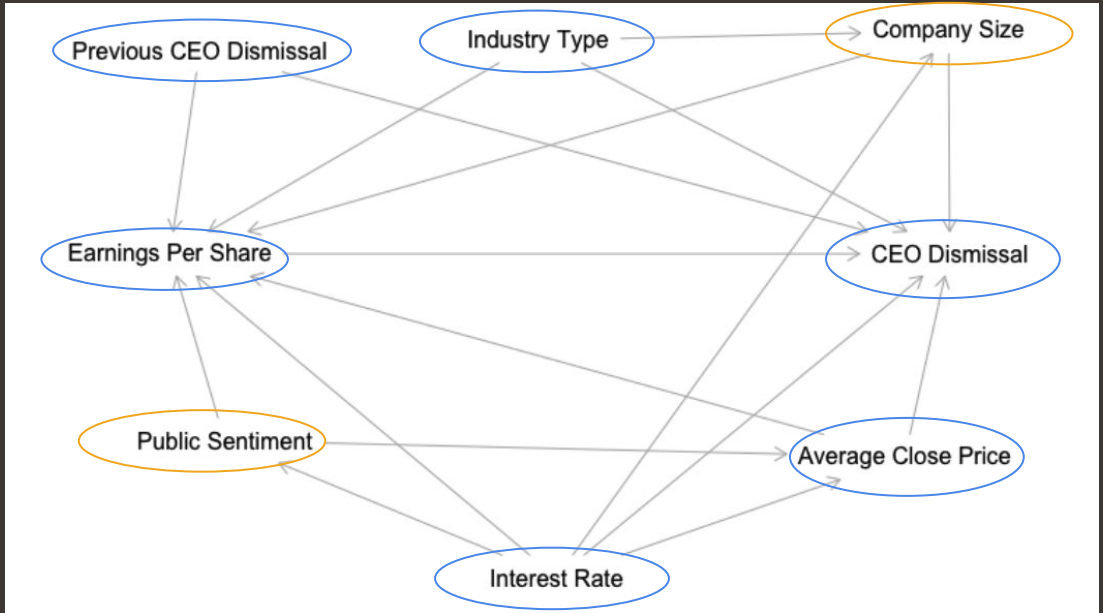


***Figure 1.*** Causal Graph Mapping the Confounding Variables Between Earnings Per Share [Treatment] and CEO Dismissal [Outcome].

Legend:
🔵: Observed
🟠: Unobserved

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# Regression

Logistic Regression

$$\hat{p} = \frac{e^{(\alpha+\beta_1 x_1+\beta_2 x_2+\beta_3 x_3+\beta_4 x_4+\beta_5 x_5+\beta_6 x_6)}}{1+e^{(\alpha+\beta_1 x_1+\beta_2 x_2+\beta_3 x_3+\beta_4 x_4+\beta_5 x_5+\beta_6 x_6)}}$$

Where
*p-hat: probability of dismissal in log odds*
*α* = intercept term
*β1 through β6*: coefficients
*x1 : Treatment variable:*
*below average EPS per quarter = 1*
*above average EPS per quarter = 0*
*x2 through x6: covariates*

From log odds to probability:

$$p = \frac{logodds}{logodds + 1}$$

**#regression**

# Regression

## Regression Results

Table 1: Ordinary Logit

| | *Dependent variable:* |
|---|---|
| | CEO Dismissal |
| Below Average EPS | −0.175 |
| | (0.154) |
| Net Income | −0.203 |
| | (0.220) |
| Operating Income | −0.625** |
| | (0.265) |
| Quarterly Interest Rate | −0.003 |
| | (0.061) |
| Adjusted Close Price | −0.005*** |
| | (0.002) |
| Constant | −2.664*** |
| | (0.136) |
| Observations | 4,332 |
| Log Likelihood | −764.926 |
| Akaike Inf. Crit. | 1,541.851 |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 |

Table 2: Time Lagged Logit

| | *Dependent variable:* |
|---|---|
| | CEO Dismissal |
| Lagged Below Average EPS | 0.099 |
| | (0.159) |
| Lagged Net Income | −0.184 |
| | (0.220) |
| Lagged Adjusted Close Pice | −0.005*** |
| | (0.002) |
| Lagged Operating Income | −0.570** |
| | (0.266) |
| Quarterly Interest Rate | 0.0004 |
| | (0.061) |
| Recession | −0.548 |
| | (0.425) |
| Constant | −2.777*** |
| | (0.161) |
| Observations | 4,332 |
| Log Likelihood | −764.473 |
| Akaike Inf. Crit. | 1,542.946 |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 |

## Interpretation

$$p = \frac{0.099}{0.099 + 1} = 0.09$$

When controlled for Net income, Adjusted close price, Operating income, Quarterly interest rate, and Recession
The probability of CEO being dismissed after below average EPS quarter raises about 9% in the next quarter.

**#regression**

# Strengths

- Unique and novel way to look at CEO dismissal.
- Created an open source panel dataset that will be published on kaggle.
- Novel and creative way to combine panel data with logit regression.

# Weaknesses

- Effect is not causal due to unobserved variable bias.
- Lot of dismissal data had to be cut due to lack of Financial data.

# Future directions

- Run robustness checks.
- Use coefficients in predictive analysis.
- Conduct sensitivity analysis to more unobserved variables.

# Thank you.


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