Corporate Governance: Data and Technology

Wei Jiang

Arthur F. Burns Professor of Free and Competitive Enterprise

Columbia Business School

Prepared for The Institute for Corporate Governance

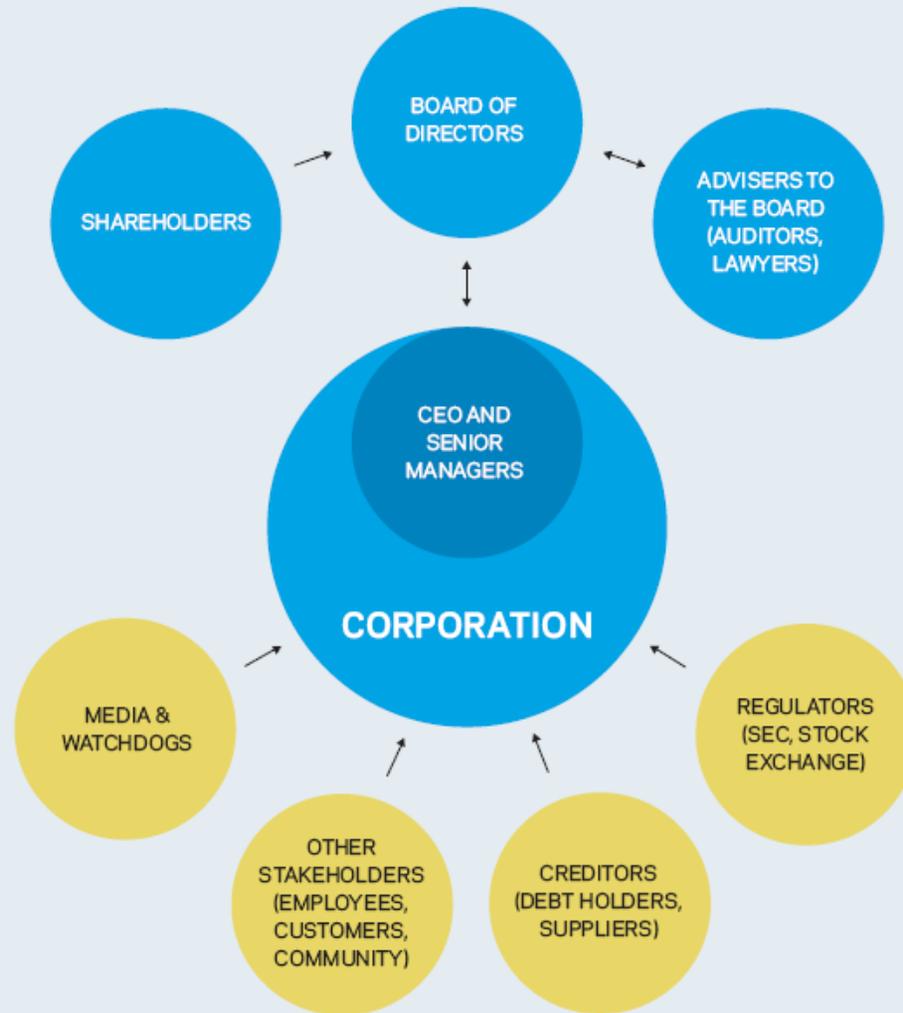at Kelley School of Business

December 2, 2021

Fundamentals of corporate governance

- Regarding "corporate governance," what issues come to your mind?
  - …
  - Formal definition: "The set of processes, customs, policies, laws, and institutions affecting the way a corporation is directed, administered, or controlled."

- What is the ultimate reason for these issues?
  - Conflicts of interest due to separation of ownership and control.
  - Information asymmetry, usually between insiders and outside investors.

Columbia Business School
AT THE VERY CENTER OF BUSINESS™

The Full Governance Structure

PARTICIPANTS IN THE CORPORATE GOVERNANCE PROCESS

Where does technology fit?

SHAREHOLDERS

BOARD OF DIRECTORS

ADVISERS TO THE BOARD (AUDITORS, LAWYERS)

CEO AND SENIOR MANAGERS

CORPORATION

MEDIA & WATCHDOGS

OTHER STAKEHOLDERS (EMPLOYEES, CUSTOMERS, COMMUNITY)

CREDITORS (DEBT HOLDERS, SUPPLIERS)

REGULATORS (SEC, STOCK EXCHANGE)

Tech brings new chapters to corporate governance

- There are multiple new chapters:
  - Governance *with* data and technology: new information, innovative toolkits, improved infrastructure.
  - Governance *of* data and technology: privacy; data monopoly, algorithmic biases; AI ethics.
  - Big data/machine learning methodologies in corporate governance research.
- I will only be focusing on the first part.
  - The changing nature of information.
  - Distributed ledger technology and shareholder empowerment.
  - Smart contract.

Part I

NEW PARADIGM OF INFORMATION ASYMMETRY

Re-defining information and information advantage

- Governance issues are invariably related to asymmetric information.
- Asymmetric information in corporate governance has mostly been following the Myers and Majluf (1984) `tevehrkq $`…when firms have information that investors do not have."
  - Work with coauthors, Chen, Goldstein, and Jiang (2007) and Edmans, Goldstein, and Jiang (2015), suggest that firm managers learn from stock price in decision making.
  - This was the main challenge.
- Law/regulation aiming at leveling the information ground also focuses on "material, nonpublic information" obtained from a source that owes a duty of trust and confidence to the firm.
  - How should information created outside the firm be interpreted and regulated?

Columbia Business School
AT THE VERY CENTER OF BUSINESS

New sources of information and new asymmetry

- Alternative data:
  - Generated outside the firms by tracking "footprints" (satellite images, internet traffic, credit card scan, censors, social media postings).
  - Could be ahead of or incremental to managerial information.
  - Access of information is both universal and uneven.
- Traditional data: SEC filings, press releases, IR presentations.
  - The length of 10k increases by five times from 2005 to 2017, and the number of textual changes over previous filings increases by over 12 times (Cohen, Malloy, and Nguyen, 2020).
  - The SEC estimates that "as much as 85% of the documents visited are by internet bot" (Bauguess, 2018).
  - Differential ability to process big data creates asymmetry due to public information.
- Neither form of asymmetry could be mitigated by Reg FD, etc.

Governance power of "alternative data"

- Zhu (2019) shows that externally generated alternative data (which became popular around 2014-2016) are predictive of firm performance and offset insider advantage.
  - The introduction of clicks and "conversion" data; and satellite images.
  - Stock prices become more informative.
  - Management enjoys less rents from insider trading.
  - Better investment alignment with fundamentals.
- Growing data that provide information on ownership structures, leadership quality, shareholder sentiment, employee satisfaction, governance risks.
- Give ESG metrics content and transparency.

Advantage from alternative data

An event study in Cao, Jiang, Wang, and Yang (2021): How analyst forecast performance changes after the target firm is covered by "alt data," relative to AI-forecasts that are mostly based on firm-disclosed information.

		Dependent variable: *Man Beats Machine*		
Alt Data Cover × Post × AI Hiring			6.674***	4.807**
			(3.27)	(2.12)
AI Hiring	0.141**	0.192**	0.206**	0.243**
	(2.00)	(2.52)	(2.56)	(2.44)
Alt Data Cover			-0.011	
			(-0.18)	
Post			0.109*	0.004
			(1.69)	(0.05)
Alt Data Cover × Post			0.057	-0.028
			(0.74)	(-0.31)
Alt Data Cover × AI Hiring			-2.880**	-1.429
			(-2.02)	(-0.89)
Post × AI Hiring			-0.322	-0.282
			(-1.46)	(-1.20)
Constant	0.354***	0.527***	0.360***	0.526***
	(6.30)	(4.20)	(6.56)	(4.19)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	No	Yes	No	Yes
Observations	85,950	85,950	85,950	85,950
Adjusted R-squared	0.02	0.166	0.02	0.167

Columbia Business School
AT THE VERY CENTER OF BUSINESS

Data processing capacity creates new (public) information asymmetry

Cao, Jiang, Yang, Zhang (2021) quantify "machine readership" and "machine readability."
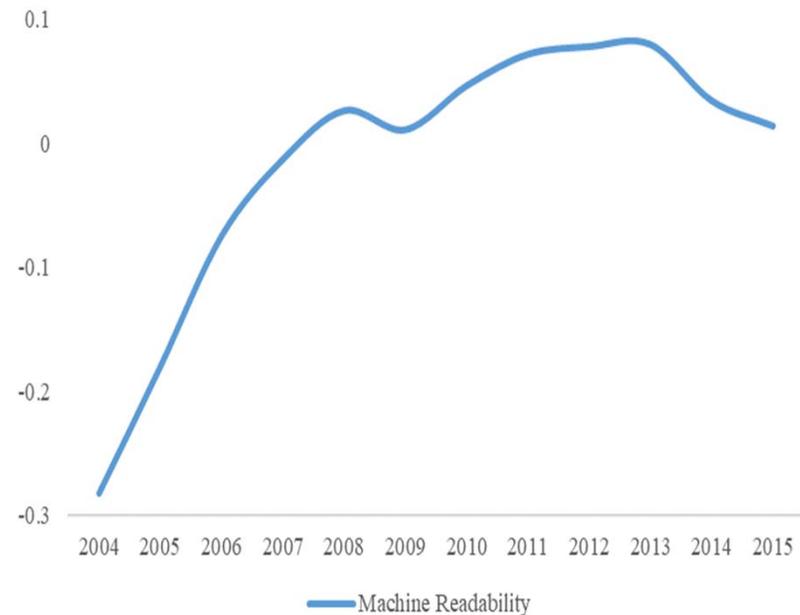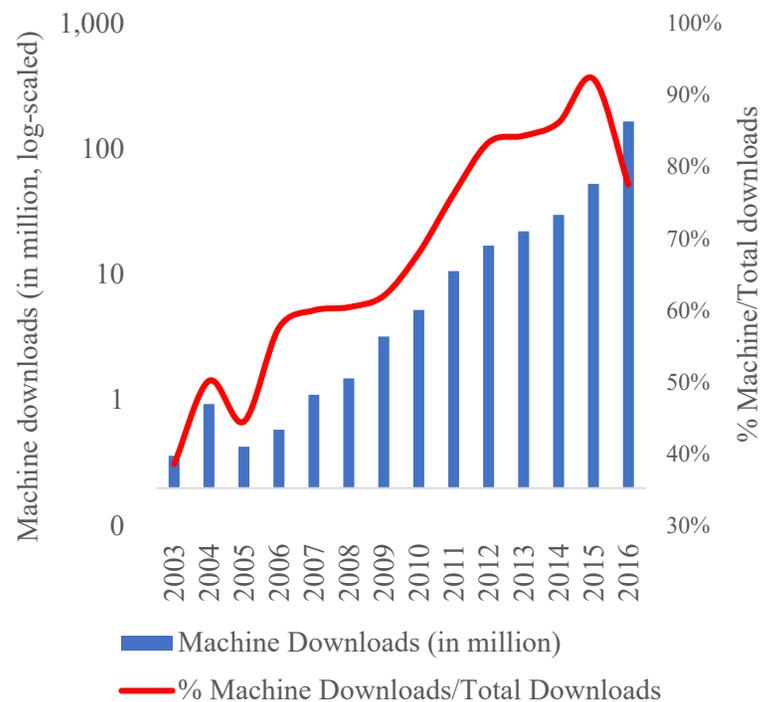
Public information asymmetry

Machine processing is associated with faster trade (in seconds) and speedier information dissemination.

Dependent Variable	(1)	(2) Time to the First Trade	(3)	(4)	(5)	(6) Time to the First Directional Trade	(7)	(8)
Machine Downloads	-8.353**	-4.857*	-7.347**	-3.398	-12.365***	-7.540***	-12.374***	-7.258**
	(-2.56)	(-1.68)	(-2.19)	(-1.14)	(-3.94)	(-2.71)	(-3.87)	(-2.55)
Machine Downloads × Machine Readability			-3.761**	-3.887***			-2.815*	-2.127*
			(-2.46)	(-2.84)			(-1.87)	(-1.67)

And hence more information asymmetry post filing manifested in widened bid-ask spread (in percentage points)

Dependent Variable	(1)	(2)	(3) Bid-Ask Spread	(4)	(5)	(6)
Machine Downloads × After	0.028***	0.037***	0.063***	0.068***	0.055***	0.081***
	(3.11)	(3.64)	(7.24)	(6.97)	(8.46)	(10.94)

Moreover, firms changes the way they talk

- An emerging issue in the age of machine learning: Agents with vested interest have the incentive to change the way they talk knowing that machines are listening.

- ...they're sorting through the language in transcripts of earnings calls, looking for changes in tones and counting positive and negative words. Naturally, once BlackRock is successful in decoding these reports management at those companies will catch on and attempting to change the signals they're inadvertently sending."– Institutional Investor, November 2016

- E.g., after Loughran and McDonald (2011) determines that certain words represent negative sentiment, their frequency of appearance has decreased.

Frequency of Loughran and McDonald (2011) negative words
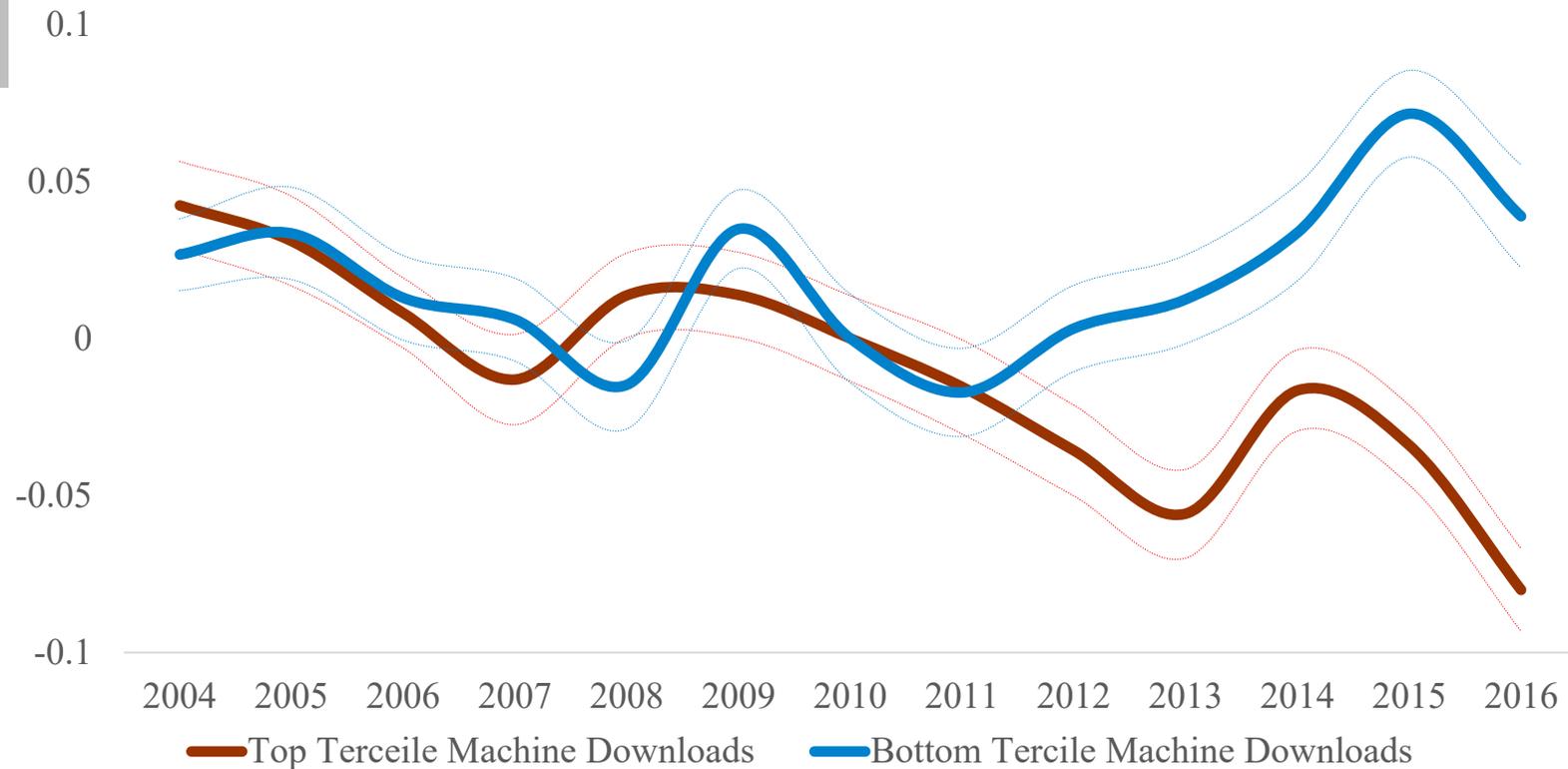
A more general lesson from Cao, Jiang, Yang, Zhang (2021): A novel "feedback effect" from machine learning about firm fundamentals to corporate decisions.
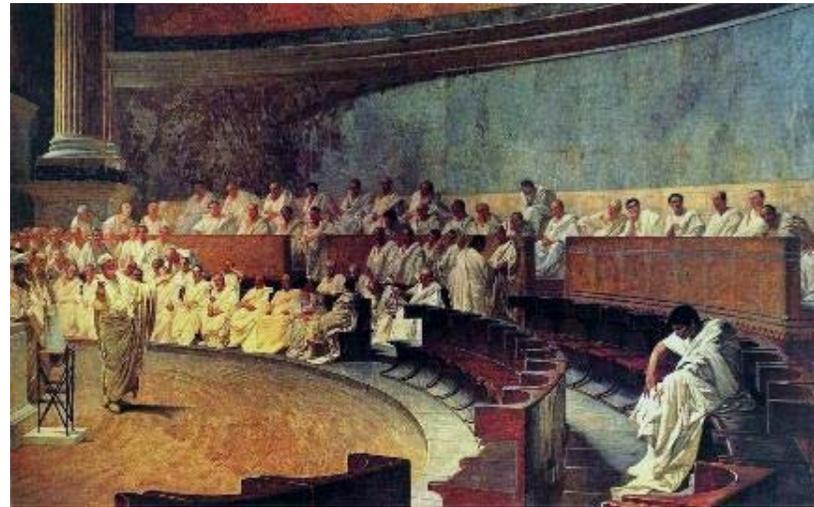
Part II

NEW FOUNDATIONAL TECHNOLOGY FOR OWNERSHIP AND VOTING

Columbia Business School
AT THE VERY CENTER OF BUSINESS™

Voting is the building block of shareholder democracy

Direct Democracy
(e.g., shareholder proposal;
say-on-pay)

Representative Democracy
(e.g., proxy contests)

Columbia Business School
AT THE VERY CENTER OF BUSINESS

# Major blunders in voting plumbing

- T. Rowe's dissension against Dell going-private transaction in 2013.
  - Nearly 30% of shareholder voted against the deal, a sizable dissension.
  - Dissenters refrained from voting, and surrendered their shares to the court for an "judicially determined fair value" (Jiang, Li, Mei, Thomas, 2016).
  - T. Rowe *thought* it dissented, and filed an appraisal petition; but the voting instructions were in fact submitted as "For."

- In 2013, CEO of Dole Foods (who used dubious share lending empty voting) settled a class action lawsuit to compensate shareholder for underpayment in the MBO, 133.6% of the shares outstanding claim to be eligible.

- "Over-voting" (around 4% on average) introduces a pro-management bias (Smith, 2013).

Columbia Business School
AT THE VERY CENTER OF BUSINESS

Contested elections often result in unknown outcomes

- About 1% of the firms are targeted with proxy contests in a given year (Brav, Jiang, Li, and Pennington,, 2021).
    - 44% of the announced fights proceeded to the voting stage.
    - Conditional on voting, dissidents won 49.5% of the time.
    - Leading proxy advisors support dissidents 52.3% of the time.
- Three counts of the Trian v. P&G proxy contest in 2017 yielded results from 0.2% win by P&G to 0.0016% win by Trian.
- "In a contest that is closer than 55 to 45%, there is no verifiable answer to the question, 'who won?'" (From Council of Institutional Investors to the SEC, 2018).

Columbia Business School
AT THE VERY CENTER OF BUSINESS

Blockchains please help the plumbing

Diagram 1: The Flow of Proxy Materials
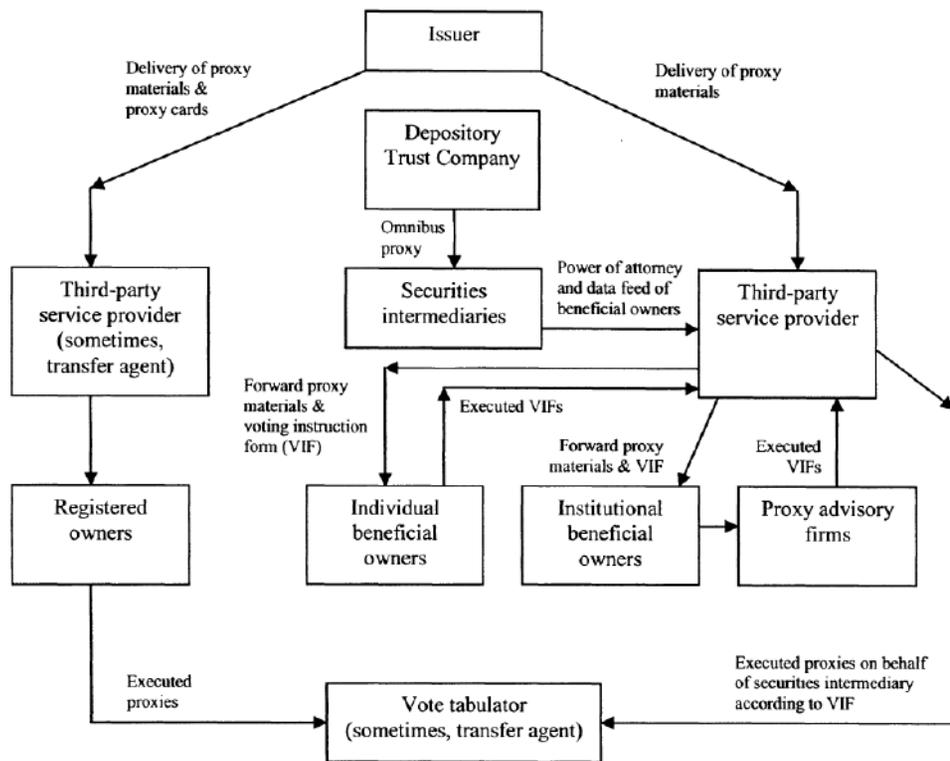
Source: SEC (2019)

Blockchain as a foundational technology

- Solution to "double spending" hopefully also resolves "double voting."

- Transparency, accuracy, and immutability of ownership (Yermack, 2017).

- Allowing additional features:

  – Tenure-based voting (Edelman, Jiang, and Thomas, 2019).

  – Different classes of shares sorted on the level of privacy.

  – Voting power of outside shares contingent on firm performance; contingent "sunset" of dual-class shares.

  – Empowering of retail investors with decentralized autonomous organizations (DAOs), which serves as self-sufficient proxy advisories.

Age of radical ownership transparency?

- For a company with shares listed on a public or permissioned blockchain, all interested parties would be able to view the distribution of and changes in ownership in real-time.

- Blockchains offering varying degrees of investor anonymity can compete to attract corporate listings trying to appeal to different shareholder clienteles.

- Even with the most decentralized technology (complete anonymity and arbitrary numbers of digital wallet per investor), identity could still be traced to a level accomplished by "tape watchers."

- Regulators may require "type code" disclosure, such as insiders, 5%-plus block holders.

- Regulators may further require public keys of insiders under penalty of law.

Columbia Business School
AT THE VERY CENTER OF BUSINESS

What immutability can accomplish
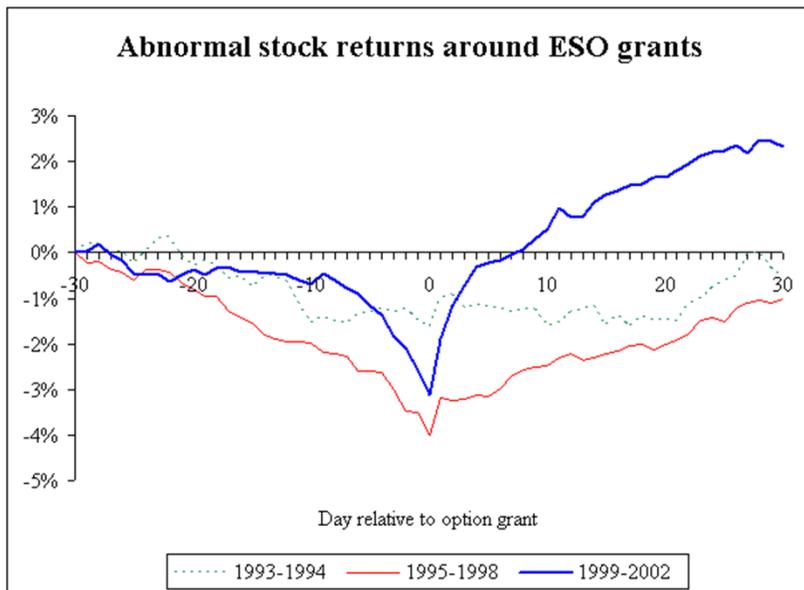
Heron and Lie (2007)
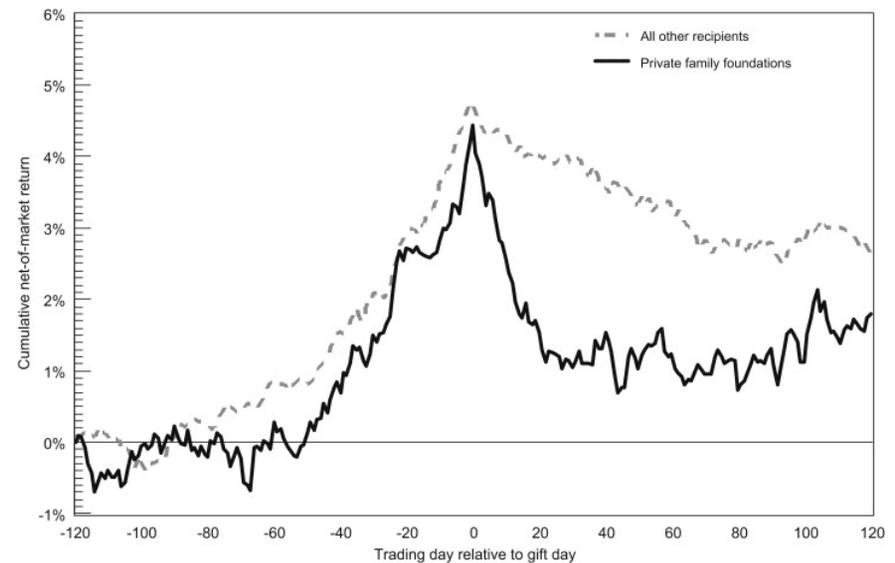
Yermack (2009)

Part III

NEW CONTRACTING SPACE

Columbia Business School
AT THE VERY CENTER OF BUSINESS™

Basic elements of a smart contract

- "Smart contracts are <u>digital</u> contracts allowing <u>terms contingent</u> on <u>decentralized consensus</u> that are <u>tamper-proof</u> and typically <u>self-enforcing</u> through <u>automated execution</u>." (Cong and He, 2019)
- More robotic than intelligent.
- We already have a lot of quasi-smart contracts:
  - A vending machine.
  - An escrow account.
- Applications: collateral, property rights, insurance.

Columbia Business School
AT THE VERY CENTER OF BUSINESS

Problems smart contract can solve and create

- Mitigate traditional moral hazard as a lot of "hidden actions" becomes verifiable.
  - In Cong, He, Li (2021), "effort" is effectively observable.
- Save enforcement cost.
- Deter strategic behavior.
- Remove the need for trust!
- Suited for situations where commitment is better than renegotiation. If not?
  - Real estate foreclosure.
- Contingency must be free from "feedback" effect (Bond, Goldstein, Prescott, 2010).
  - Coco bonds trigger (Sundaresan and Wang, 2015).

Conclusion remarks

- Data and technology have been constantly reshaping our financial markets and systems, and their governance.

- They solve and create problems – at different levels of capacity and efficiency.

- They level some fields but generate new inequalities.

- The board-centric model needs to adapt to the <u>new information</u>, <u>preference aggregation</u>, and <u>contractual feasibility</u>.

- A lot of exciting new topics!

- Look forward to more talks in this series.