DO CEO DEPARTURES HAVE AN IMPACT ON EQUITY TRADING AND FINANCIAL RATIOS?

Data Analytics in Accounting
ACCT 626 (072)

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SECTION 1 : INTRODUCTION

Hypothesis & Purpose

Null Hypothesis H0:

- CEO departure does not impact trading and financial ratios(Pre-event variable = Post-event variable). If null hypothesis is rejected, how does the difference vary according to reasons?

Purpose:

- This analysis is interesting for companies and investors looking to mitigate risk during CEO turnover
- It will give them insight on how to plan for the change in their finances and take bets in financial markets when the CEO leaves for different reasons

Research Paper: A database of CEO turnover and dismissal in S&P 1500 firms, 2000–2018 (Gentry, R. J., Harrison, J. S., Quigley, T. J., & Boivie, S. (2021).

Clayton, Matthew C., et al. “The Impact of CEO Turnover on Equity Volatility.” The Journal of Business, vol. 78, no. 5, 2005, pp. 1779–808. JSTOR, https://doi.org/10.1086/431442. Accessed 19 Apr. 2024.

Project Objectives

1. **Create a consolidated dataset:** Merge CEO dismissal data with company financial ratios and stock price from CRSP and Compustat

2. **Develop Pre vs Post Event Analysis using t test:** Using SAS, complete a t-window event analysis around the date a CEO was dismissed and analyze the event's impact on stock trading and key financial ratios

3. **Analyze Results:** Based on the event analysis, analyze if there is significant shift in variables of interest before or after the departure. Perform this comparison across all different departure codes

4. **Business Implications:** Based on the main findings, give insights to company shareholders and investors on how to mitigate the risk before CEO departure

SECTION 2 : DATA COLLECTION

Step 1 : Excel Data Source

- Based on the selected paper, their dataset is called: Open Sourced Database for CEO Dismissal 1992-2020 (https://zenodo.org/records/4543893)
- It comprises information on various CEOs' departures from their positions within 3819 distinct companies.

Key Data Points

- Company Name (coname): The name of the company associated with each entry.
- Global Company Key (gvkey): A unique identifier for each company.
- Departure Code: A numerical code representing the reason for departure.
- Departure date: The date on which the CEO exited, marked as “leftofc”.

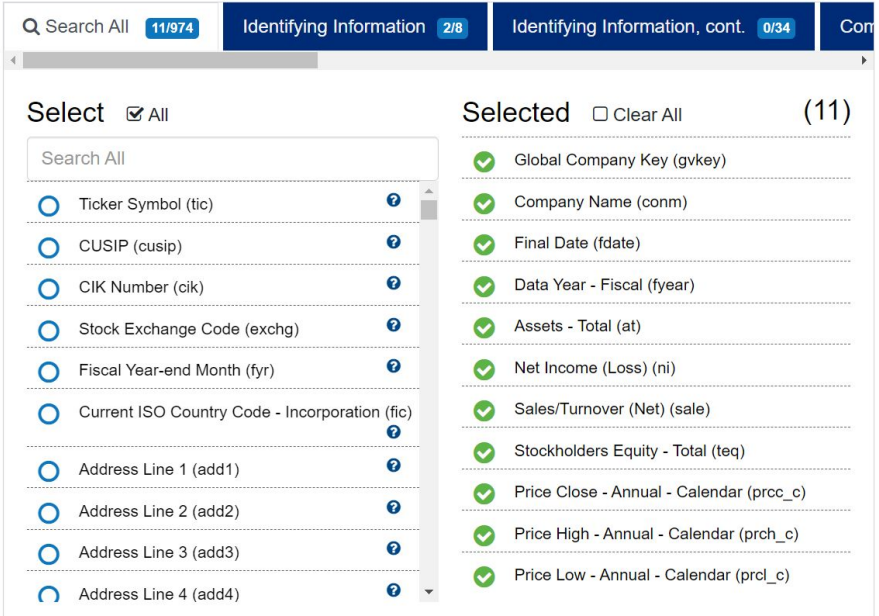
Year	1	2	3	4	5	6	7	8	9
1992	1	0	10	0	44	1	2	0	0
1993	2	1	25	1	114	3	35	2	6
1994	5	2	34	4	131	6	55	1	0
1995	6	2	29	5	123	6	48	1	1
1996	2	2	38	4	126	4	139	0	2
1997	8	3	47	5	151	8	104	0	2
1998	2	2	38	4	161	8	131	1	5
1999	4	3	54	4	181	4	140	0	6
2000	6	4	71	7	158	10	104	4	4
2001	4	1	56	8	114	2	42	2	5
2002	3	3	58	15	123	4	50	1	1
2003	4	5	37	8	134	5	69	1	1
2004	1	4	46	13	153	11	93	2	2
2005	3	3	49	12	119	6	81	1	3
2006	2	4	47	18	150	6	103	0	4
2007	3	4	72	6	169	11	86	10	7
2008	1	1	72	9	134	8	63	1	7
2009	2	2	43	11	108	10	66	3	5
2010	4	7	48	7	141	7	78	4	2
2011	2	7	51	8	132	14	74	2	7
2012	3	8	56	3	126	11	73	1	4
2013	2	3	41	5	133	6	65	3	2
2014	2	1	68	4	136	5	87	2	3
2015	3	5	52	7	145	6	89	3	6
2016	4	6	62	10	118	4	86	4	6
2017	5	10	49	9	133	11	86	2	1
2018	0	3	59	8	132	6	80	2	1
2019	0	0	8	0	8	0	4	0	0
2020	0	1	0	0	0	0	0	0	0

Dismissal Code with description

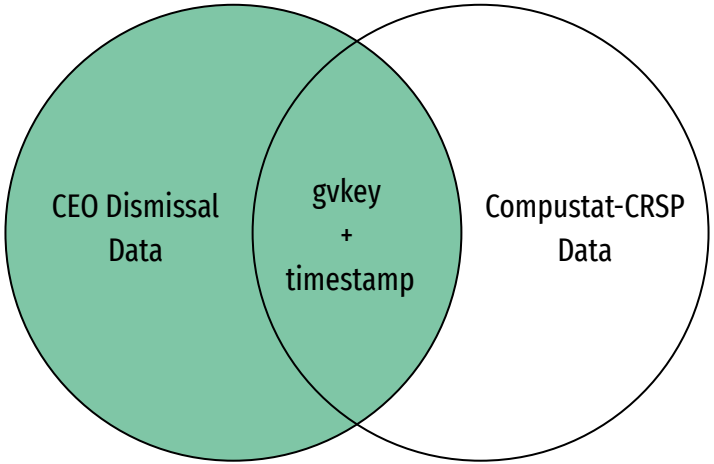
Dismissal Code	Title	Description
1	Involuntary - CEO death	The CEO died while in office and did not have an opportunity to resign before health failed.
2	Involuntary - CEO illness	Required announcement that the CEO was leaving for health concerns rather than removed during a health crisis.
3	Involuntary – CEO dismissed for job performance	The CEO stepped down for reasons related to job performance. This included situations where the CEO was immediately terminated as well as when the CEO was given some transition period, but the media coverage was negative.
4	Involuntary - CEO dismissed for personal issues	The CEO was terminated for behavioral or policy-related problems. The CEO's departure was almost always immediate, and the announcement cited an instance where the CEO violated company HR policy, expense account cheating, etc.
5	Voluntary - CEO retired	Voluntary retirement based on how the turnover was reported in the media. Here the departure did not sound forced, and the CEO often had a voice or comment in the succession announcement.
6	Voluntary - new opportunity	The CEO left to pursue a new venture or to work at another company. This frequently occurred in startup firms and for founders.
7	Other	Interim CEOs, CEO departure following a merger or acquisition, company ceased to exist, company changed key identifiers so it is not an actual turnover, and CEO may or may not have taken over the new company.
8	Missing	Despite attempts to collect information, there was not sufficient data to assign a code to the turnover event. These will remain the subject of further investigation and expansion.
9	Execucomp error	If a researcher were to create a dataset of all potential turnovers using execucomp (co_per_rol != l.co_per_rol), several instances will appear of what looks like a turnover when there was no actual event. This code captures those.

Step 2 : Compustat-CRSP Merged Data Source

- In WRDS, we used Compustat-CRSP merged database from 1991 till present (because we had gvkey in excel data)
- We retrieved gvkey, company name, dates, and financial information including yearly financial data and monthly trading data
- Data was downloaded as a SAS dataset file



Step 3 : Data processing and merge

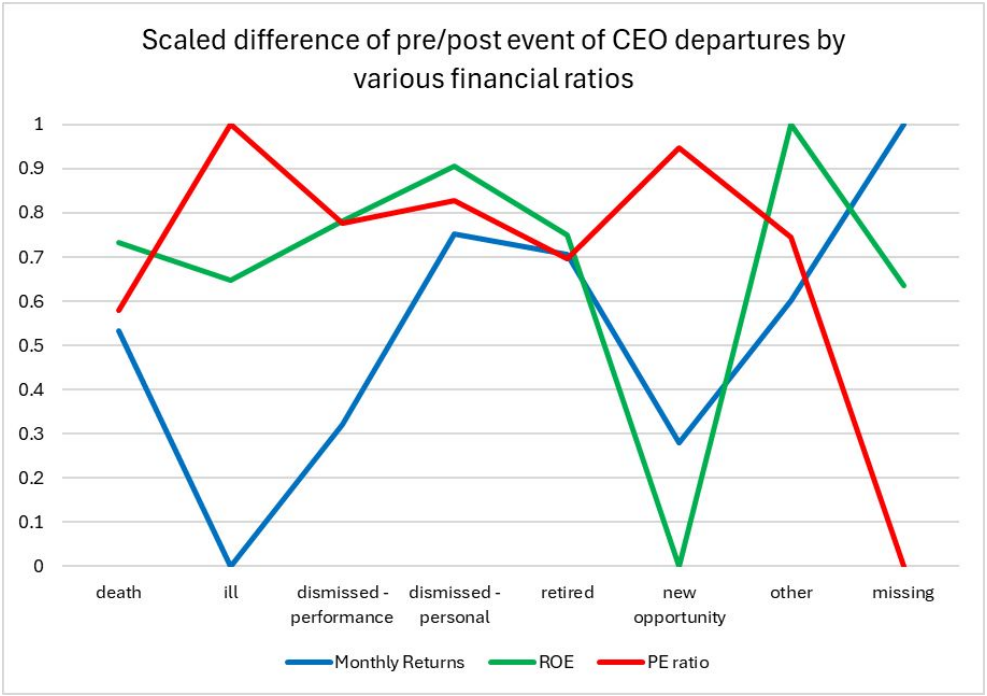


- Loading the Dataset: Imported the both the CEO turnover excel file and the .sas7bdat Compustat-CRSP dataset into SAS.
- Select/Calculate implied volatility, monthly return, monthly trading volume, ROE, operating P/E ratio from Compustat-CRSP
- Merge on identifier and time: Used 'gvkey' as a common identifier to align companies across both datasets. Adjusted the monthly price date and financial disclosure date in the Compustat-CRSP data to match the CEO departure date from the CEO Dismissal Data. This was crucial for associating financial changes with the specific timeframe of CEO changes.

SECTION 3 : STATISTICAL EVENT ANALYSIS

Scaled difference pre vs post CEO departure

- In this graph, the higher the value, the bigger the impact on the company financials
- Hence, as an example, we can see when a CEO is ill or leaves for new opportunities, there is not much impact
- However, when a CEO is dismissed for personal reasons or retired have a bigger impact



Two-tail T tests on 5 variables pre vs post event by reason

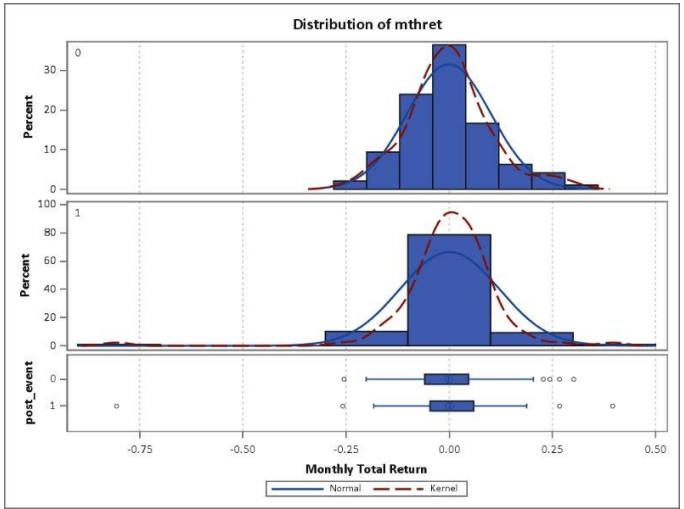
- For each departure code, we ran two-tail t-tests on the pre-event and post-event variable distributions
- This was done for: implied volatility of option trading, monthly returns, monthly trading volume, ROE, PE ratio
- All events were looked at on a full-sample (all values) and aggregated (mean value) level 15 month before event and 15 month after event, except ROE and PE was 5 years before and 5 years after

$$t = \frac{(\text{value}_{\text{pre-event}} - \text{value}_{\text{post-event}}) - 0}{\text{standard error}}$$

departure_code=1

post_event	Method	Mean	95% CL Mean		Std Dev
0		-0.00080	-0.0213	0.0197	0.1012
1		0.000848	-0.0221	0.0238	0.1201
Diff (1-2)	Pooled	-0.00165	-0.0325	0.0292	0.1116
Diff (1-2)	Satterthwaite	-0.00165	-0.0322	0.0289	

post_event	Method	95% CL Std Dev	
0		0.0886	0.1179
1		0.1059	0.1387
Diff (1-2)	Pooled	0.1017	0.1237
Diff (1-2)	Satterthwaite		



Difference of pre and post event data (Full Sample)

Table 1. T-stats of pre and post event by departure code for various variables

Full Sample	Implied Vol	Monthly Return	Trading Volume	ROE	Operating P/E
Involuntary - CEO death	0.44	1.06	0.13	-0.37	-0.92
Involuntary - CEO illness	1.24	-1.21	-1.38	-1.32	0.96
Involuntary – CEO dismissed for job performance	-2.63	-0.78	-1.02	0.24	1.04
Involuntary - CEO dismissed for legal violations or concerns	0.05	0.55	-1.83	2.21	0.8
Voluntary - CEO retired	2.34	3.22	-2.79	0.31	0.28
Voluntary - new opportunity (new career driven succession)	1.46	-0.09	-0.63	-0.97	0.84
Other (M&A, change of structure)	-1.58	-1.38	-3.82	0.85	0.83

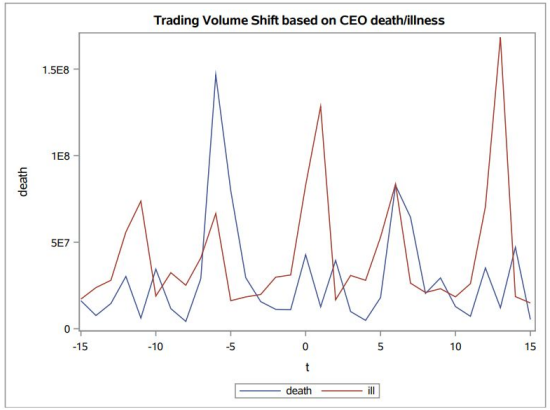
= positive impact
= negative impact

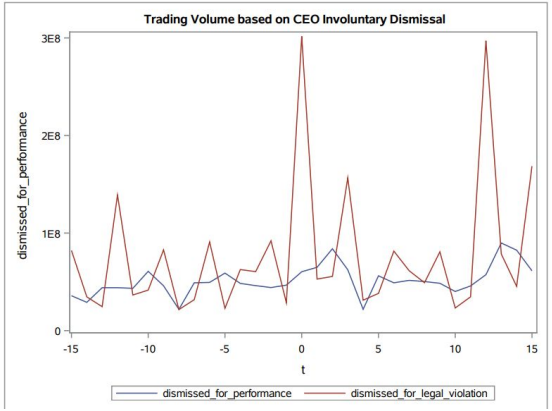
Difference of pre and post event data (Full Sample)

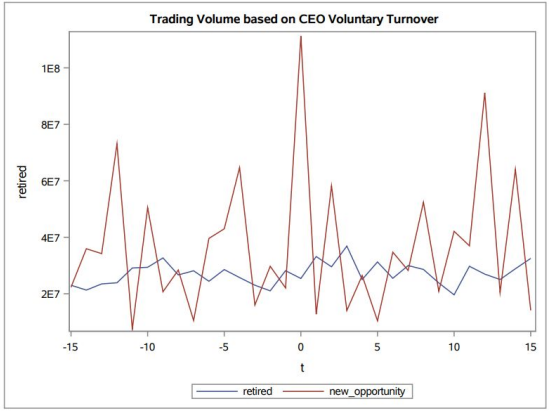
Table 2. p-value of t-stats of pre and post event by departure code for various variables

Full Sample	Implied Vol	Monthly Return	Trading Volume	ROE	OperatingP/E
Involuntary - CEO death	0.66	0.28	0.89	0.71	0.31
Involuntary - CEO illness	0.22	0.22	0.16	0.18	0.34
Involuntary – CEO dismissed for job performance	0.01***	0.44	0.29	0.81	0.29
Involuntary - CEO dismissed for legal violations or concerns	0.96	0.58	0.08**	0.05**	0.45
Voluntary - CEO retired	0.02**	0.001****	0.005****	0.75	0.78
Voluntary - new opportunity (new career driven succession)	0.13	0.93	0.53	0.33	0.39
Other (M&A, change of structure)	0.21	0.4	0.001****	0.39	0.41

Mean Stock Monthly Trading Volume Pre vs Post Event







1 CEO death and illness

2 CEO involuntary dismissal

3 CEO voluntary turnover

SECTION 4 : RESULTS

Impact of Events on Financial Metrics - Null Hypothesis Analysis

This table indicates whether the various events had an impact on the financial metrics, specifically if the null hypothesis was accepted or rejected.

Event	*Implied Volatility*	*Monthly Return*	*Trading Volume*	*ROE*	*P/E*
Death (Involuntary)	Fail to Reject	Fail to Reject	Fail to Reject	Fail to Reject	Fail to Reject
Illness	Fail to Reject	Fail to Reject	Fail to Reject	Fail to Reject	Fail to Reject
Poor Performance	Reject	Fail to Reject	Fail to Reject	Fail to Reject	Fail to Reject
Legal Concerns	Fail to Reject	Fail to Reject	Reject	Reject	Fail to Reject
Retirement	Reject	Reject	Reject	Fail to Reject	Fail to Reject
New Opportunity	Fail to Reject	Fail to Reject	Fail to Reject	Fail to Reject	Fail to Reject
Change of Structure	Fail to Reject	Fail to Reject	Reject	Fail to Reject	Fail to Reject

- ➔ ***Death***, ***New Opportunities***, and ***Illness*** resulted in the acception of null hypotheses across all metrics analyzed.
- ➔ ***Poor Performance*** affected only implied volatility, failing to impact null hypotheses for other metrics.
- ➔ ***Legal Concerns*** led to rejections in null hypotheses for trading volume and ROE.
- ➔ ***Retirement*** rejected null hypotheses for implied volatility, monthly return, and trading volume.
- ➔ ***Change of Structure*** impacted only monthly return and trading volume.

Analyzing the impact of Involuntary CEO Dismissal

Dismissal for Job Performance

- Implied Volatility: The statistically significant increase in implied volatility ($p = 0.01$, $t = -2.63$) suggests an increase in option pricing following CEO dismissals due to performance issues.

Interpretation → The observed increase in implied volatility does not provide a clear indication of how investors perceive CEO terminations. It reflects a higher level of uncertainty or anticipated volatility in the market, potentially driven by various factors such as expectations for a potential turnaround or concerns about the company's stability.

Dismissal for Legal Violations

- Return on Equity (ROE): With a significant decrease ($p = 0.05$, $t = 2.21$), ROE indicates a long-term negative impact on profitability metrics after CEO dismissals attributed to legal violations.
- Trading Volume: Though marginally significant ($p = 0.08$, $t = -1.83$), the increase in trading volume together with reduced return hints at potential market shorting post-dismissal.

Interpretation → This indicates negative investor reactions to the CEO's departure and an deterioration in the company's profitability due to the negative circumstances surrounding the CEO's departure. This can be explained by the governance risk and operational deficiency reflected by the legal scandal involving the dismissed CEO.

This analysis is based on the p-value and t-test performed on the full sample. Reference: https://hbr.org/2002/12/holes-at-the-top-why-ceo-firings-backfire

Analyzing the impact of CEO Retirement

CEO Retirement

- Monthly Return: The highly significant result (p = 0.001, t = 3.22) indicates a negative stock price reaction to the CEO's retirement.

Interpretation → This indicates that following the CEO's departure, there was a notable decrease in stock prices, potentially reflecting investor's negative sentiment about the company's future direction and profitability due to earning manipulation.

- Trading Volume: The negative t-value of -2.79 (p = 0.005) suggests a increase in trading volume following the CEO retirement.

Interpretation → This suggests that there might be a notable increase in shorting shares of the company.

- Implied Volatility: The p-value of 0.02 (t = 2.34) The positive t-value of 2.34 suggests an decrease in option pricing following the CEO departure event

Interpretation → The observed increase in implied volatility indicates that market participants expect reduced price fluctuations or lower uncertainty in the future for the underlying asset. This could imply that investors perceive the CEO departure event as potentially stabilizing or reducing risk for the company.

This analysis is based on the p-value and t-test performed on the full sample. Reference: https://www.reuters.com/article/idUSN21500895/

Analyzing the impact of Restructurations

These events typically involve significant changes in the organizational structure, ownership, or strategic direction of the company, such as Mergers and Acquisitions.

Change of Structure

- Trading Volume ($p = 0.001$, $t = -3.82$): It indicates that the observed increase in trading volume before and after the M&A event is statistically significant.

Interpretation → The increase in trading activity suggests more investors interest in response to the M&A event. The insignificant return change indicates that the market taking bets in one direction or another on the event depending on whether the company is acquiring or acquired.

This analysis is based on the p-value and t-test performed on the full sample.

Reference: https://hls.harvard.edu/bibliography/the-link-between-the-acquisitions-market-and-the-market-for-ceos/, https://www.jstor.org/stable/3874727.

SECTION 6 : CONCLUSION

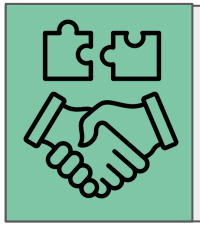
Business Implications

Risk Management

Identifying events that lead to increased market volatility or reduced trading activity can help the company anticipate and manage risks more effectively. This may involve implementing risk mitigation strategies or adjusting financial forecasts to account for potential fluctuations in market performance.

Investor Relations

Insights from the analysis can be used to enhance investor relations efforts. By understanding which events trigger significant market reactions and how they affect key financial metrics, the company can better communicate with investors and manage expectations during times of organizational change.



Mergers & Acquisitions Management

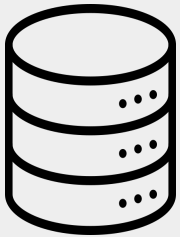
For companies involved in M&A activities or restructuring efforts, insights from the analysis can guide decision-making processes and help assess the potential impact on financial performance. This can include evaluating the market reaction to previous M&A events and identifying best practices for managing stakeholder expectations during periods of organizational change.

Change Management Strategy for the Human Resources Team

The analysis can also provide valuable insights for human resources departments, particularly in terms of succession planning and talent management. Understanding the impact of CEO departures on financial metrics can inform recruitment and retention strategies to ensure smooth leadership transitions and minimize disruptions to business operations.

Limitations and Future Considerations

Data Availability & Quantity



One of the main challenges could be obtaining comprehensive and reliable data on CEO dismissals and their associated financial impacts. Data collection may be limited by factors such as availability, completeness, and accuracy, potentially affecting the robustness of the analysis.

Causality vs. Correlation

While the analysis may identify correlations between CEO dismissals and financial metrics, establishing causality can be challenging. Other factors, such as market conditions, industry trends, or company-specific events, may also influence financial performance, making it difficult to attribute changes solely to CEO dismissals.

Additional Research

Long-term Impact Analysis

- Investigating the long-term effects of CEO departures on financial metrics beyond the immediate post-event period to assess sustained changes and market sentiment over time.

Qualitative Analysis

- Conducting qualitative studies such as interviews or surveys with investors, analysts, or company stakeholders to gain insights into the underlying reasons for market reactions and perceptions surrounding CEO departures.

Comparative Analysis

- Comparing the financial performance and market reactions of companies experiencing CEO departures with those of similar firms in the industry to identify industry-specific trends or patterns.

THANK YOU

IF YOU HAVE ANY QUESTIONS, FEEL FREE TO ASK!

RESOURCES

- Gentry, R. J., Harrison, J. S., Quigley, T. J., & Boivie, S. (2021). A database of CEO turnover and dismissal in S&P 1500 firms, 2000–2018. Strategic Management Journal, 42(5), 968-991.
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- Lehn, K. M., & Zhao, M. (2006). CEO Turnover after Acquisitions: Are Bad Bidders Fired? The Journal of Finance, 61(4), 1759–1811. http://www.jstor.org/stable/3874727

Slide allocation

- Audrey: slides 1 - 12 + Data collection
- Zicheng: slides 13 - 16 + SAS code
- Samia: slides 17 - 25

APPENDICES

Difference and t-stats of pre and post event data (Mean)

Table 3. T-stats of pre and post event by departure code for various variables

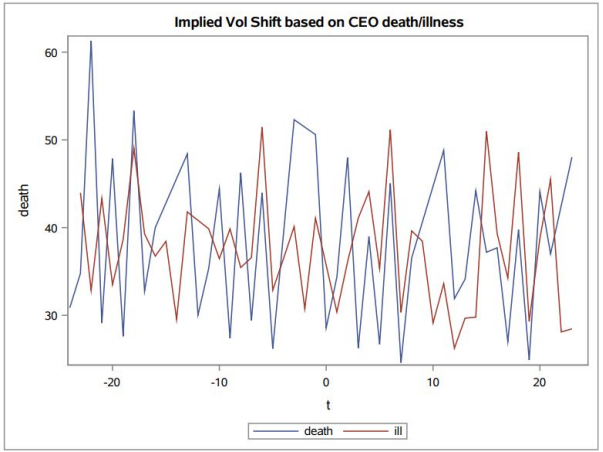
Mean	Implied Vol	Monthly Return	Trading Volume	ROE	OperatingP/E
Involuntary - CEO death	1.1	0.27	0.19	-0.58	-1.37
Involuntary - CEO illness	1.07	-1.42	-1.39	-1.46	0.76
Involuntary – CEO dismissed for job performance	-2.43	-1.63	-2.63	0.39	1.23
Involuntary - CEO dismissed for legal violations or concerns	0.07	0.41	-1.65	2.18	0.35
Voluntary - CEO retired	1.79	1.46	-1.71	0.09	-0.21
Voluntary - new opportunity (new career driven succession)	1.11	-0.86	-0.75	-0.97	1.3
Other (M&A, change of structure)	-1.44	1.04	-1.84	0.99	0.69

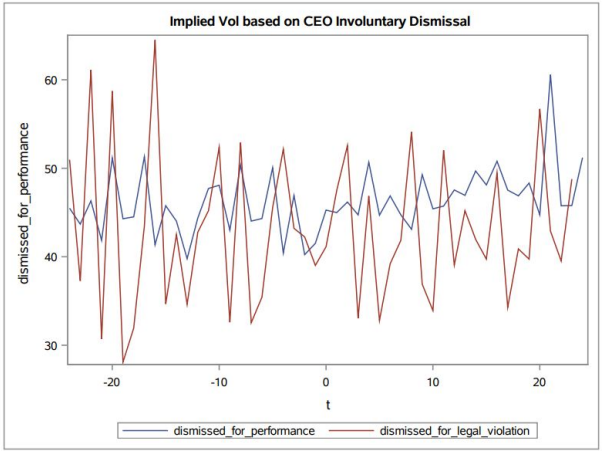
Difference and t-stats of pre and post event data (Mean)

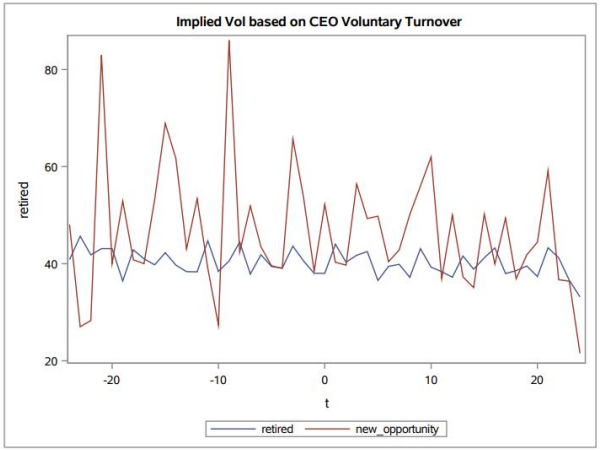
Table 4. p-value of t-stats of pre and post event by departure code for various variables

Mean	Implied Vol	Monthly Return	Trading Volume	ROE	Operating P/E
Involuntary - CEO death	0.28	0.78	0.85	0.58	0.22
Involuntary - CEO illness	0.29	0.16	0.17	0.22	0.48
Involuntary – CEO dismissed for job performance	0.02***	0.11’	0.01***	0.72	0.23
Involuntary - CEO dismissed for legal violations or concerns	0.94	0.68	0.11’	0.08**	0.73
Voluntary - CEO retired	0.08**	0.15	0.09**	0.93	0.84
Voluntary - new opportunity (new career driven succession)	0.27	0.39	0.45	0.38	0.25
Other (M&A, change of structure)	0.15	0.3	0.07**	0.36	0.5

Mean Implied Volatility Pre vs Post Event





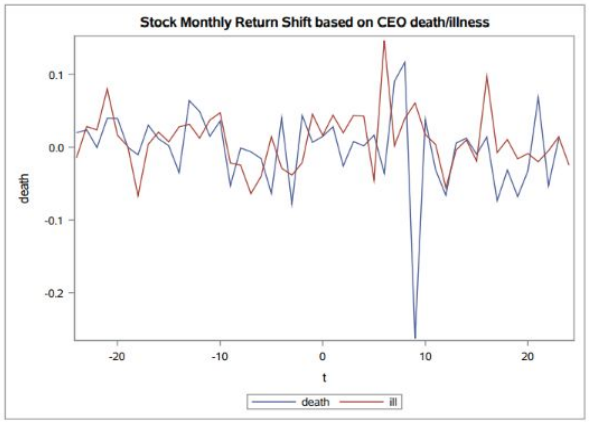


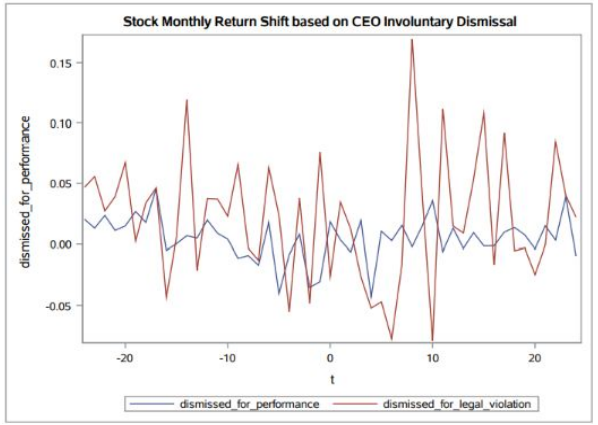
1 CEO death and illness

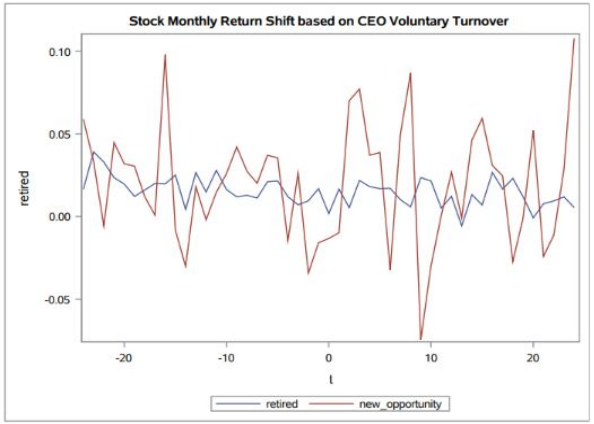
2 CEO involuntary dismissal

3 CEO voluntary turnover

Mean Stock Monthly Return Pre vs Post Event







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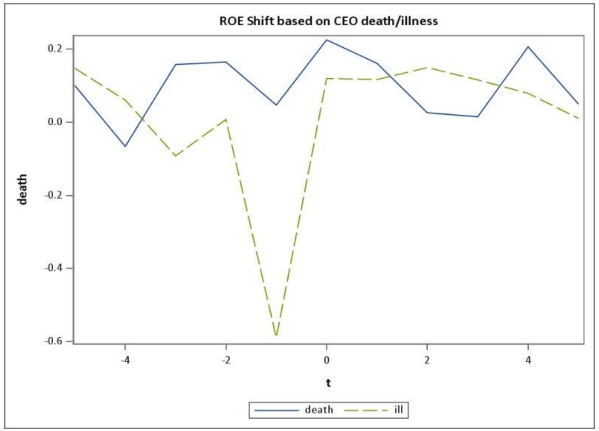
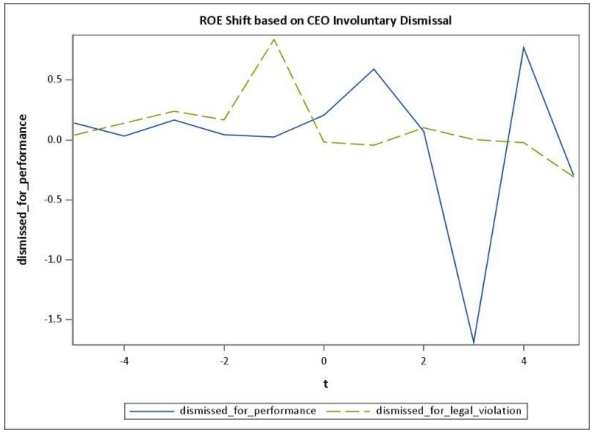
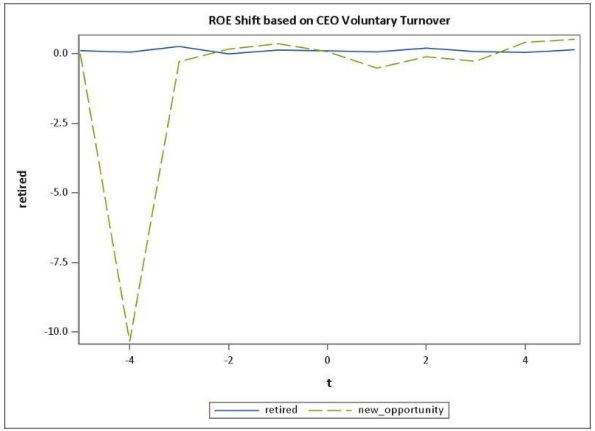
Mean ROE Pre vs Post Event

Output 2: ROE





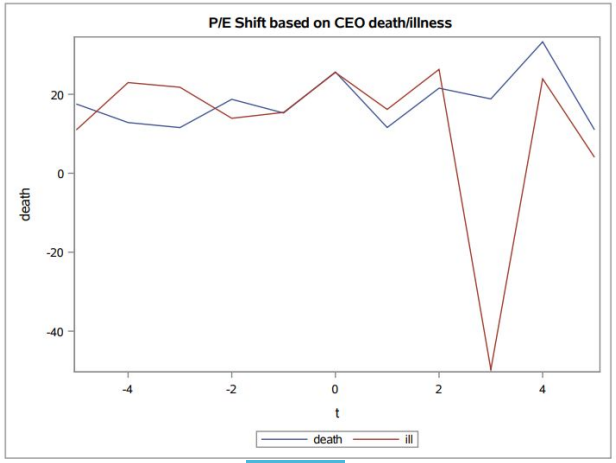


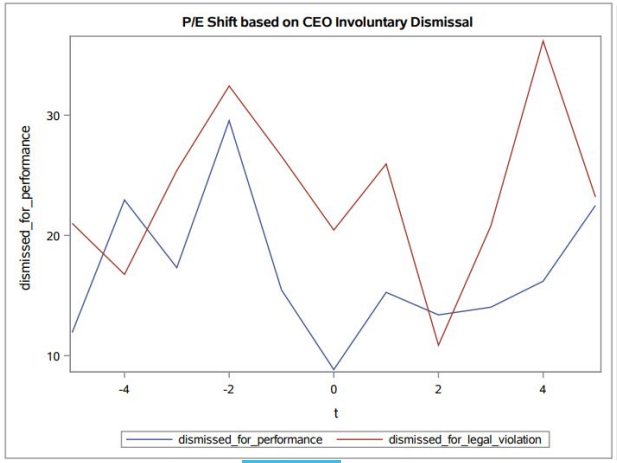
1 CEO death and illness

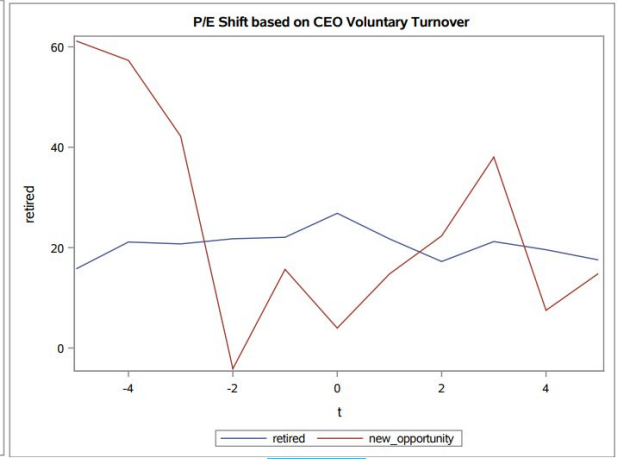
2 CEO involuntary dismissal

3 CEO voluntary turnover

Mean Operating P/E ratio Pre vs Post Event







1 CEO death and illness

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Analyzing the impact of Restructurations

These events typically involve significant changes in the organizational structure, ownership, or strategic direction of the company, such as Mergers and Acquisitions.

Change of Structure

- Trading Volume ($p = 0.001$, $t = -3.82$): It indicates that the observed increase in trading volume before and after the M&A event is statistically significant.

Research → On one hand, M.Lehn et al.(2006) found that 47% of the CEOs of acquiring firms left their post within 5 years of the event and there exists a negative correlation between bidder company returns and likelihood of CEO turnover, which ties it back to performance. On the other hand, finding a friendly acquirer could be an alternative to CEO retirement, according to Coates.IV et al (2011). The complexities involved in such CEO turnover make it hard to bet on this type of CEO turnover.

This analysis is based on the p-value and t-test performed on the full sample.

Reference: https://hls.harvard.edu/bibliography/the-link-between-the-acquisitions-market-and-the-market-for-ceos/, ***https://www.jstor.org/stable/3874727.***

Analyzing the impact of CEO Retirement

CEO Retirement

- Monthly Return: The highly significant result (p = 0.001, t = 3.22) indicates a negative stock price reaction to the CEO's retirement.

Research → This finding aligns with the research conducted by Paul Kalyta, a former McGill Scholar in 2009, which indicated that CEOs approaching retirement may have strong incentives to make accounting choices that boost short-term income and consequently enhance the value of their pensions. This negative market interpretation of CEO retirement reflects concerns about the potential impact on the company's performance and may contribute to increased trading volume.

This analysis is based on the p-value and t-test performed on the full sample. Reference: https://www.reuters.com/article/idUSN21500895/

Analyzing the impact of Involuntary CEO Dismissal

Dismissal for Job Performance

- Implied Volatility: The statistically significant increase in implied volatility (p = 0.01, t = -2.63) suggests an increase in option pricing following CEO dismissals due to performance issues.

Research→ However, in the long term, the firing of CEOs does not lead to improved profitability for companies. This observation aligns with the findings of an article by Wiersema in the Harvard Business Review from 2002, which argues that replacing CEOs does not necessarily enhance corporate performance.

This analysis is based on the p-value and t-test performed on the full sample. Reference: https://hbr.org/2002/12/holes-at-the-top-why-ceo-firings-backfire