From Numbers to Stories: Accounting Numbers and Executive Compensation Narratives

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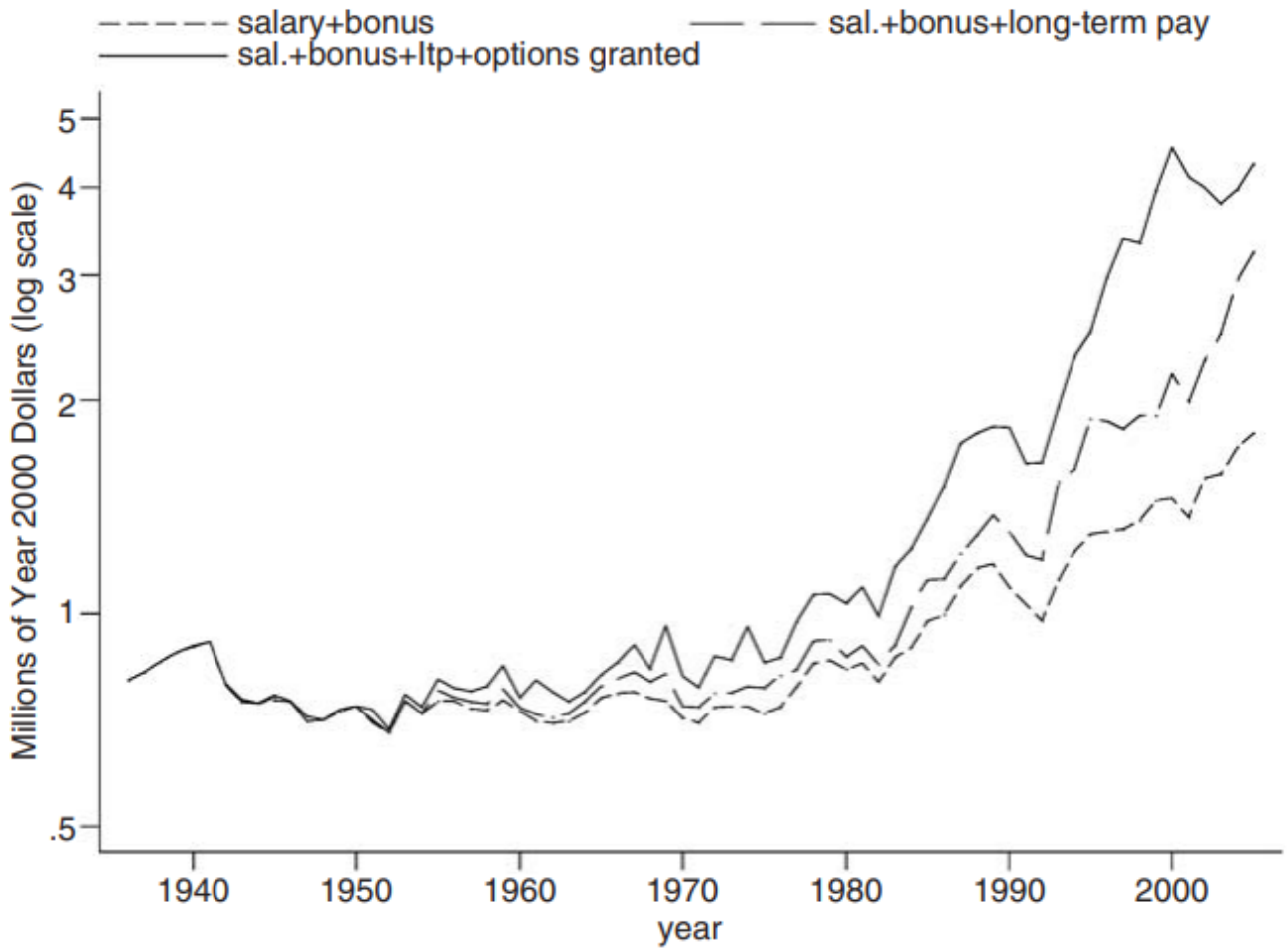
Background and Motivation

Substantial Growth in Executive Compensation Since 1970s



Source: Frydman and Saks, 2010

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Enron Case – A Closer Look

Forbes

Pay Madness At Enron

Mar 22, 2002, 08:00am EST

Year	1996	1997	1998	1999	2000
Top 5 Executive Salaries (in $mil)	$3.04	$3.13	$3.62	$3.80	$3.61
Top 5 Bonus Payments ($mil)	4.70	1.85	9.46	11.30	17.55
Top 5 Stock Grants* ($mil)	29.71	62.51	54.74	81.40	86.51
Top 5 Total Compensation ($mil)	37.46	67.48	67.82	96.50	107.67
Enron Net Earnings ($mil)	584	105	703	893	979
Return on Invested Capital (Operating Income/Total Assets)	4.20%	0.06%	4.69%	2.40%	2.98%

Source: https://www.forbes.com/2002/03/22/0322enronpay.html?sh=262058927a6d

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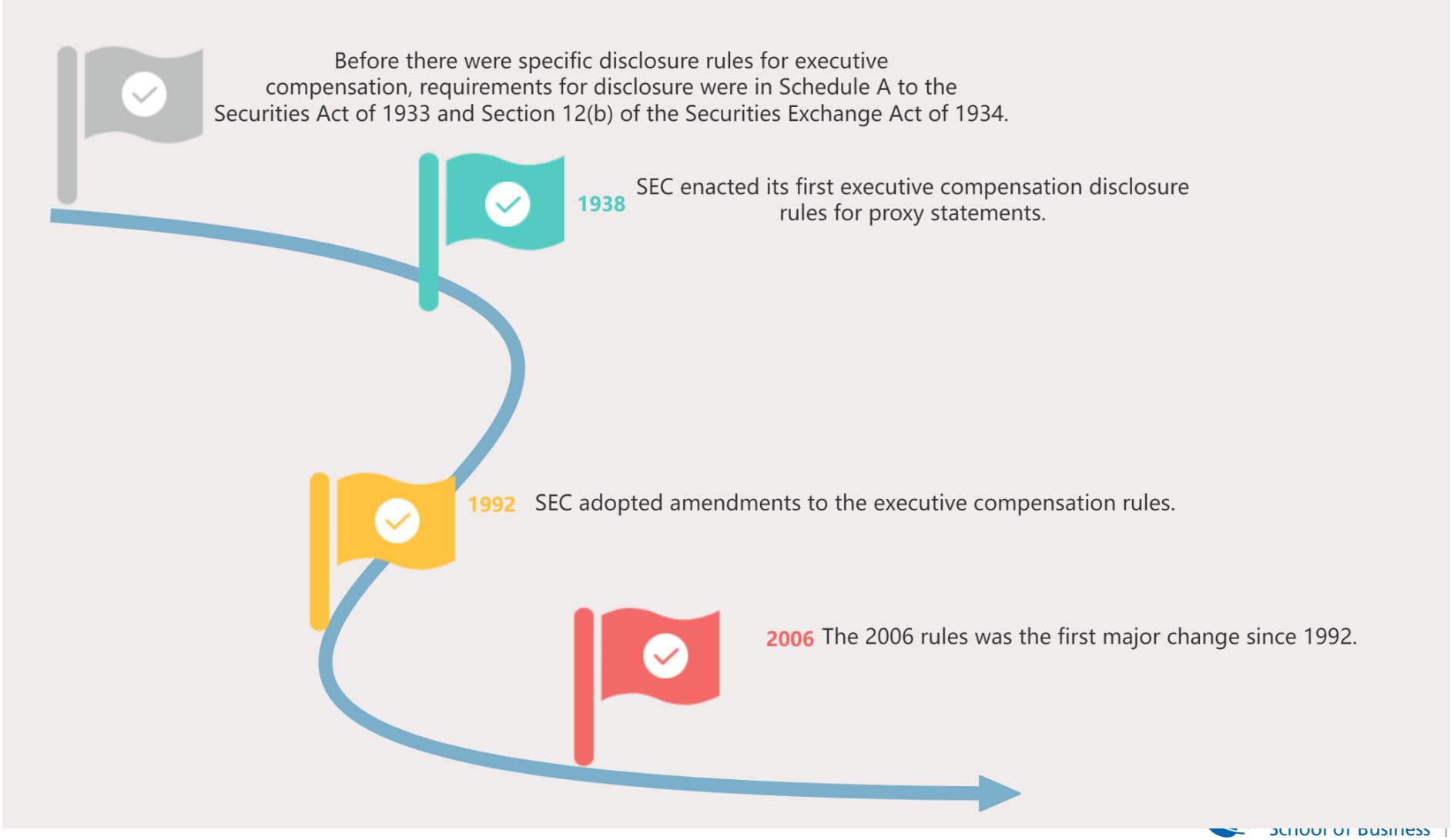
Regulatory Change – Executive Compensation Disclosures



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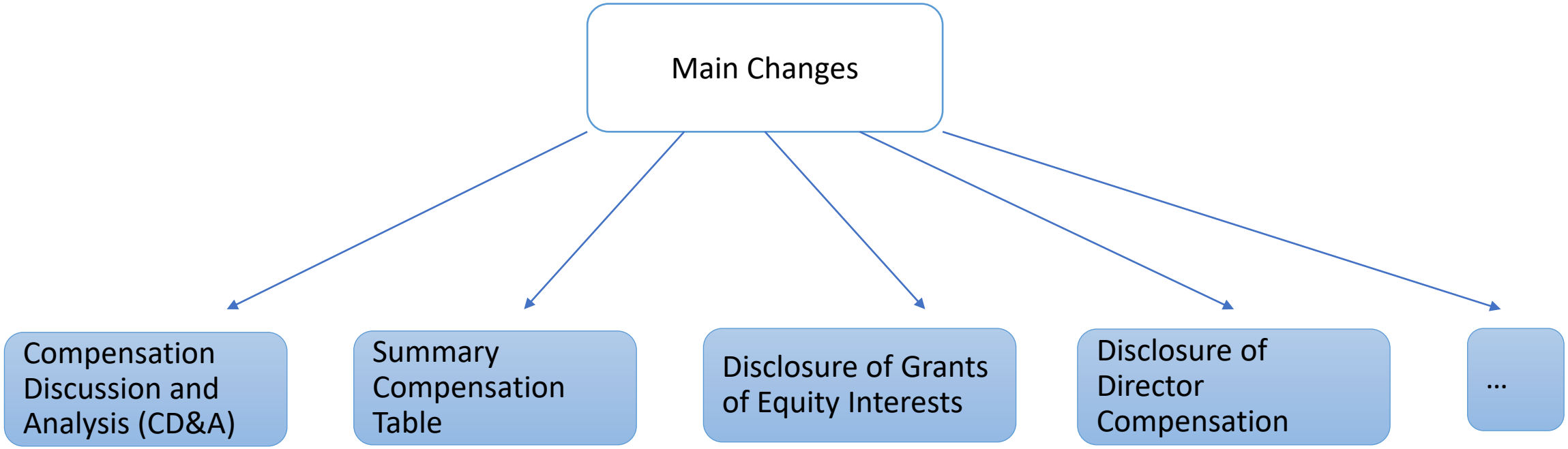

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Why CD&A?

Firms are required to cover six elements of executive compensation design in CD&A disclosures:

- the objectives of the compensation program;
- what the compensation program is designed to reward;
- each element of compensation;
- why the issuer chooses to pay each element;
- how the issuer determines the amount and formula for each element; and
- how each element of compensation and the issuer's decisions about that element fit into the issuer's overall compensation objectives and affect decisions about other elements.

The 2006 rules grant managers considerable discretion in storytelling and justification activities.

Theoretical Framing and Research Questions

RQ1: What topics does management choose to emphasize in their CD&A disclosures?

Past CD&A studies have examined core textual characteristics such as tone and readability. For example,

- Balsam et al. (2016) find managers tend to use a positive tone when writing CD&A disclosures to reduce voting dissent among shareholders

- Laksmana et al. (2012) find that overpaid CEOs are motivated to reduce the readability of CD&A disclosures.

- Packard et al. (2023) conduct sentence-level tests, measuring the number of CD&A sentences containing performance-related words.

Meanwhile, non-CD&A studies have investigated the topical content of MD&A, 10-K reports, analyst reports, etc. using topic modeling techniques.

RQ2: How are CD&A topics affected by changes in accounting performance numbers?

Impression management: Managers' strategic selection and presentation of information in a deliberate attempt to "distort readers' perception of corporate achievements" (Godfrey et al., 2003, p. 96).

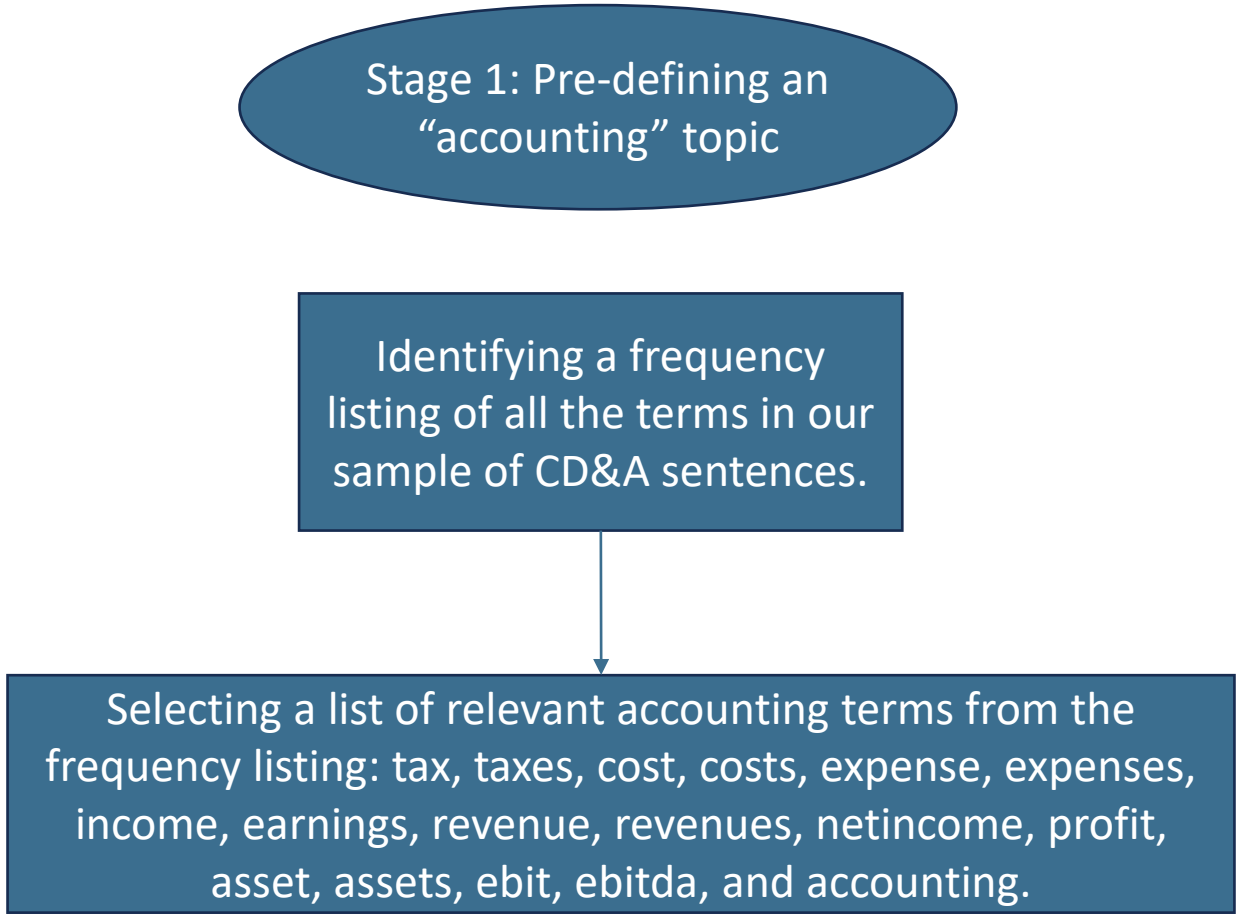
We posit that managers have a strong incentive to sway shareholder perceptions of compensation schemes and influence voting behavior by strategically manipulating the thematic content in their CD&A narratives, especially when there are shifts in accounting performance metrics.

Data and Method

Data

Sample selection		
	Number of CD&A Filings	Number of CD&A sentence-level observations
All CD&A documents filed by S&P 1500 firms over fiscal years 2006 to 2015	13,433	
Less: Duplicated filings	(15)	
Less: Unavailable firm-year observations in Compustat database	(361)	
Primary sample	13,057	2,258,574
Less: sentences with less than 30 characters		(278,540)
Final sample		1,980,034

Method - Measuring Topics



Stage 2: Conducting topic modeling

Removing the accounting terms

↓

Using LDA approach to determine the optimal number of topics and extract topical content.

↓

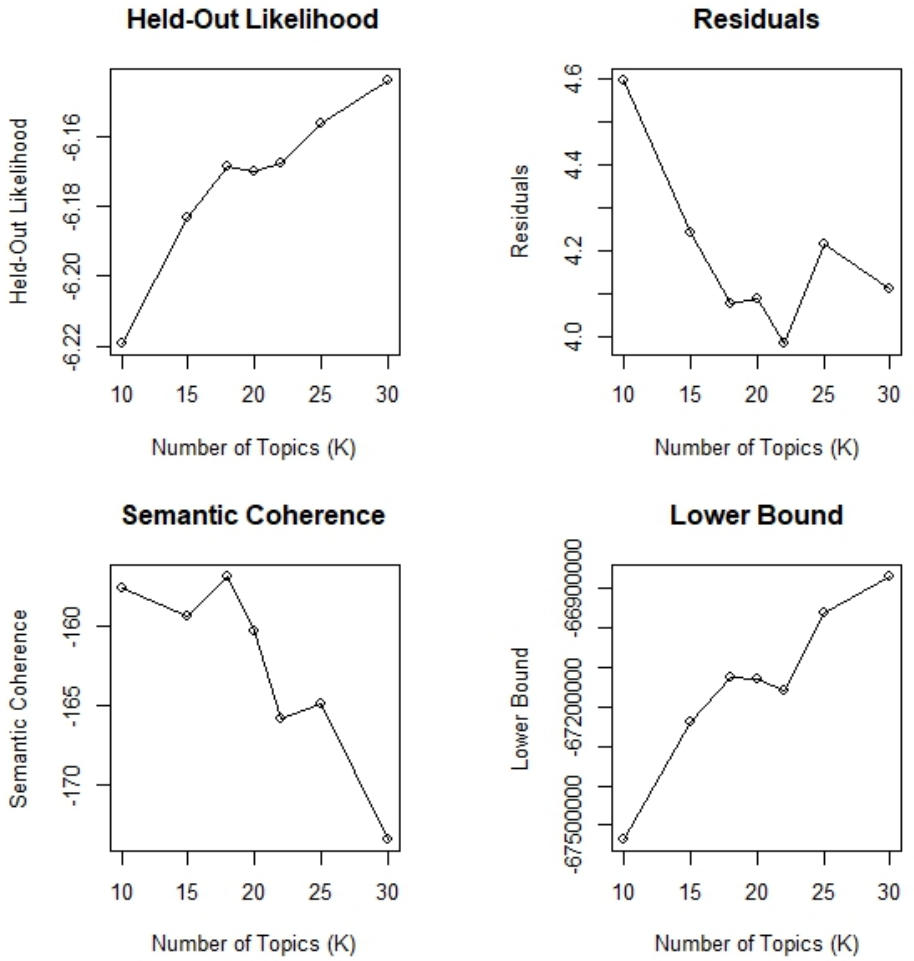
Using LDA approach to extract **frequent-and-exclusive (FREX)** words for each topic.

↓

For each of the 19 topics, assigning a value of 1 to variable $TOPIC_i$ in a given sentence if the sentence contains at least one FREX word from topic *i*, and zero otherwise.

↓

Creating *TOPICj* for each of the eight combined topics.



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Method – Measuring Performance Number Change

Our proxy for the change in accounting performance is the year-over-year change in ROA (net income over total assets).

Method – LASSO regression

Least Absolute Shrinkage and Selection Operator (LASSO) regression:

- The primary goal of LASSO regression is to find a balance between model simplicity and accuracy.
- It achieves this by adding a penalty term to the traditional linear regression model, which encourages sparse solutions where some coefficients are forced to be exactly zero.
- This feature makes LASSO particularly useful for feature selection, as it can automatically identify and discard irrelevant or redundant variables.

For 19 individual topics: $ROA_INCREASE = \alpha + \beta_i \times TOPIC_i + CONTROLS$
For 8 combined topics: $ROA_INCREASE = \alpha + \beta_j \times TOPIC_j + CONTROLS$

Findings

Topical Content - FREX Words

19 individual topics and descriptions by topical category	FREX words
Accounting	
$TOPIC_{Accting}$: Accounting terms	tax, taxes, cost, costs, expense, expenses, income, earnings, revenues, net income, profit, asset, assets, ebit, ebitda, accounting
Aligning interests	
$TOPIC_{Incentives}$: Long-term incentives	order, tie, portion, ensur, sinc, retent, remain
$TOPIC_{Voting}$: Shareholders' voting	vote, advisori, saydexi, approxim, propos, consider, express
$TOPIC_{Goals}$: Firms' long-term goals	success, attract, leadership, key, import, strateg, experi
$TOPIC_{Efficiency}$: Short-term incentives to maximize efficiency	mix, sheet, short, invest, effici, improv, balanc
Pay-for-performance	
$TOPIC_{Stock}$: Stock grant calculation	rsus, common, quarter, dividend, close, equal, ltip
$TOPIC_{Non\text{-}GAAP}$: Non-GAAP performance measures calculation	exclud, charg, calcul, dollar, item, loss, amort
$TOPIC_{Bonus}$: Bonus calculation	threshold, maximum, metric, fund, pre, pool, minimum
Peers	
$TOPIC_{Peer}$: Peer firms	presid, vice, inc, senior, resourc, human, corp
$TOPIC_{Market}$: Market survey sources	survey, industri, median, similar, size, comparison, benchmark
Independence	
$TOPIC_{Committee}$: Committee's discretion	discret, messr, author, discretionari, final, sole, howev
$TOPIC_{Advisor}$: Independent advisor	independ, member, request, assess, assist, pearl, input
Basic introduction	
$TOPIC_{Elements}$: Compensation package elements	current, packag, histor, talli, potenti, various, vehicl
$TOPIC_{Introduction}$: Introductory sentences	page, see, forth, statement, column, proxi, shown
$TOPIC_{Overview}$: CD&A overview	philosophi, analysi, princip, overview, refer, appli, specif
$TOPIC_{Termination}$: Termination payments and retirement plans	etir, termin, insur, disabl, defer, sever, life
Risk management	
$TOPIC_{Risk}$: Risk management	releas, materi, like, affect, advers, secur, hedg
$TOPIC_{Clawback}$: Clawback policy	previous, restat, due, part, seek, subsequ, basi
Compliance	
$TOPIC_{Compliance}$: Compliance with Internal Revenue Code	code, ownership, guidelin, deduct, limit, adopt, intern

Topical Content - Representative Sentences

$TOPIC_{Incentives}$	Long-term incentives are designed to tie a significant portion of our named executive officers' compensation to our performance, create a meaningful alignment of our named executive officers' financial interests with those of stockholders, and encourage long term retention.
$TOPIC_{Stock}$	Stock options granted by us have an exercise price equal to the fair market value of our common stock on the day of grant, typically vest over a three-year period (with 33% vesting 12 months after the grant date and the remainder vesting ratably each year thereafter based upon continued employment) and generally expire five years after the date of grant.
$TOPIC_{Market}$	For fiscal year 2011, these survey sources were the Hewitt TCM Executive Survey, the Mercer Benchmark Database Survey, the Towers Perrin CDB Executive Survey, and the Watson Wyatt Top Management Survey.

$TOPIC_{Accting}$
$TOPIC_{Advisor}$
$TOPIC_{Risk}$
...

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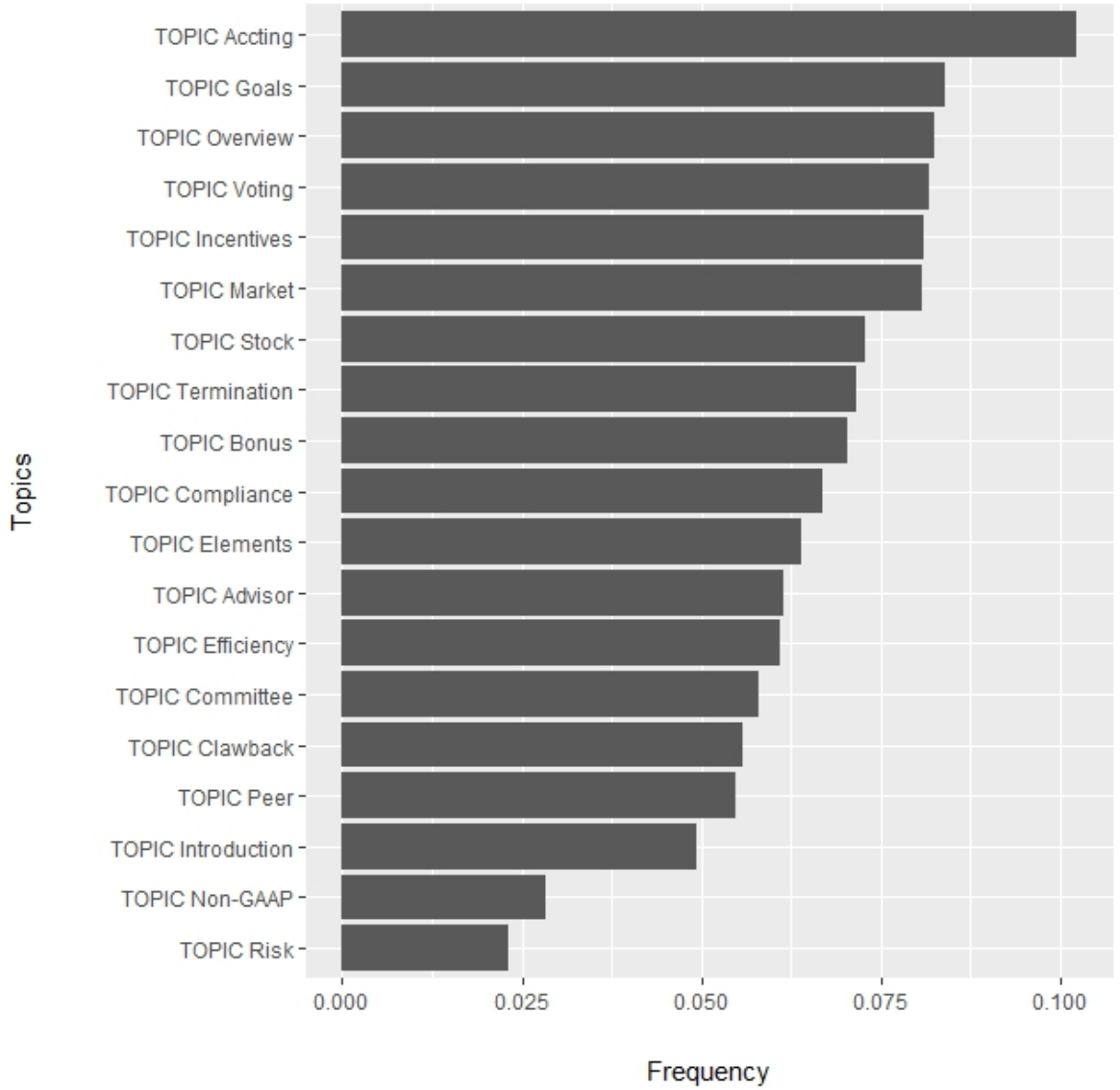
Topical Content – Prevalance Ranking



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ROA Increase and Topic Adoption

	(1) *IVs are 19 individual topic variables*	(2) *IVs are 8 combined topic categories*
Intercept	0.5387	0.5383
Accounting		
$TOPIC_{Accting}$	-0.0006	-0.0001
Aligning interests		
$TOPIC_{Incentives}$	-0.0005	
$TOPIC_{Voting}$	0.0006	
$TOPIC_{Goals}$	0.0018	
$TOPIC_{Efficiency}$	0.0070	
$TOPIC_{Combined\text{-}Alignment}$		0.0027
Pay-for-performance		
$TOPIC_{Stock}$	-0.0048	
$TOPIC_{Non\text{-}GAAP}$	-0.0042	
$TOPIC_{Bonus}$	0.0049	
$TOPIC_{Combined\text{-}Performance}$		-0.0012
Peers		
$TOPIC_{Peer}$	-0.0035	
$TOPIC_{Market}$	-0.0010	
$TOPIC_{Combined\text{-}Peers}$		-0.0020
Independence		
$TOPIC_{Committee}$	-0.0057	
$TOPIC_{Advisor}$	0.0010	
$TOPIC_{Combined\text{-}Independence}$		-0.0027
Basic introduction		
$TOPIC_{Elements}$	-0.0074	
$TOPIC_{Introduction}$	0.0058	
$TOPIC_{Overview}$	0.0030	
$TOPIC_{Termination}$	0.0035	
$TOPIC_{Combined\text{-}Intro}$		0.0020
Risk management		
$TOPIC_{Risk}$	-0.0022	
$TOPIC_{Clawback}$	-0.0041	
$TOPIC_{Combined\text{-}Risks}$		-0.0038
Compliance		
$TOPIC_{Compliance}$	0.0050	0.0045

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Additional Tests and Robustness Check

- Miscellaneous robustness tests: Omitting observations with missing values; Adding control variables; Changing the number of topics to 15 and 20.

- Alternative measure of topics: Most prevalent topic per sentence.

- Alternative unit of analysis: Conducting filing level analyses.

- Alternative measure of performance number change: ROA_DECREASE.

CEO Pay Increase and Topic Adoption

	(1) *IVs are 19 individual topics*	(2) *IVs are 8 combined topic categories*
Intercept	0.6287	0.6289
Accounting		
$TOPIC_{Accting}$	0.0004	0.00001
Aligning interests		
$TOPIC_{Incentives}$	-	
$TOPIC_{Voting}$	0.0018	
$TOPIC_{Goals}$	0.0009	
$TOPIC_{Efficiency}$	-0.0041	
$TOPIC_{Combined\text{-}Alignment}$		0.0008
Pay-for-performance		
$TOPIC_{Stock}$	0.0039	
$TOPIC_{Non\text{-}GAAP}$	0.0008	
$TOPIC_{Bonus}$	-0.0008	
$TOPIC_{Combined\text{-}Performance}$		0.0016
Peers		
$TOPIC_{Peer}$	-0.0033	
$TOPIC_{Market}$	0.0041	
$TOPIC_{Combined\text{-}Peers}$		0.0010
Independence		
TOPICCommittee	-0.0015	
TOPICAdvisor	-0.0001	
$TOPIC_{Combined\text{-}Independence}$		-0.0007
Basic introduction		
$TOPIC_{Elements}$	-0.0010	
$TOPIC_{Introduction}$	-	
$TOPIC_{Overview}$	0.0009	
$TOPIC_{Termination}$	-0.0033	
$TOPIC_{Combined\text{-}Intro}$		-0.0011
Risk management		
$TOPIC_{Risk}$	-0.00002	
$TOPIC_{Clawback}$	-	
$TOPIC_{Combined\text{-}Risks}$		-
Compliance		
$TOPIC_{Compliance}$	0.0014	0.0014

Market Reaction (Three-day Cumulative Abnormal Returns) to Topic Proportion

	(1) *IVs are 19 individual topic variables*	(2) *IVs are 8 combined topic categories*
Intercept	0.0013	0.0017
Accounting		
$TOPIC_PROP_{Accting}$	-	-0.0444
Aligning interests		
$TOPIC_PROP_{Incentives}$	-0.1769	
$TOPIC_PROP_{Voting}$	-0.0106	
$TOPIC_PROP_{Goals}$	-	
$TOPIC_PROP_{Efficiency}$	-	
$TOPIC_PROP_{Combined\text{-}Alignment}$		-0.0091
Pay-for-performance		
$TOPIC_PROP_{Stock}$	0.0207	
$TOPIC_PROP_{Non\text{-}GAAP}$	-	
$TOPIC_PROP_{Bonus}$	-0.1663	
$TOPIC_PROP_{Combined\text{-}Performance}$		-0.0109
Peers		
$TOPIC_PROP_{Peer}$	-	
$TOPIC_PROP_{Market}$	0.0740	
$TOPIC_PROP_{Combined\text{-}Peers}$		-
Independence		
$TOPIC_PROP_{Committee}$	-	
$TOPIC_PROP_{Advisor}$	-	
$TOPIC_PROP_{Combined\text{-}Independence}$		-
Basic introduction		
$TOPIC_PROP_{Elements}$	0.0688	
$TOPIC_PROP_{Introduction}$	-	
$TOPIC_PROP_{Overview}$	0.1668	
$TOPIC_PROP_{Termination}$	-	
$TOPIC_PROP_{Combined\text{-}Intro}$		0.0389
Risk management		
$TOPIC_PROP_{Risk}$	-	
$TOPIC_PROP_{Clawback}$	-0.0085	
$TOPIC_PROP_{Combined\text{-}Risks}$		-0.0177
Compliance		
$TOPIC_PROP_{Compliance}$	0.0318	0.0678

Discussion

- We identify 19 conceptually significant topics organized into eight broad categories; Of these, the topics in the *accounting, aligning interests, pay-for-performance* categories are more pervasive than others.

- Our LASSO regressions for RQ2 suggest that an increase in ROA leads managers to emphasize certain CD&A topics, particularly those related to *aligning interests* and *compliance*.

- Contributions:

  Providing a more detailed understanding of CD&A disclosures;
  Showing that topic adoption is an impression management technique;
  Offering practical value to policymakers and investors.

THANK YOU