

Understanding the News that Moves Markets

Bloomberg

EMNLP 2018

November 3, 2018

Gideon Mann

Head of Data Science, Office of the CTO

My journey: bad hair to no hair



What this talk is **not
about:**

How to make money on the stock market

What this talk **is about:**

Financial technology

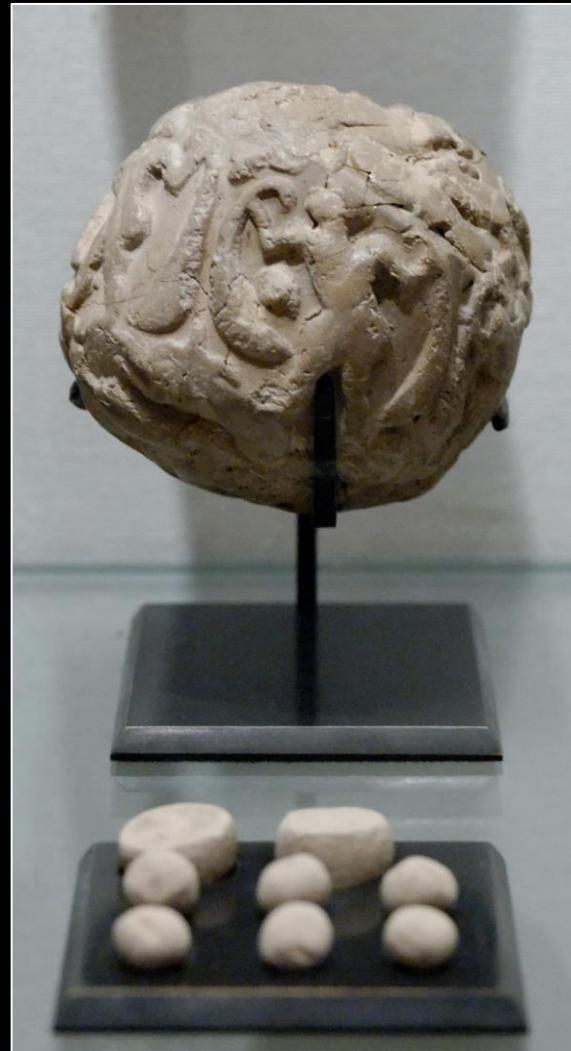
The news that moves markets

Computer Things

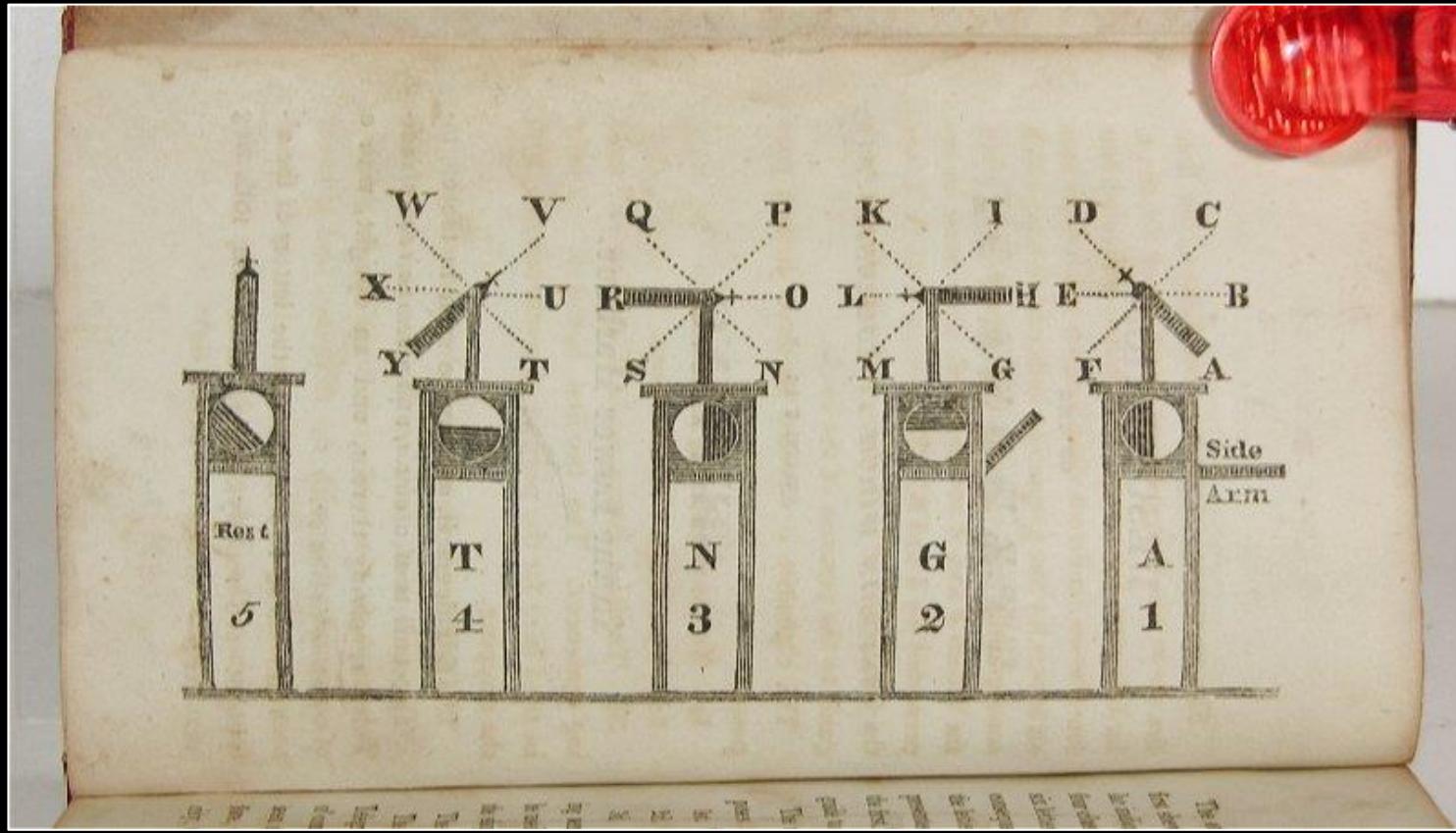
BlocksWorld



Financial Technology



Financial Technology II



Financial Technology III





What is the finance ecosystem?

Savers

(Companies, charities, governments, individuals - me and you)

Market:

Stock exchanges

Buy side

Wealth managers

Sovereign Wealth Funds

(Norway's "Oil Fund")

Insurance companies

Pension funds

Buy side

Investment Management firms

(Vanguard, Azimut)

Sell side

Investment banks and other brokers

(HSBC)

Fund Rating agencies

Investment consultants

Sell side analysts

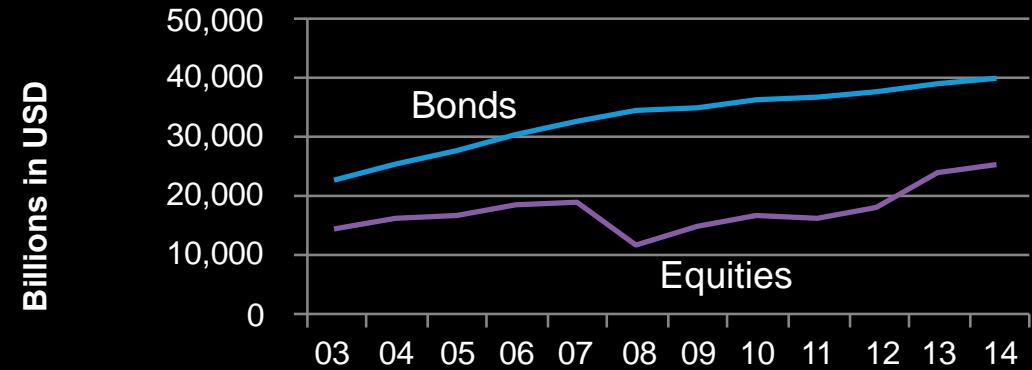
Bloomberg

Government and companies

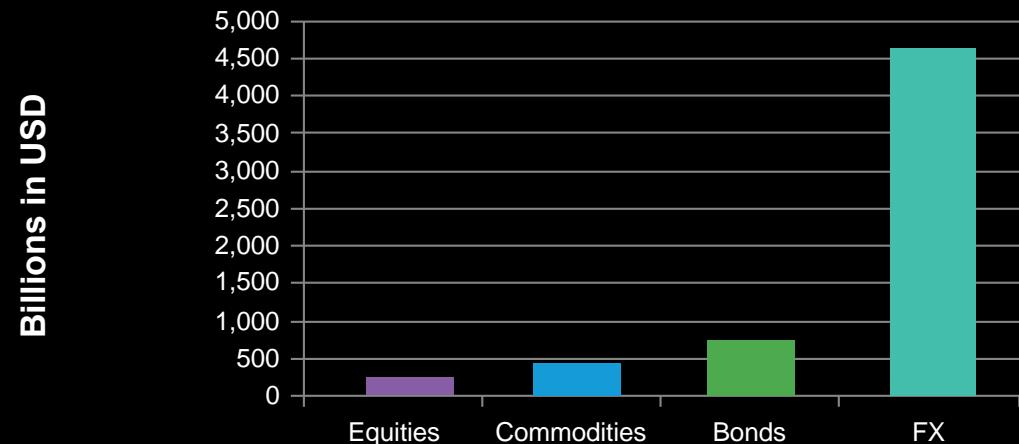
Credit rating agencies

Central Banks

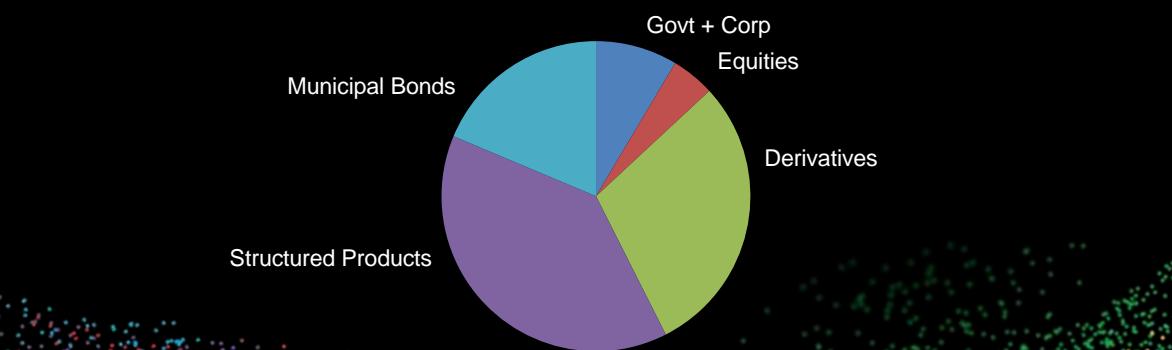
Bonds have more market value than equities



FX has the most daily notational volume

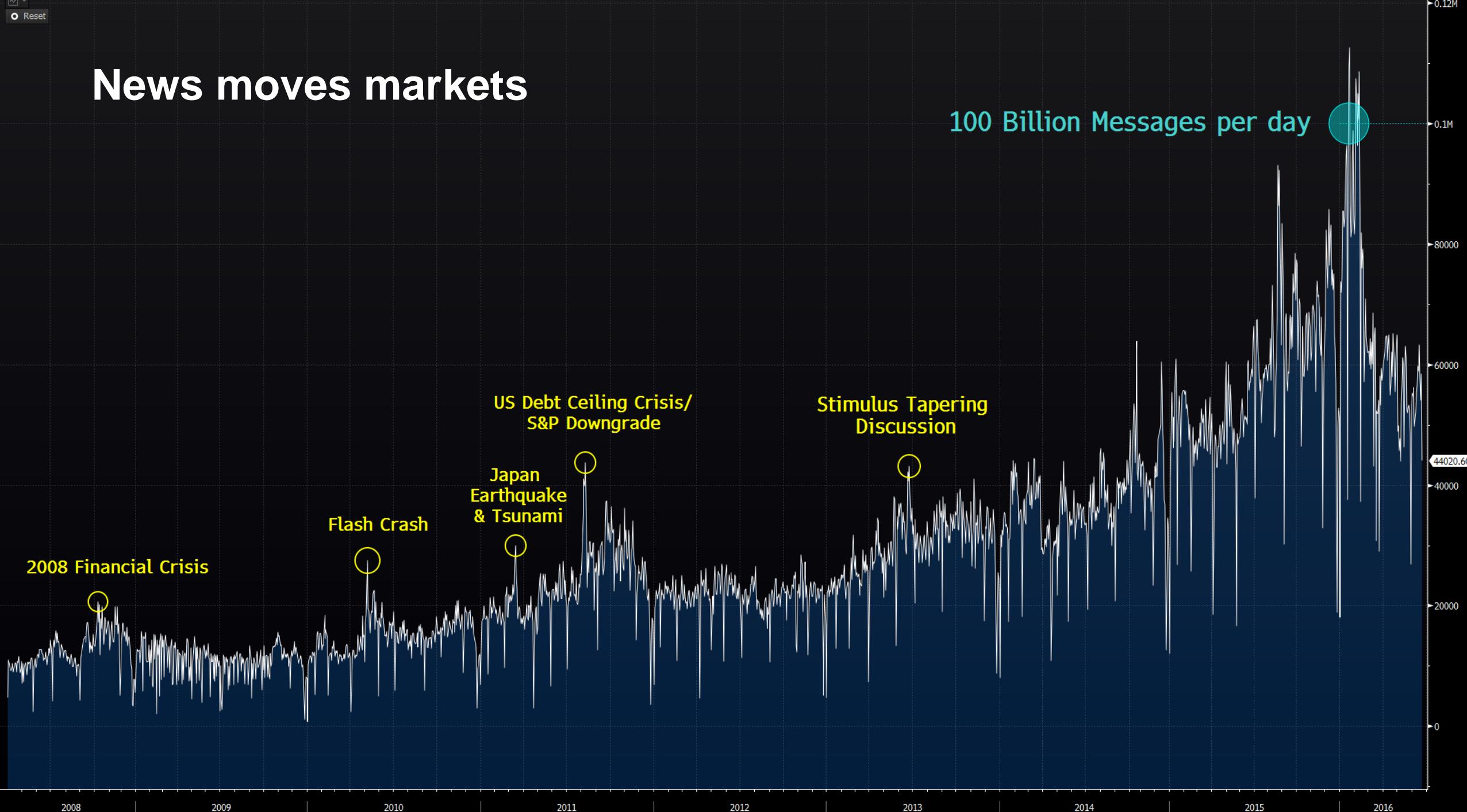


Vastly more structured products and derivatives than equities



News moves markets

100 Billion Messages per day



Not all channels are the same...

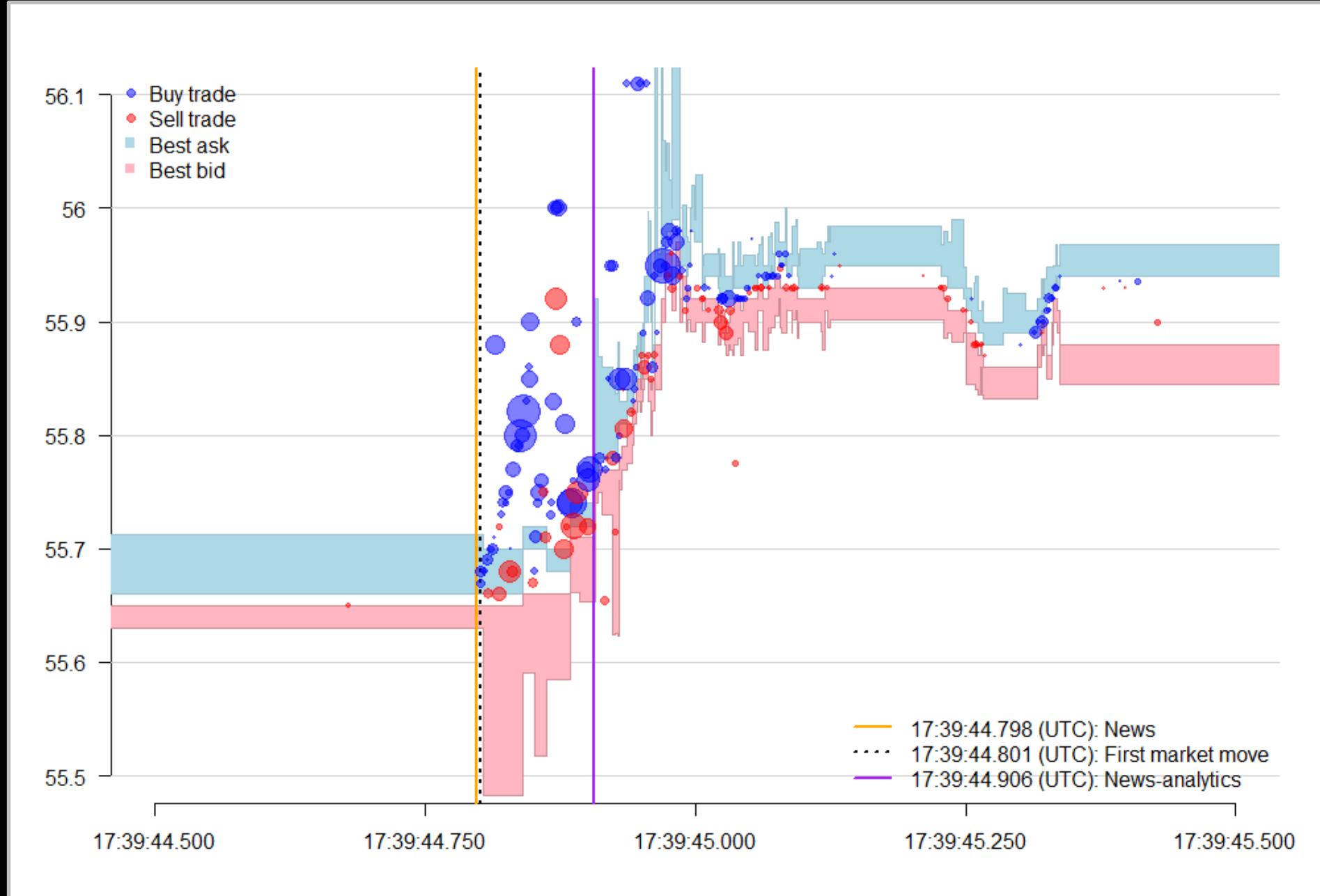


[Dredze et al. 2016]
[Osborne, Dredze 2014]

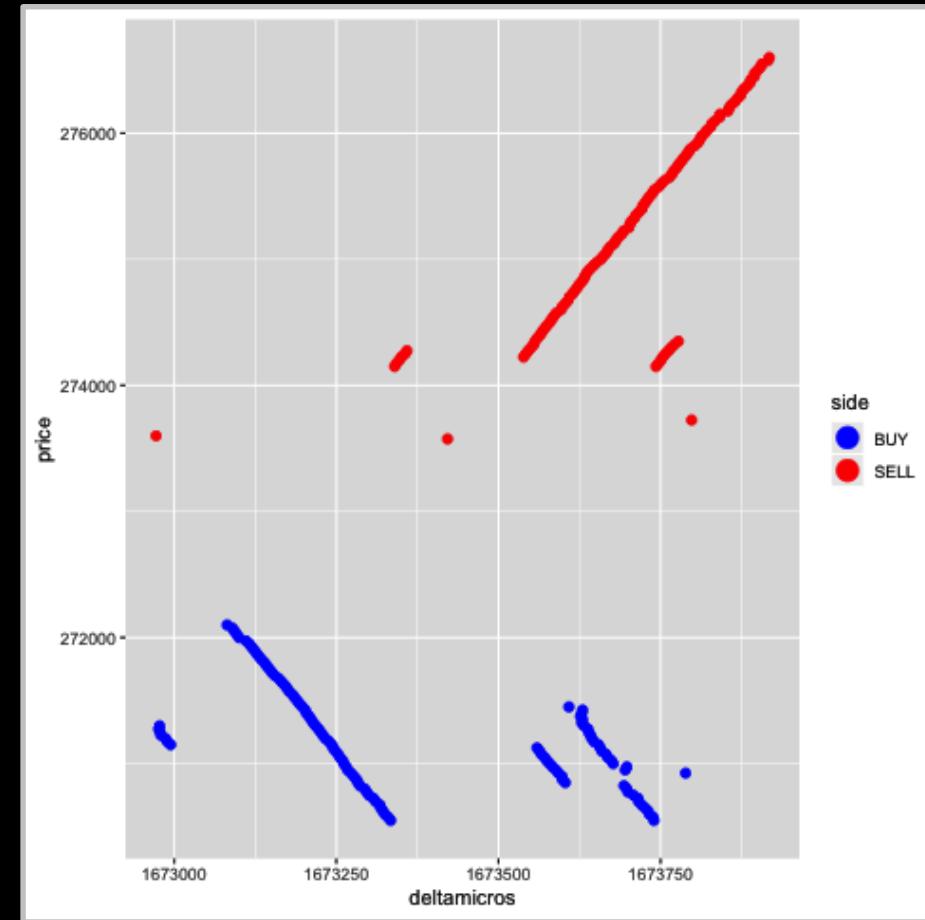
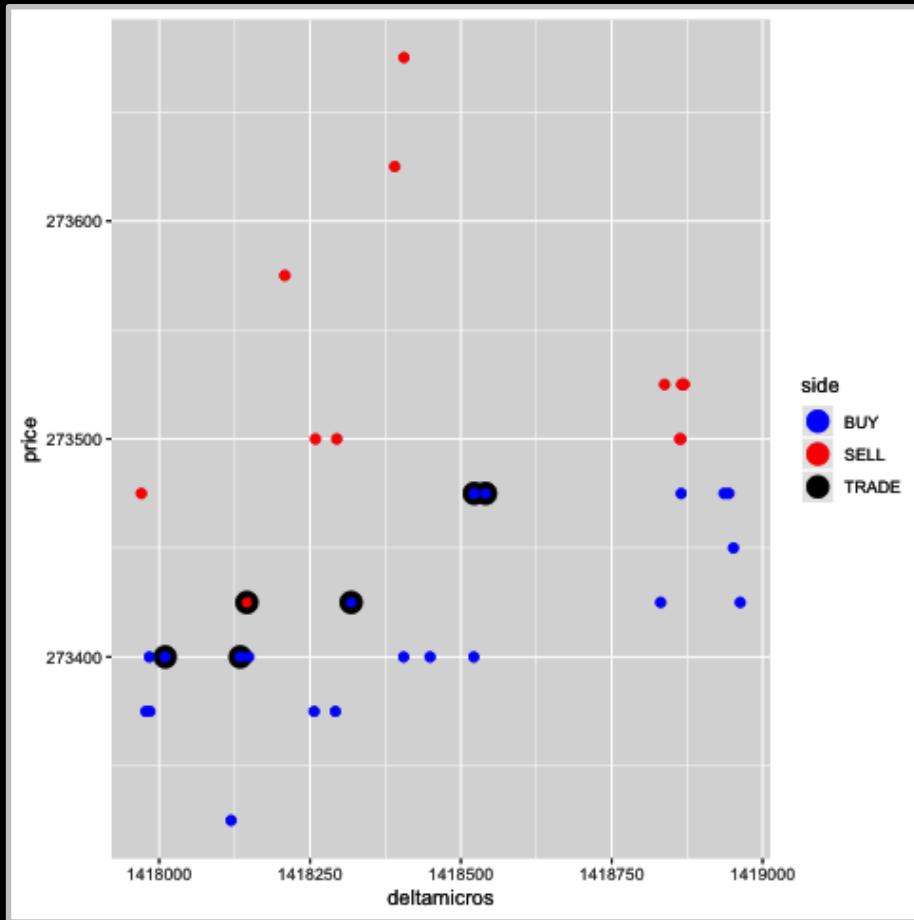
...not all sources are the same



Broadcomm is said to explore deal to acquire chipmaker Qualcomm



Human Language Technology, not Renaissance Technologies



Time is not a myth

Days & Hours

Fundamental Investor

Minutes

Institutional Trader

Milliseconds

Event Driven Algorithmic Trader

Microseconds

High Frequency Trading



Detection

New text arrives

Extraction

Extract structured
data from text

Interpretation

Relate new data to
existing data

Presentation

Inform the user on
what happened

Detection

Extraction

Interpretation

Presentation



Document ingest and search

The screenshot shows a news search interface with the following details:

- Search News Actions ▾ Custom Searches Translate ▾**
- Page 1 News**
- Coffee** (highlighted in orange)
- All Sources All Dates Time**
- Top Ranked News | More »**
- Time Ordered News**
- Results:**

 - 1) Engelhart Hires Former Sucden's Donovan to Bolster Coffee Team BN 12:10
 - 2) SOFTS: Cocoa Advances on El Nino Concerns; Coffee, Sugar Climb BFW 10/25
 - 3) Tata Coffee Earnings Teleconference TCO IN BT 05:19
 - 4) *SEC Short Sale Rule 201 is in Effect : YGYI (NASDAQ) BSS 12:10
 - 5) Engelhart Hires Former Sucden's Donovan to Bolster Coffee Team BN 12:10
 - 6) Mena Report: Tender For Sale Of Dried Coffee Berries. NS8 11:36
 - 7) Mena Report: Supply Of Coffee. NS8 09:45
 - 8) Mena Report: Coffee, Tea And Accompanying Products. NS8 09:28
 - 9) The Columbian: Food & Drink: Kafielx celebrates global coffee village NS1 09:09
 - 10) Mena Report: Food, Beverages, Tobacco And Related Products (coffee Beverage, ... NS8 09:05
 - 11) Stewart & Mackertich Research_WEEKLY Dossier 26-10-2018 SMK 08:46
 - 12) Tuoi Tre: Tea-based drinks outplay coffee in caffeine-loving Vietnam: report NS6 08:18
 - 13) Intl Coffee Org: Visit from Ambassador of Angola IN9 06:51
 - 14) AGRICULTURE WEEKLY AGENDA: Sugar Ethanol; Bali; Soy Crush; Bunge BFW 05:45
 - 15) Asian News: GreenBrew all set to dominate Indian market with flavored green c... RE6 05:28
 - 16) Tata Coffee Earnings Teleconference TCO IN BT 05:19
 - 17) Commodity Online: India Coffee exports may fall as floods dent production NS1 04:19
 - 18) *SEC Short Sale Rule 201 Not In Effect : YGYI (NASDAQ) BSS 03:58
 - 19) Tata Coffee Earnings Q2 2019 Earnings Call Teleconference TCO IN BT 02:38

Twitter: Ranking financial tweets



StockCats
@StockCats

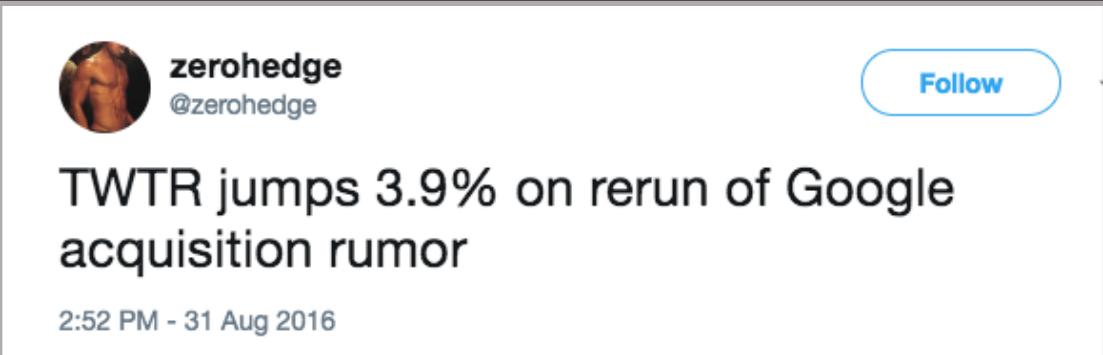
Follow

we haven't had a Twitter takeover rumor all year, so he's got to come up with something

4:09 PM - 26 Jan 2017

1 Retweet 14 Likes

3 1 14



zero hedge
@zero hedge

Follow

TWTR jumps 3.9% on rerun of Google acquisition rumor

2:52 PM - 31 Aug 2016

[Ceccarelli, Nidito,
Osborne 2016]

A disaster in the White House is huge

AP The Associated Press  Following

Breaking: Two Explosions in the White House and Barack Obama is injured

Reply Retweet Favorite Buffer More

3,242 RETWEETS 153 FAVORITES



12:07 PM - 23 Apr 13



Over \$136 billion
was wiped out in
minutes

Credibility



Twitter: Geolocation credibility



Mike Buss
@MikeBuss

Follow

Firefighters are battling a fire on the 50th floor of Trump Tower in NYC

3:49 PM - 7 Apr 2018 from [Highworth, England](#)

3 Likes

Q ↗ ❤ 3

[Preotiuc-Pietro, Guntuku, Ungar 2017]
[Preotiuc-Pietro, Liu, Hopkins, Ungar 2017]
[Giorgi, Preotiuc-Pietro, Buffone, Rieman, Ungar Schwartz 2018]
[Dredze, Osborne, Kambadur 2016]

Detection

Extraction

Interpretation

Presentation



Extraction from natural documents

PART I — FINANCIAL INFORMATION

Item 1. Financial Statements

STARBUCKS CORPORATION

CONDENSED CONSOLIDATED STATEMENTS OF EARNINGS

(in millions, except per share data)

(unaudited)

	Quarter Ended		Three Quarters Ended	
	Jul 1,	Jul 2,	Jul 1,	Jul 2,
Net revenues:				
Company-operated stores	\$ 5,060.4	\$ 4,309.0	\$ 14,630.3	\$ 13,173.7
Licensed stores	660.6	588.3	1,968.6	1,737.4
CPG, foodservice and other	589.3	564.2	1,817.0	
Total net revenues	6,310.3	5,661.5	18,415.9	16,688.5
Cost of sales including occupancy costs	2,554.9	2,249.1	7,573.7	
Store operating expenses	1,825.0	1,628.9	5,351.6	4,853.5
Other operating expenses	148.0	142.5	424.0	422.7
Depreciation and amortization expenses	330.0	252.6	920.4	756.0
General and administrative expenses	468.7	325.0	1,253.6	1,008.2
Restructuring and impairments	16.9	120.2	179.2	120.2
Total operating expenses	5,343.5	4,718.3	15,702.5	13,845.9
Income from equity investees	71.4	101.0	213.5	269.5
Operating income	1,038.2	1,044.2	2,926.9	3,112.1
Gain resulting from acquisition of joint venture	2.5	—	1,376.4	—
Net gain resulting from divestiture of certain operations	—	—	496.3	9.6
Interest income and other, net	31.5	31.7	155.2	114.1
Interest expense	(45.4)	(23.5)	(106.4)	(70.2)
Earnings before income taxes	1,026.8	1,052.4	4,848.4	3,165.6
Income tax expense	174.8	361.1	1,086.5	1,070.1
Net earnings including noncontrolling interests	852.0	691.3	3,761.9	2,095.5
Net loss attributable to noncontrolling interests	(0.5)	(0.3)	(0.9)	(0.6)
Net earnings attributable to Starbucks	\$ 852.5	\$ 691.6	\$ 3,762.8	\$ 2,096.1
Earnings per share - basic	\$ 0.62	\$ 0.48	\$ 2.69	\$ 1.44
Earnings per share - diluted	\$ 0.61	\$ 0.47	\$ 2.67	\$ 1.43
Weighted average shares outstanding:				
Basic	1,377.1	1,447.7	1,397.7	1,452.8
Diluted	1,388.5	1,459.4	1,409.9	1,464.9
Cash dividends declared per share	\$ 0.36	\$ 0.25	\$ 0.96	\$ 0.75
<i>See Notes to Condensed Consolidated Financial Statements.</i>				
Table of Contents				

STARBUCKS CORP Equity FA Related Functions Menu Message

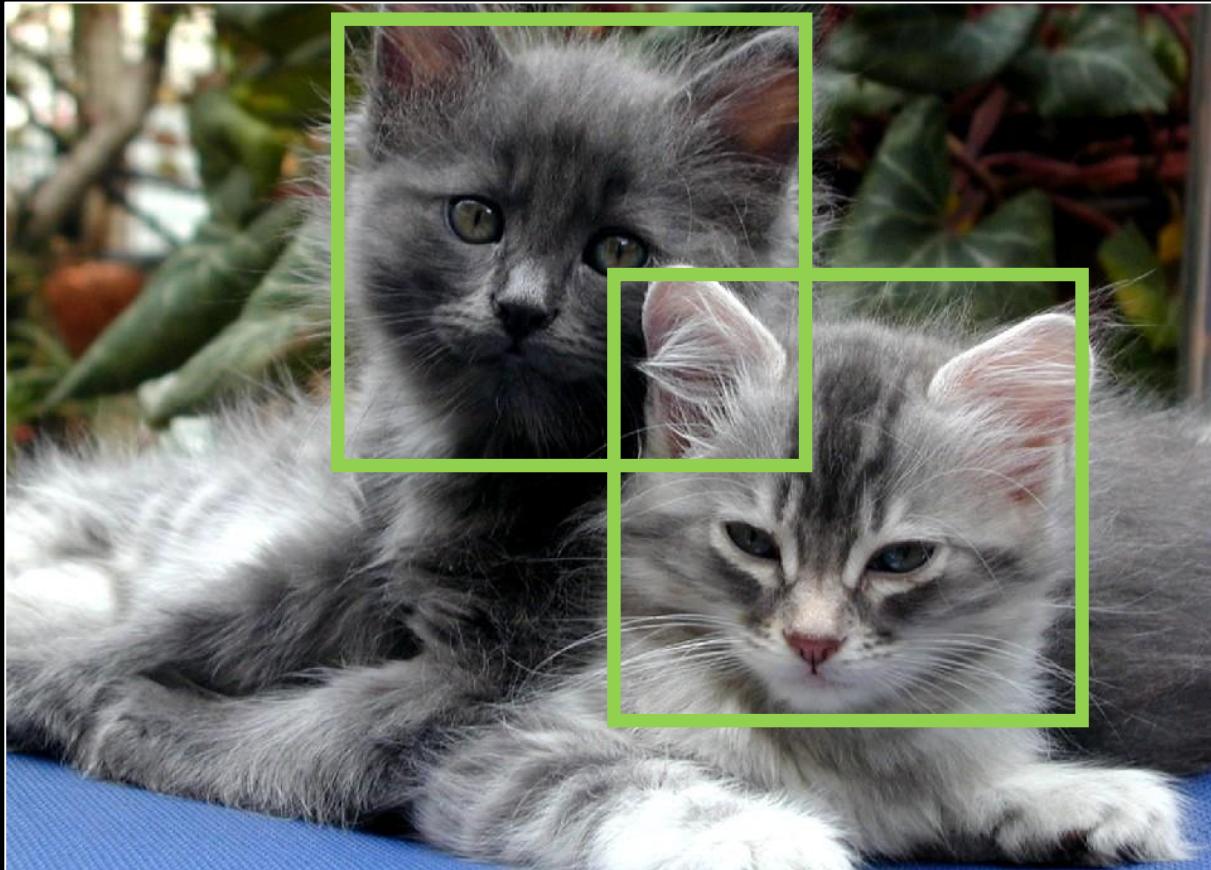
SBUX US \$ ↓ 57.80 +1.05 Q57.80 / 57.81Z 15x11
 At 14:57 d Vol 6,263,151 0 56.940 H 58.01K L 56.77Q Val 360.424M

SBUX US Equity 90 Actions 97 Export 98 Settings Financial Analysis

Starbucks Corp BQL Periodicity Annuals Cur FRC (USD) ↗

	Key Stats	I/S	B/S	C/F	Ratios	Segments	Addl	ESG	Custom	Shared
Adj Highlights	12 GAAP Highlights	13 Earnings	14 Enterprise Value	15 Multiples	16 Per Share	17 Stock Value				
In Millions of USD	2014 Y	2015 Y	2016 Y	2017 Y	Current/LTM	2018 Y Est	2019 Y Est			
12 Months Ending	09/28/2014	09/27/2015	10/02/2016	10/01/2017	07/01/2018	09/30/2018	09/30/2019			
Market Capitalization	56,343.7	86,120.9	79,071.5	76,891.2	78,005.0					
- Cash & Equivalents	1,843.8	1,611.4	2,263.2	2,690.9	1,976.6					
+ Preferred & Other	1.7	1.8	6.7	6.9	6.0					
+ Total Debt	2,048.3	2,347.5	3,585.2	3,932.6	6,798.9					
Enterprise Value	56,540.9	86,858.8	80,400.2	78,139.8	82,833.3					
Revenue, Adj	16,447.8	19,162.7	21,315.9	22,386.8	24,114.1	24,694.9	26,124.5			
Growth %, YoY	10.6	16.5	11.2	7.7	10.3	5.8				
Gross Profit, Adj	4,950.8	5,964.1	6,740.5	6,855.3	7,196.0	14,551.4	15,661.6			
Margin %	30.1	31.1	31.6	30.6	29.8	58.9	60.0			
EBITDA, Adj	3,809.3	4,589.4	5,259.4	5,418.3	5,626.0	5,500.2	5,914.3			
Margin %	23.2	23.9	24.7	24.2	23.3	22.3	22.6			
Net Income, Adj	1,985.9	2,578.7	2,855.0	3,055.9	3,527.6	3,345.8	3,421.3			
Margin %	12.1	13.5	13.4	13.7	14.6	13.5	13.1			
EPS, Adj	1.30	1.70	1.93	2.09	2.48	2.41	2.64			
Growth %, YoY	17.8	31.3	13.1	8.4	30.4	15.3	9.7			
Cash from Operations	607.8	3,749.1	4,575.1	4,174.3	4,589.1					
Capital Expenditures	-1,160.9	-1,303.7	-1,440.3	-1,519.4	-1,901.9	-2,012.9	-1,926.4			
Free Cash Flow	-553.1	2,445.4	3,134.8	2,654.9	2,687.2	2,686.7	3,164.0			

Cats all the way down



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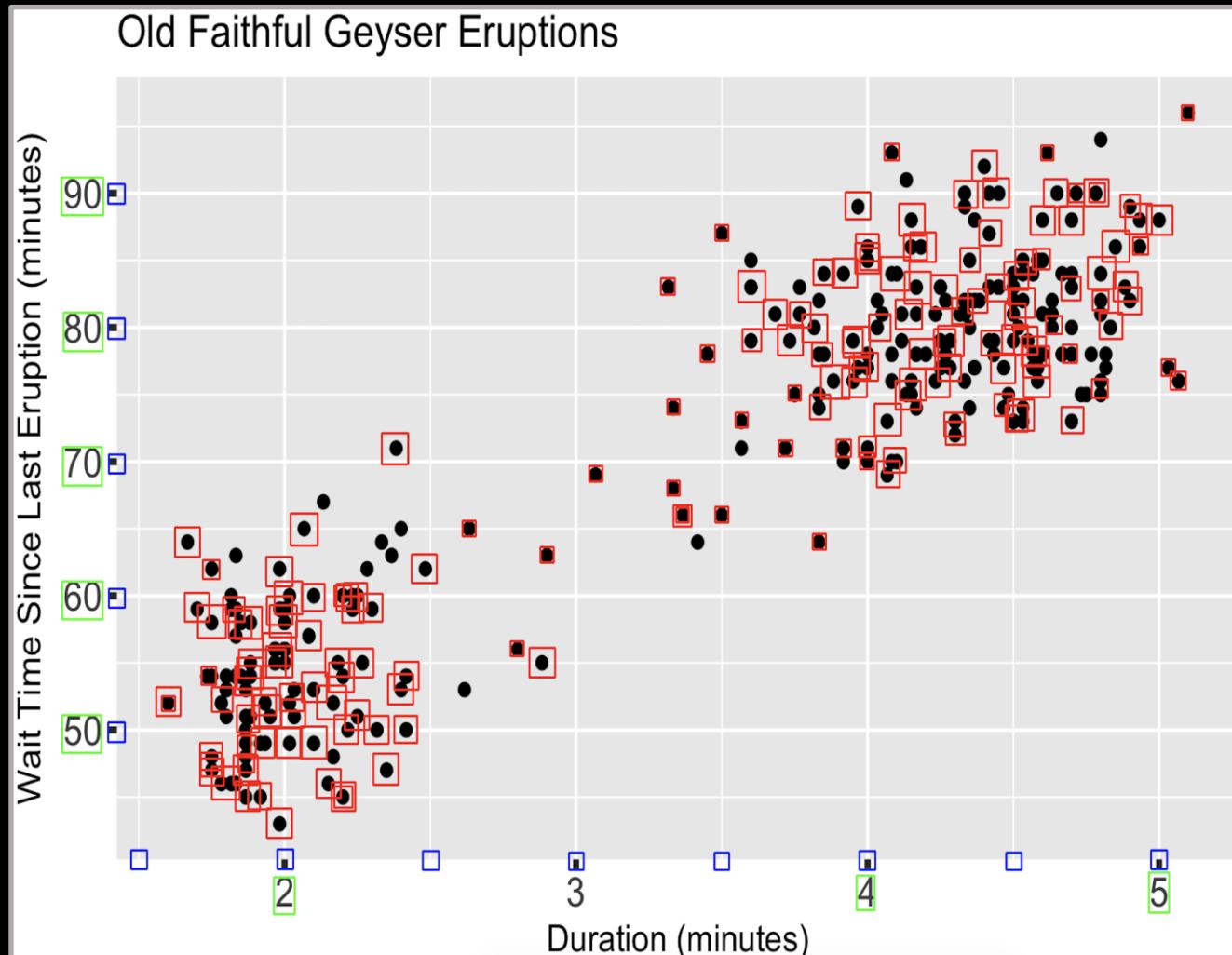
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See Notes to Condensed Consolidated Financial Statements.

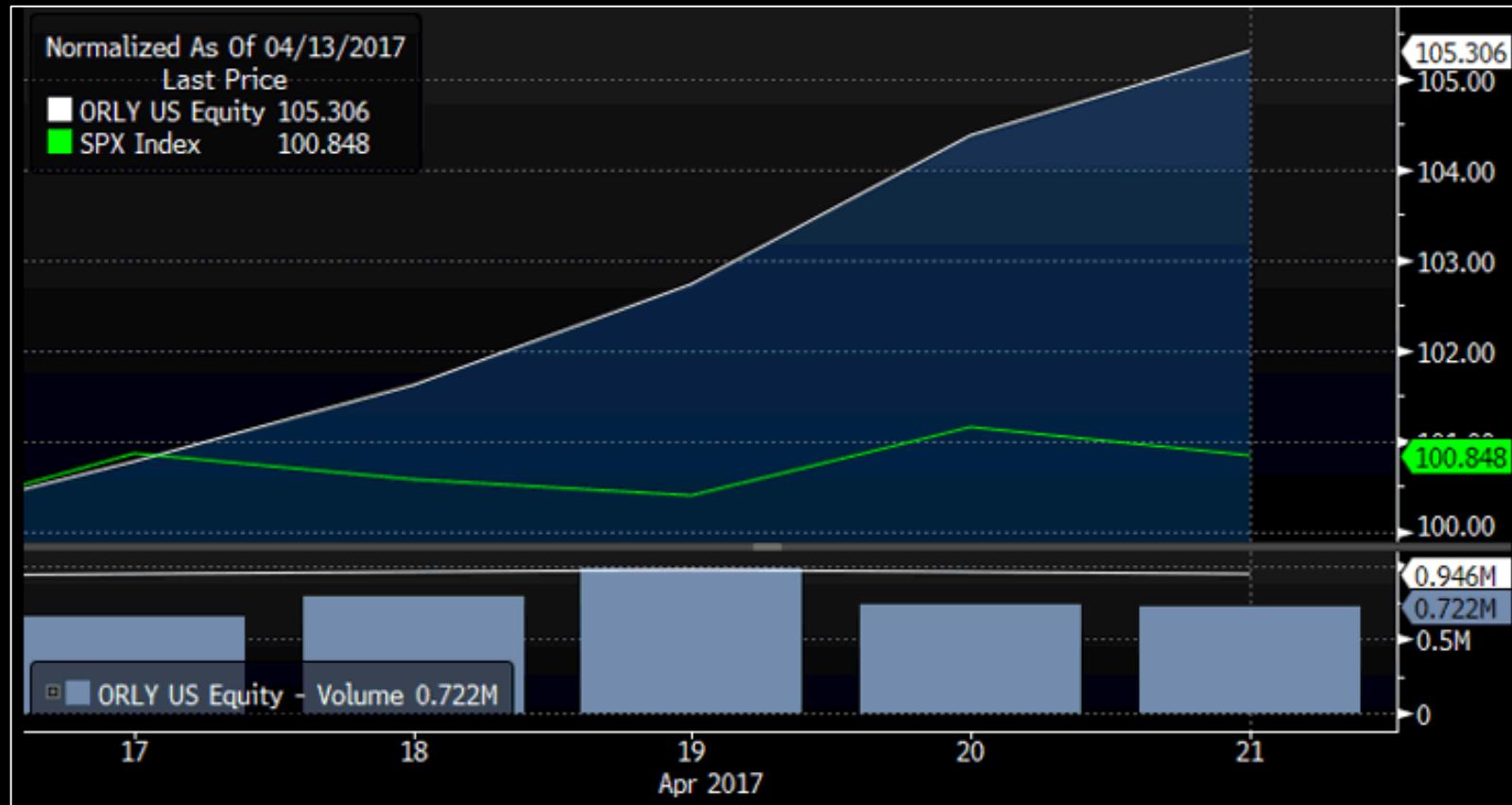
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Scatteract



[Cliche, Rosenberg,
Madeka, Yee 2017]

How Bill O'Reilly leaving Fox fired up O'Reilly Auto Parts stock



[Yang, Irsoy, Rahman 2018]
[Tsai, Roth 2018]

Financial named entity extraction

JP



Bear Stearns

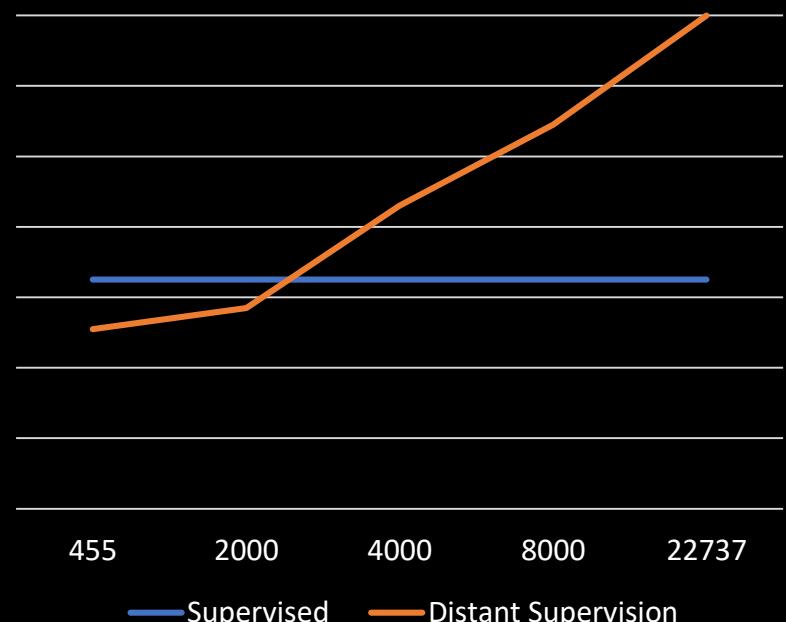
More data, more distant supervision for fact extraction

Starbucks reports **2017** fourth-quarter and three-month trailing results

Three-month trailing results

Three-month trailing net revenue of \$16,688.53

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Detection

Extraction

Interpretation

Presentation

+4.80
+4.15
4.52
0.16
.81

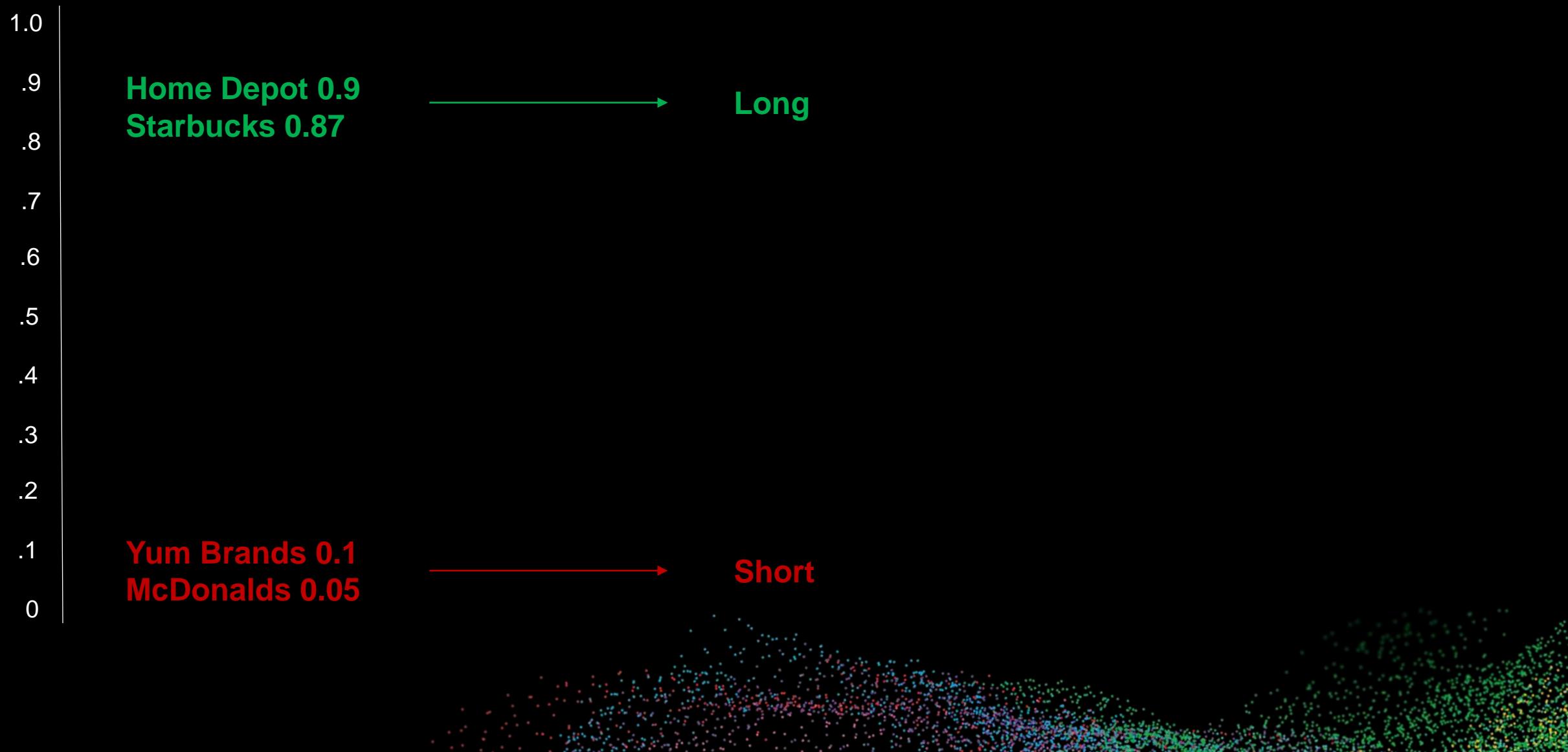
27.65
43.58
16.31
98.76
27.65
20.46

Sanford Bernstein's Toni Sacconaghi: “And so where specifically will you be in terms of capital requirements?”

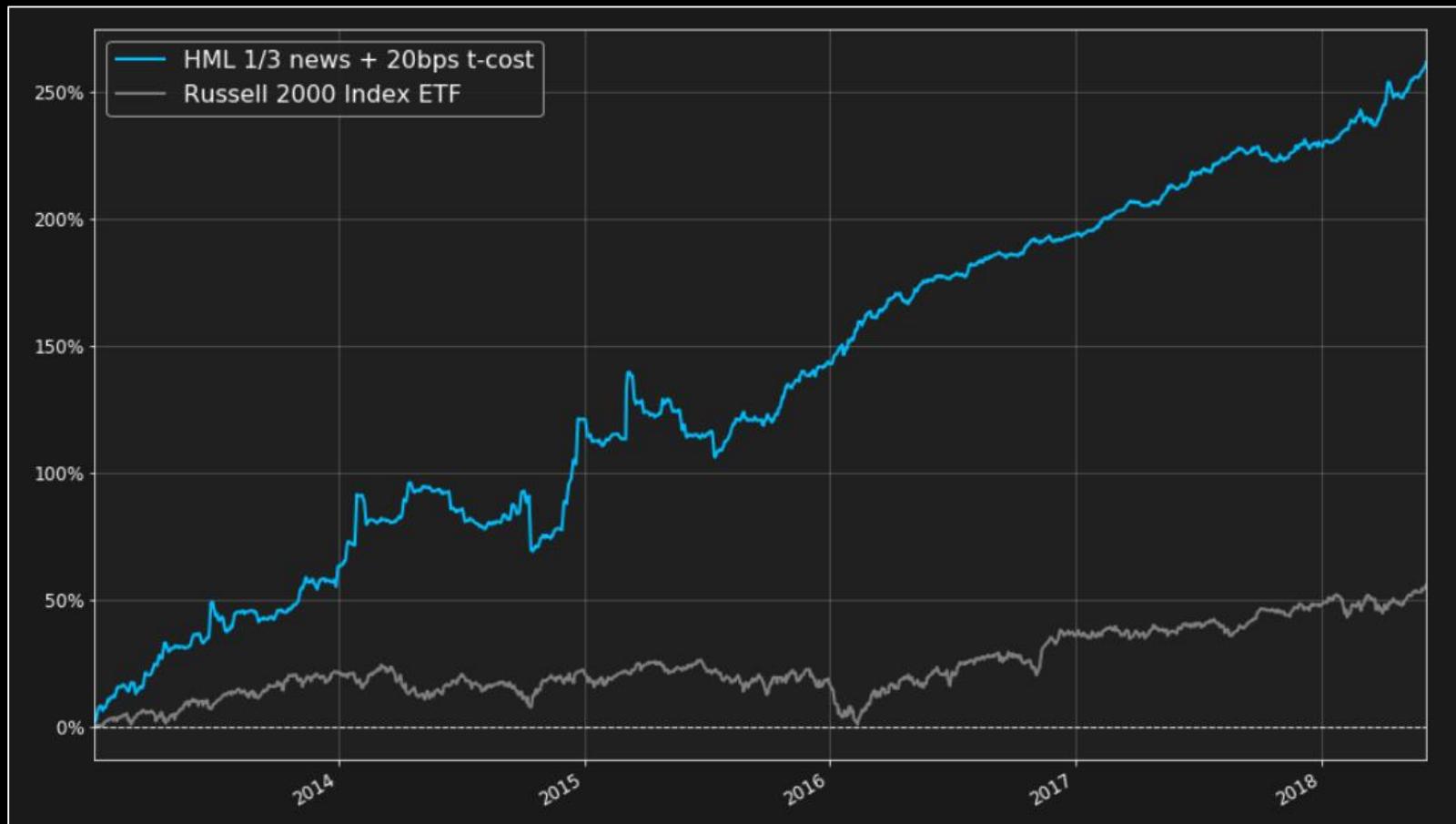
Musk “Excuse me. Next. Boring, bonehead questions are not cool. Next?”



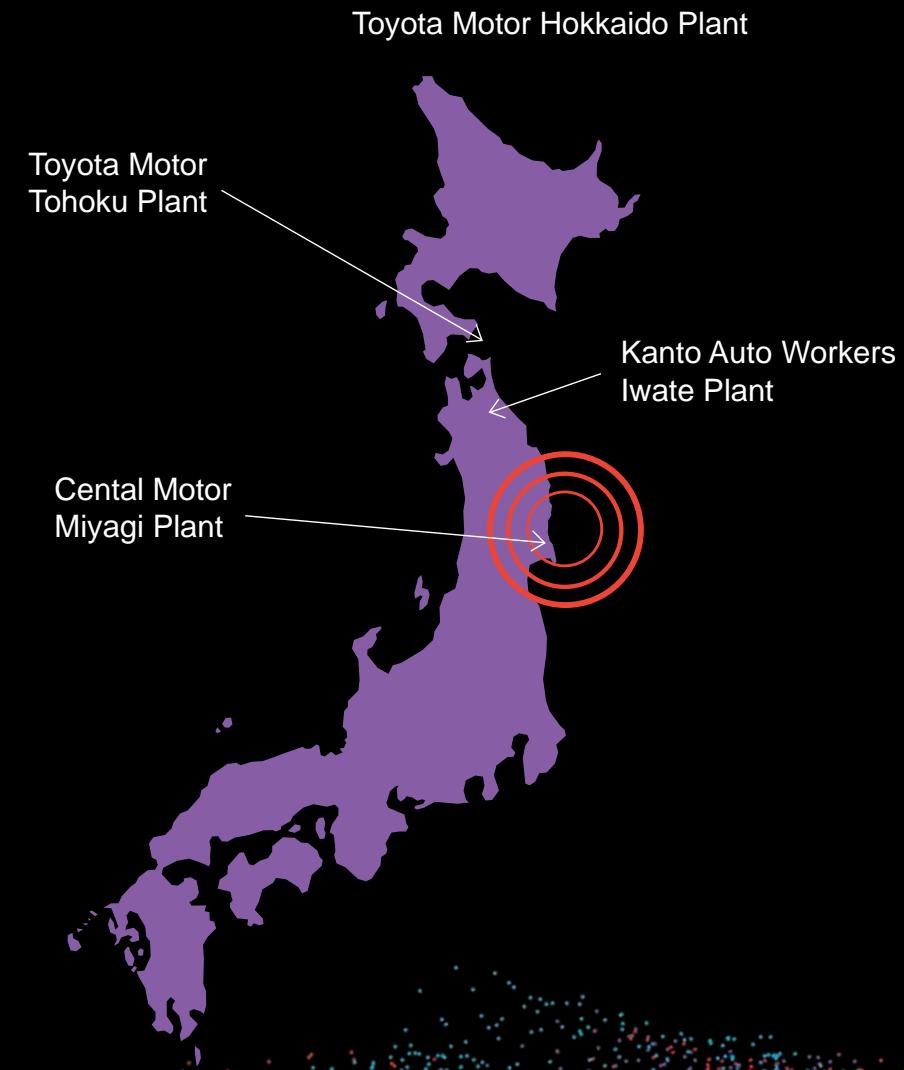
Constructing portfolio from a statistic: factor loading



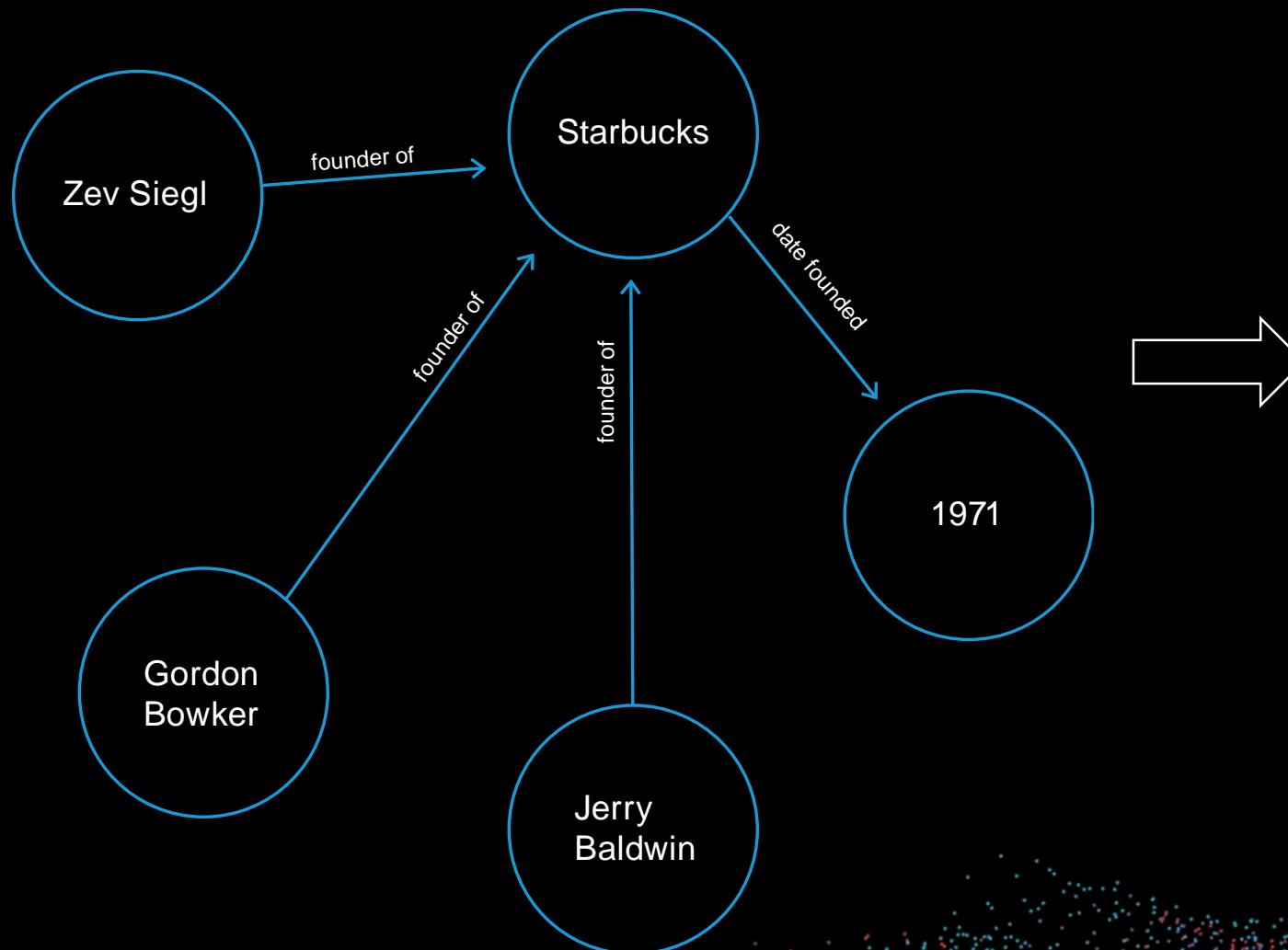
Sentiment Alpha: Russell 2000



March 11, 2011: Earthquake in Japan



Explaining Knowledge Graph relationships



“In 1971, **Siegl, Bowker and Baldwin** established the **Starbucks** Coffee Company.”

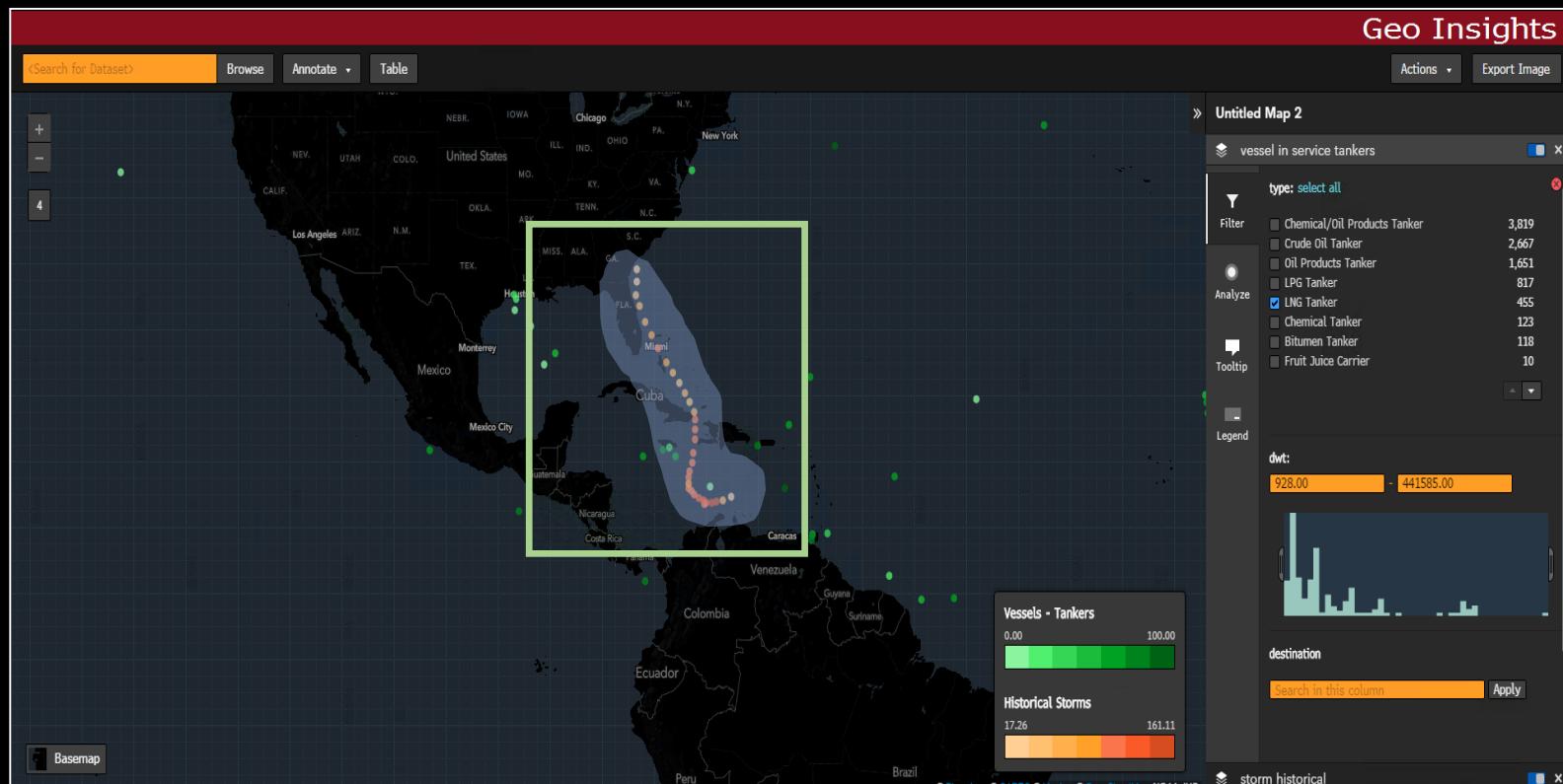
- [Stefanoni, Motik, Kostylev 2018]
- [Abujabal, Roy, Yahya 2018]
- [Voskarides, Meij, Reinanda, Khaitan, Osborne, Stefanoni, Kambadur, Rijke, 2018]
- [Voskarides, Meij, Rijke 2017]

Detection

Extraction

Interpretation

Presentation



Automated news

DEEP ECO: Starbucks Pressured, Industry Sales Slowest in 8 Yrs

By Bloomberg Automation | Feedback?

(Bloomberg) -- Starbucks Corp.'s revenue may be pressured after a U.S. Census Bureau report showed limited-service eating places nominal retail sales fell 0.1 percent in November, the first decrease in eight years.

- The monthly report may provide an indication of the performance of companies in the industry Bloomberg classifies as limited service restaurants; Starbucks gets 89 percent of its revenue from this industry.
- Analysts estimate the company's revenue will rise 8.2 percent in the current fiscal quarter.
- This retail sales index was up 1 percent in the first two months of the company's current fiscal quarter.
- Starbucks' first quarter started on Oct. 2, 2017.
- In the past six years, Starbucks' revenue has had a 0.7 correlation with this index, according to data compiled by Bloomberg.

SBUX US Equity Graphic Dashboard»

1M Imp Vol 3M
28.07

Top Contacts

Bijan Segha...
Nimish Patel
Joanna Fowl...
Steven Wats...
Greta E Irel...

Starbucks Shares Fall After Chain's U.S. Sales Disappoint Again

By Leslie Patton



News on demand

The screenshot shows a financial news application interface. At the top, there's a header bar with tabs for 'STARBucks CORP Equity', 'AID', 'Related Functions Menu', 'Message' (with a checkmark), and a help icon. Below the header, the stock information for SBUX US is displayed: Price (\$ 57.86), Change (+1.11), Volume (6,237,626), Average Volume (56.94), High (58.01K), Low (56.77K), and Value (358.948M). A small chart shows price movement. Below the main data, there are buttons for 'SBUX US Equity' (highlighted in orange), 'Save as Note', and 'Send via MSG'. To the right, it says 'Automated Insights on Demand'. A note at the bottom indicates the data was generated at 03:10 PM EDT.

Starbucks Jumps 2%, Outpaces S&P 500 Index Gains

Starbucks Corp. rose 2 percent as the S&P 500 Index advanced.

The shares increased to \$57.86 from \$56.75. Trading volume was almost the same as the 20-day average for this time of day. Starbucks's move compares with the 2 percent rise in the Russell 3000 Consumer Discretionary Index and the 1.9 percent gain in the S&P 500 Index.

In the past year, the stock had a similar or greater gain 10 times and was little changed the next day. It advanced four times for an average 1 percent and declined six times for an average 1.2 percent.

The stock rose 5.7 percent in the past month, compared with the 0.5 percent increase for the company's Bloomberg peers, the 4.8 percent loss in its industry index and the 3.5

NL QA / structured extraction from databases

The screenshot shows a financial analysis interface for Starbucks Corp (SBUX). At the top, it displays the stock price as \$57.80, down by \$1.05, with a volume of 6,263,151 shares traded. Below this, there are tabs for 'Actions', 'Export', and 'Settings'. The main area is titled 'Financial Analysis' and shows historical financial data for Starbucks Corp. The data is presented in a grid format with columns for years (2014 Y, 2015 Y, 2016 Y, 2017 Y, Current/LTM, 2018 Y Est, 2019 Y Est) and rows for various financial metrics. The metrics include Market Capitalization, Cash & Equivalents, Preferred & Other, Total Debt, Enterprise Value, Revenue, Gross Profit, EBITDA, Net Income, EPS, Cash from Operations, Capital Expenditures, and Free Cash Flow. The data is presented in millions of USD.

	2014 Y	2015 Y	2016 Y	2017 Y	Current/LTM	2018 Y Est	2019 Y Est
Market Capitalization	56,343.7	86,120.9	79,071.5	76,891.2	78,005.0		
- Cash & Equivalents	1,843.8	1,611.4	2,263.2	2,690.9	1,976.6		
+ Preferred & Other	1.7	1.8	6.7	6.9	6.0		
+ Total Debt	2,048.3	2,347.5	3,585.2	3,932.6	6,798.9		
Enterprise Value	56,549.9	86,858.8	80,400.2	78,139.8	82,833.3		
Revenue, Adj	16,447.8	19,162.7	21,315.9	22,386.8	24,114.1	24,694.9	26,124.5
Growth %, YoY	10.6	16.5	11.2	5.0	7.7	10.3	5.8
Gross Profit, Adj	4,950.8	5,964.1	6,740.5	6,855.3	7,196.0	14,551.4	15,661.6
Margin %	30.1	31.1	31.6	30.6	29.8	58.9	60.0
EBITDA, Adj	3,809.3	4,589.4	5,259.4	5,418.3	5,626.0	5,500.2	5,914.3
Margin %	23.2	23.9	24.7	24.2	23.3	22.3	22.6
Net Income, Adj	1,985.9	2,578.7	2,855.0	3,055.9	3,527.6	3,345.8	3,421.3
Margin %	12.1	13.5	13.4	13.7	14.6	13.5	13.1
EPS, Adj	1.30	1.70	1.93	2.09	2.48	2.41	2.64
Growth %, YoY	17.8	31.3	13.1	8.4	30.4	15.3	9.7
Cash from Operations	607.8	3,749.1	4,575.1	4,174.3	4,589.1		
Capital Expenditures	-1,160.9	-1,303.7	-1,440.3	-1,519.4	-1,901.9	-2,012.9	-1,926.4
Free Cash Flow	-553.1	2,445.4	3,134.8	2,654.9	2,687.2	2,686.7	3,164.0

Detection

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and ranking

Topic identification

Twitter user demographics

Twitter geolocation

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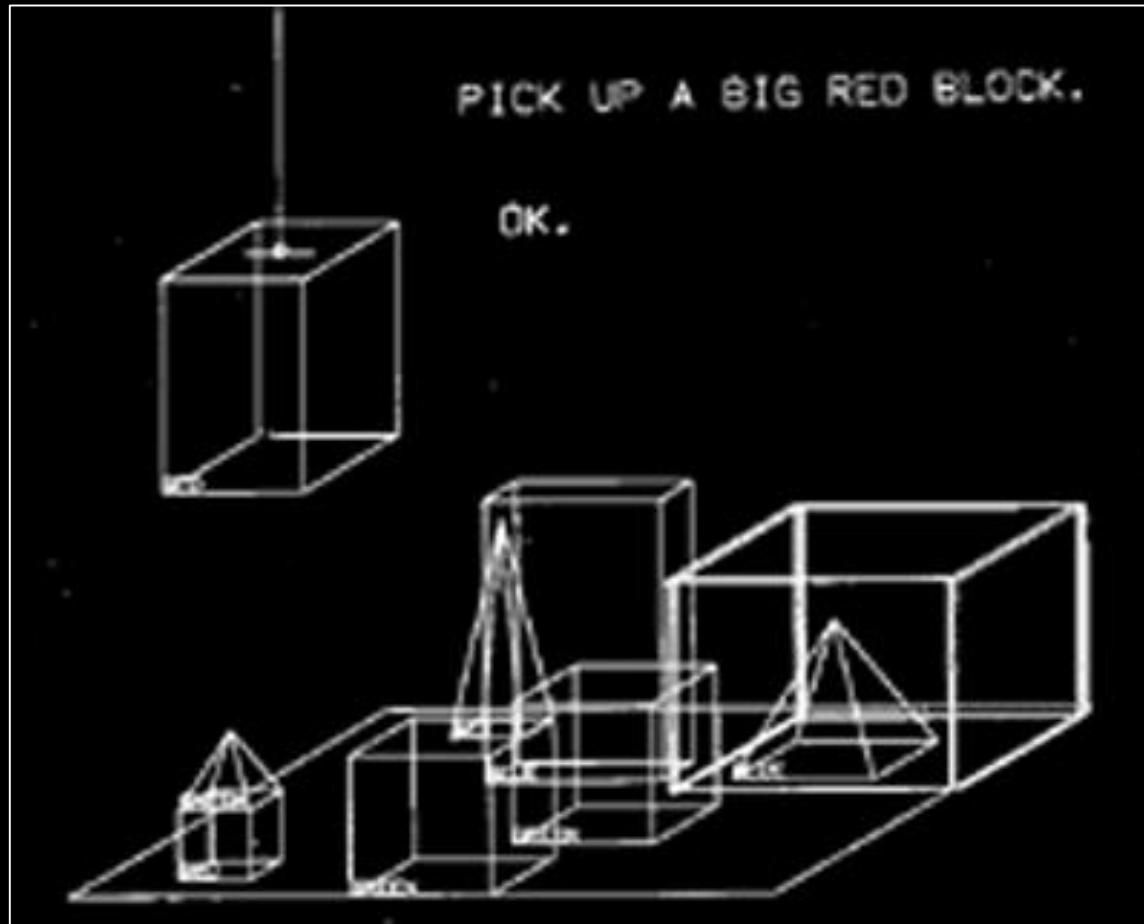
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Speed

Precision

We're not in BlocksWorld anymore



Lynette Hirschman on Reading comprehension

“A system has learned from a text if, by reading the text, it is able to answer questions it would not have been able to answer before having access to it.”



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More Info:

<https://www.TechAtBloomberg.com/NLP>

Thank You!

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