What Triggers Stock Market Jumps?

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Based on research with Scott Baker, Nick Bloom and Marco Sammon

Hoover Institution

26 October 2021

The U.S. stock market rose nearly 5% on 26 December 2018.

Why is unclear.

At least it was unclear to contemporaneous observers.

That lack of clarity is reflected in next-day newspaper accounts.

U.S. MARKETS

Dow Industrials Leap More Than 1,000 Points

Rebound pulls Dow industrials, S&P 500 from brink of bear market

By Jessica Menton

Updated Dec. 26, 2018 11:07 p.m. ET

The Dow Jones Industrial Average surged more than 1,000 points for the first time in a single session Wednesday, rebounding after a bruising four-day selloff put the blue-chip index and the S&P 500 on the brink of a bear market.

All 30 stocks in the Dow industrials notched gains, as did each of the 11 sectors in the broader S&P. Shares of Amazon.com , Facebook and Netflix climbed more than 8%, while retailers including Kohl's and Macy's rallied as early data on the crucial holiday shopping season appeared robust. Energy stocks including Exxon Mobil and Chevron , meanwhile, rose alongside a nearly 9% climb in oil prices.

But as in many of the volatile days that have characterized markets since the end of September, investors and traders were left scratching their heads to explain the wild swing, with the Dow adding nearly 450 points in the last hour of the session.

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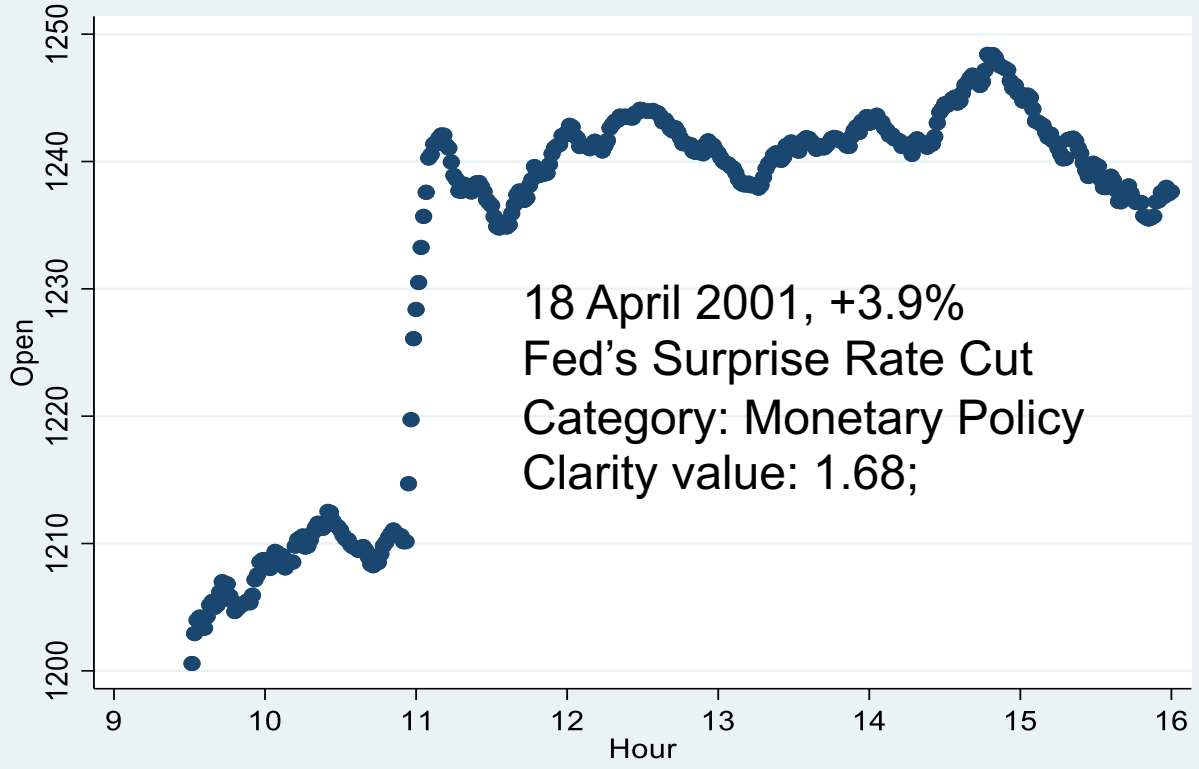
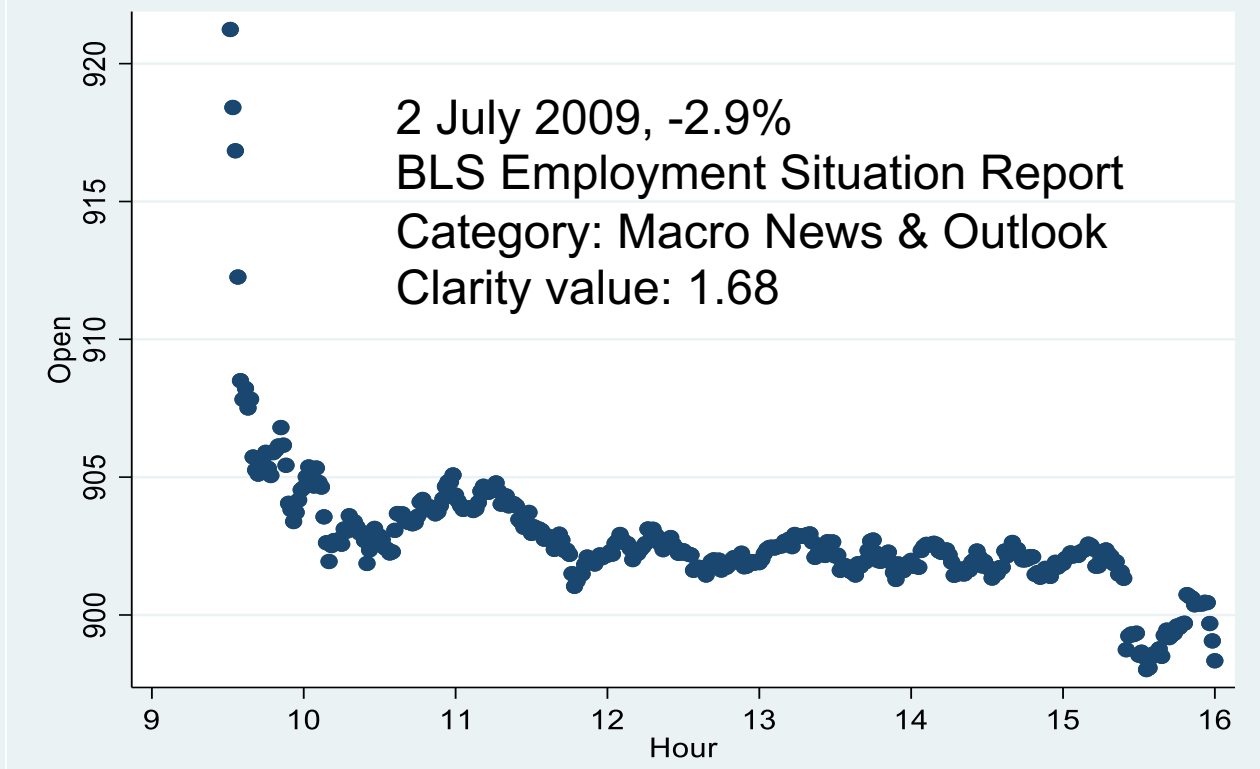
Emphasis added

Intra-Day Market Behavior Often, But Not Always, Points to the Jump Reason





Notes: Each panel plots the S&P 500 index at 1-minute intervals from market open to close on the indicated date. We also report the percent change from the previous-day close to the current-day close, the primary jump reason (as classified by our human readers), and our measure of clarity as to jump reason. The clarity measure is standardized to mean zero and unit standard deviation. The top two panels also report the specific event that, according to newspaper accounts, triggered the jump.

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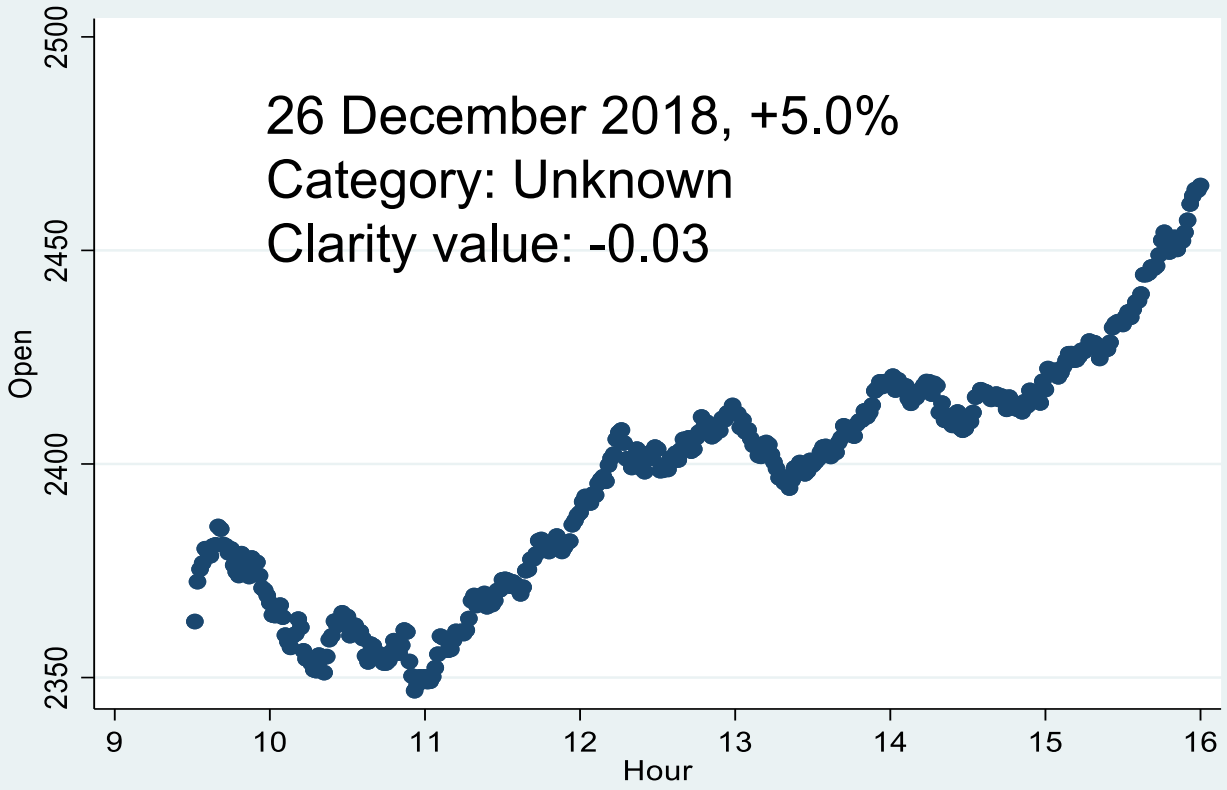
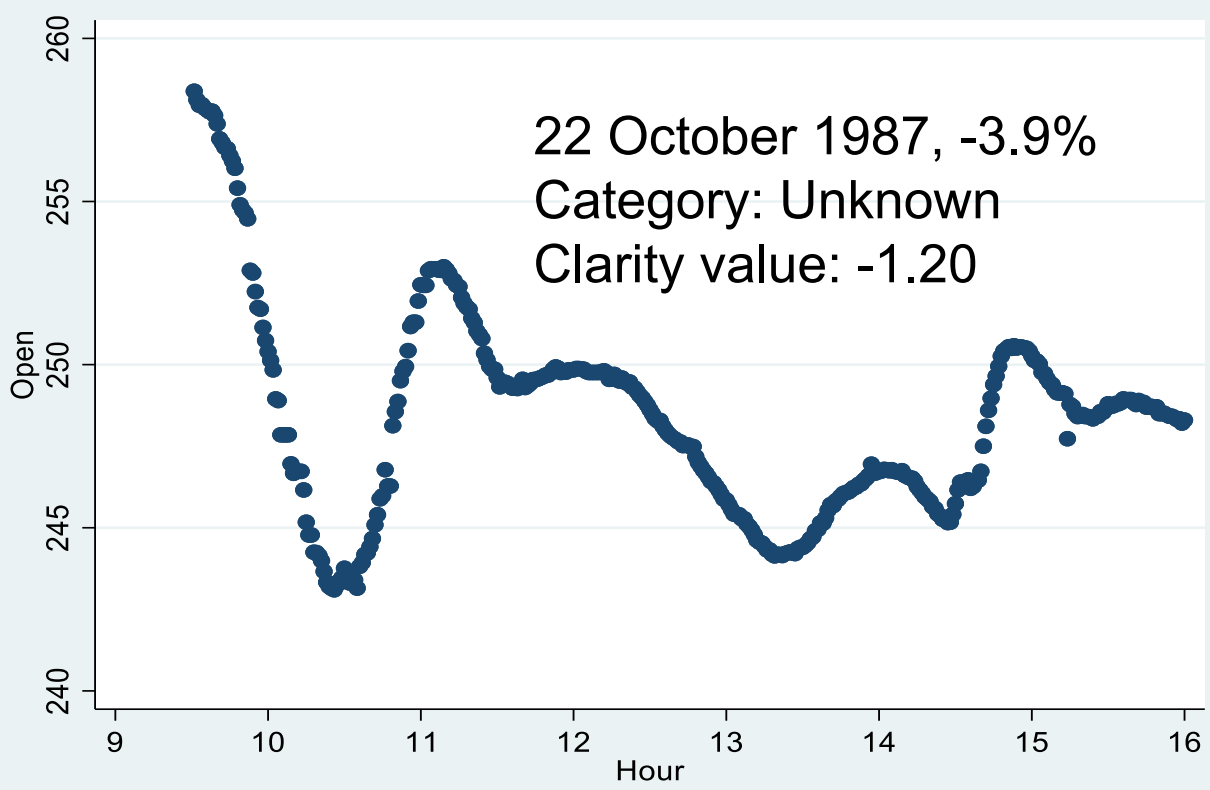
Intra-Day Index Values on Two Low-Clarity Days

First Example I showed



Another Low-Clarity Jump



Why Newspaper Accounts of Daily Jumps?

Practical

- Newspapers are ubiquitous, and digital archives are easy to access.
- Major papers operate on a daily cycle.
- They typically contain articles about jumps of the size we consider.

Meaningful

- Newspapers reflect and inform perceptions.
- Jump days selected by our threshold account for 47% of total squared daily return variation in U.S. data from 1900 to 2020.

Scalable

- We examine 8,000+ jumps across 19 national markets to assess the proximate cause, clarity as to cause, and geographic source of the market-moving news
- Extensions to other countries and asset classes are straightforward.

Why Human Readers?

- Human codings generate data that can be used to train automated classification algorithms.
- Even so, automated algorithms face challenges:
  - Few jumps in some categories of interest (Trade Policy).
  - Subtle distinctions: For example, applying Taylor Rule concept to distinguish Monetary Policy from Macro News.
  - Understanding context. Examples:
    - "War" in "trade war" does not mean military conflict
    - "Ford" can refer to Henry Ford, the Ford auto company, a type of car, etc.
  - Tendency toward convoluted language in early decades and in coverage of hard-to-explain jumps.

Preview of Main findings

1. Policy jumps are distinctive: Unlike other jumps, those triggered by policy news drive a higher share of upward than downward jumps.

Jumps attributed to Monetary Policy and Govt. Spending account for this result.

2. MP and GS jumps are counter cyclical: Their share of upward jumps rises in the wake of falling stock prices, more so the bigger the fall in prior months.
3. Jump type matters for volatility: Jumps attributed to Monetary Policy foreshadow much lower future stock market volatility than other jumps, unconditionally and conditional on a battery of controls.
4. Clarity matters: Greater clarity as to jump reason also foreshadows lower volatility. Clarity has trended upwards over the past 90 years in the U.S. and U.K.
5. Extraordinary U.S. Role: Excluding U.S. jumps, leading newspapers attribute one-third of jumps in their own national markets to U.S.-related news. The U.S. role in this regard dwarfs that of Europe and China.

Outline

More on Measurement and Methodology

Data: Validation

Some Key Patterns

Predictive Content of Jump Type and Clarity

Geographic Origin of Market-Moving News

If time permits: Unprecedented stock market reaction to COVID-19.

Approach: Trained humans read and code next-day newspaper accounts of daily jumps in national stock markets. They code aspects of the articles, following our detailed Coding Guide.

Overview of the process

1. **Set daily jump threshold.**
   - Threshold ranges from |2.5%| to |4.0%|, depending on country
   - Threshold = |2.5%| for U.S.
   - Picks up ~3.5% of all U.S. trading days since 1900
   - Accounts for nearly half of daily squared return variation

2. **Find next-day articles about the national stock market jump in leading, own-country newspapers.**

3. **Read and code the article(s):**
   - Identify primary reason for jump, according to the article.
   - Classify that reason into one of 17 categories. “Unknown & No Explanation Offered” is a category.
   - Classify secondary reason for jump, if one is offered.
   - Quantify “Journalist Confidence” as to the primary reason for the jump on a 3-point scale.
   - Quantify “Ease of Coding” on a 3-point scale to capture difficulty of discerning and classifying the jump reason.
   - Identify and record the geographic origin of the market-moving news: a country, multiple countries, or region of the world. (Again, according to the news article.)

Coding Guide Definition for International Trade Policy: News reports, forecasts or concerns that pertain to international trade and commercial policies including tariffs, import quotas, voluntary export restraints, trade agreements, trade subsidies, and WTO cases.

Example: WSJ article about 2.52% drop in S&P 500 on 22 March 2018.

U.S. Stocks Sell Off on Concerns About Trade

Trade-war fears, along with broader concerns about technology companies and the outlook for economic growth and interest rates, intensified Thursday, sending the Dow Jones Industrial Average tumbling more than 700 points and adding to fears that stocks could be headed for a larger reckoning.

Thursday's selling, which sent shares of manufacturers, aluminum producers and steelmakers sharply lower, culminates months of growing investor anxiety over U.S. trade policy. It came as many say the market was already under pressure, gripped by concern over rising interest rates and sliding technology shares.

Trade tensions ratcheted higher as the Trump administration said it would impose tariffs on tens of billions of dollars of Chinese imports on top of duties on steel and aluminum imports, provoking the ire of officials from China to Germany to Mexico.

… Investors are concerned that China will retaliate, leading to "tit for tat" escalations of policies hindering trade and leading to slower growth, he said….

Primary Category: Trade Policy Secondary: Macro News & Outlook

Another Example (9/29/2008, -8.7%): Government Spending

THE WALL STREET JOURNAL.

Bailout Plan Rejected, Markets Plunge, Forcing New Scramble to Solve Crisis

2119 words
30 September 2008
The Wall Street Journal
J
A1
English

WASHINGTON -- The House of Representatives defeated the White House's historic $700 billion financial-rescue package -- a stunning turn of events that sent the stock market into a tailspin and added to concerns that the U.S. faces a prolonged recession if the legislation isn't revived.

The Dow Jones Industrial Average sustained its biggest point drop in history and its biggest closing decline since the day the markets re-opened after the Sept. 11, 2001, terrorist attacks. The Dow, which had opened sharply lower on fears of more possible bank failures, finished the day down 7%, with a 777.68 point drop to 10365.45. Losses to shares on the broader Dow Jones Wilshire 5000 index amounted, on paper, to $1.2 trillion -- eclipsing the size of the proposed bailout package. The Nasdaq Stock Market finished down 9.1%.

The widely watched VIX index, a measure of market volatility often called "the fear index," closed at its highest levels in its 28-year history. In early trading in Asia Tuesday, Japan's Nikkei was off 4.5%, and other markets also were down.

The 228-205 vote, which defied a full-court press from the president and the Treasury secretary, marked a dark moment in a month that has shaken the financial system to its core and forced the government to take a host of ad hoc measures to shore up confidence. Earlier Monday, U.S. authorities helped arrange the sale of Wachovia Corp. to Citigroup Inc., while the Federal Reserve joined other central banks in injecting more funds into credit markets.

The bailout was designed in part to get financial institutions lending again by ridding the market of the toxic mortgage-backed securities and other holdings that lenders fear could cause borrowers to default. If credit markets continue to seize, the impact on businesses and consumers could be widespread. Access to loans would be reduced, crimping spending and investment. Economists said the credit crunch could lead to increased layoffs in the U.S. and prompt a hefty rate cut from the Federal Reserve.

We code the primary reason as **Government Spending,** because the first explanation advanced for the stock market plunge is the House rejection of the bailout plan proposed by the White House. The bailout plan itself involves government spending to help the economy. Although the House voted to reject the plan, that is still news about government spending. The geographic source of this news is the **United States**. Journalist confidence is **“High”,** and Ease of Coding is **“Easy.”**

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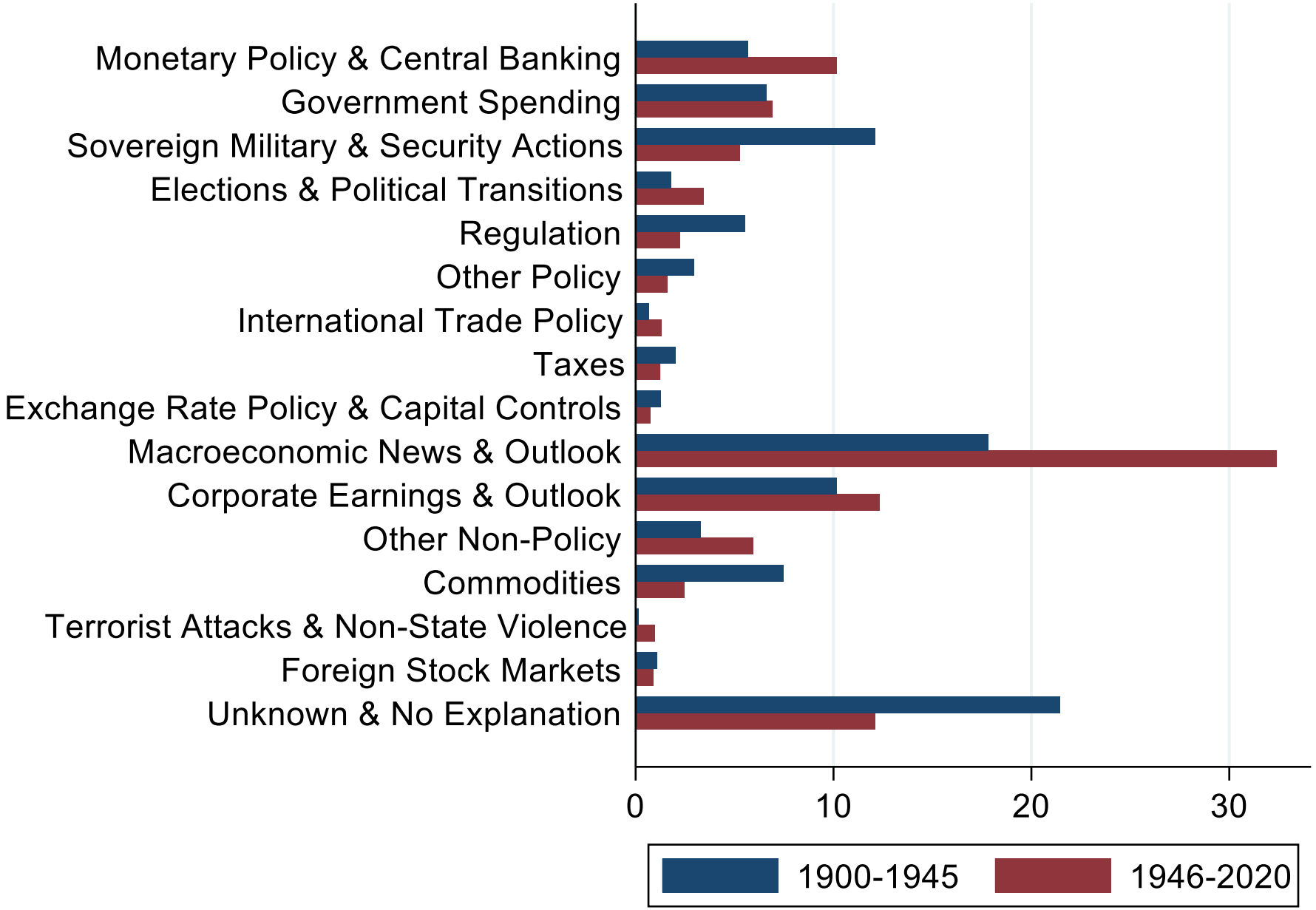
Geographic Origin of Market-Moving News

The Categorical Distribution of U.S. Jumps



Notes: x-axis units are the percent of jumps attributed to that category in the indicated period. We order categories as follows: Policy categories by descending values of 1946-2020 share; non-policy categories, ordered the same way; and, lastly, Unknown & No Explanation Offered. This figure is based on next-day articles in the Wall Street Journal about 1,152 U.S. stock market jumps.

How reliable are these jump codings?

Two concerns:

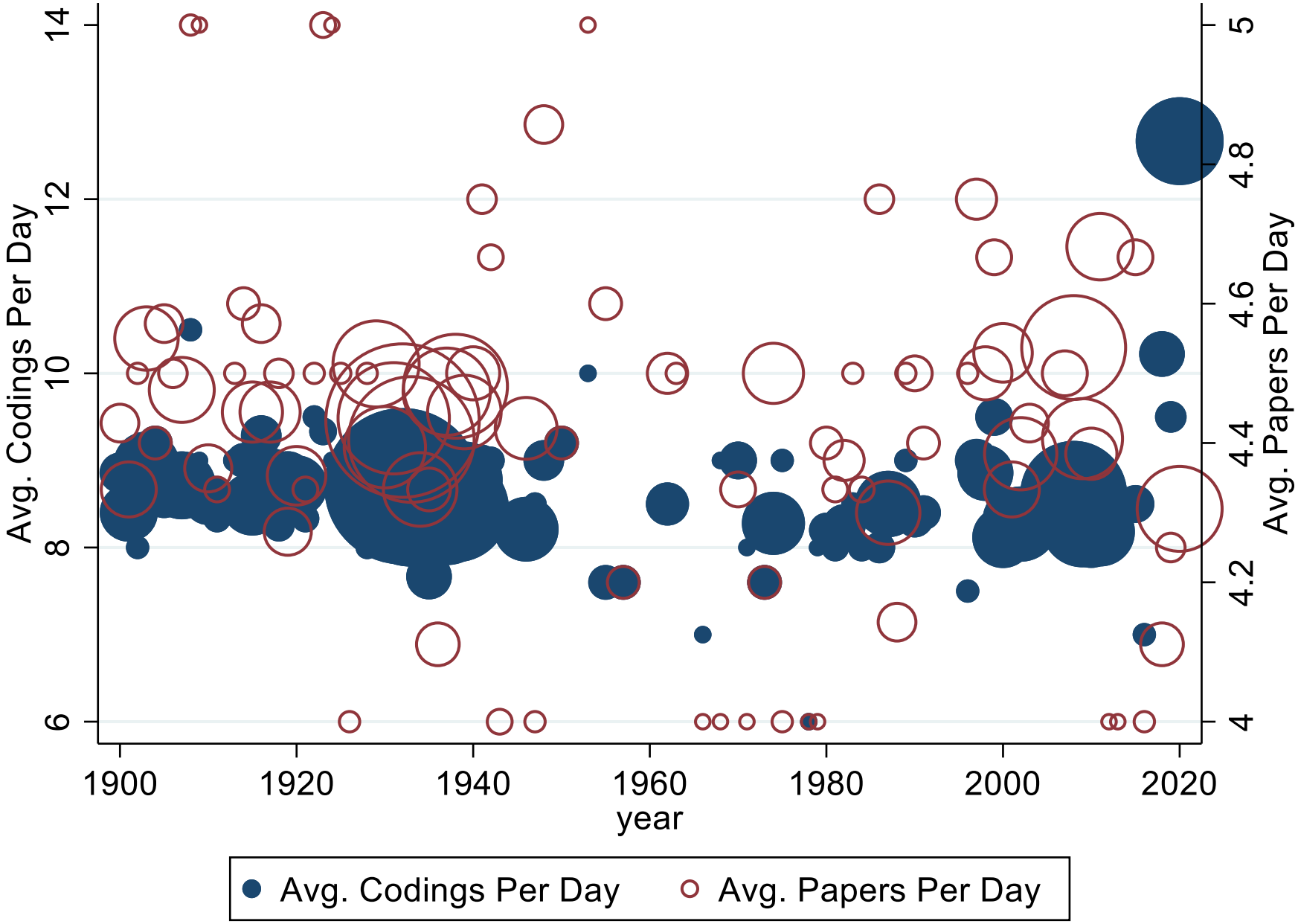
1. Newspapers can differ in how they interpret a given jump
2. Humans can differ in how they code a given article

To assess these concerns, we calculate agreement rates:

1. Across newspapers for a given jump
2. Across readers of the same paper about the same jump

Later: Transform these “concerns" into inputs for our clarity measure.

Number of coders and newspapers per jump by year, United States



Notes: Chart shows average number of coders and newspapers per day, with the circle areas proportional to the number of jumps in that year. Data from 1900 to 2020.

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Categorical Agreement Rates, U.S. Jumps

Time Period	1900-1979		1980-2020	
	Policy vs. Non-Policy	Granular Categories	Policy vs. Non-Policy	Granular Categories
All Coders & All Papers	76.4%	45.9%	82.3%	58.8%
All Coders Within Paper	89.5%	71.3%	90.0%	73.6%
Within WSJ	91.9%	76.6%	92.4%	77.6%
With Random Assignment	52.8%	12.6%	57.6%	18.1%
Standard Error	1.5%	1.8%	2.0%	2.6%

These agreement rates pertain to 9,745 codings of 1,152 U.S. jumps.

Notes: We have 6,684 codings for 802 jumps from 1900-1979, and 3,061 codings for 350 jumps from 1980-2020. "Granular" means all 16 jump categories, excluding no article found. "Policy" covers Monetary Policy, Government Spending, Sovereign Military, Other Policy, Regulation, Trade Policy, Exchange Rate Policy, Elections, and Taxes. "Non-Policy" covers all other categories. "All Papers" covers the Wall Street Journal, New York Times, Chicago Tribune, Washington Post, and Los Angeles Times. We compute outcomes implied by random assignment using the unconditional jump distribution for the indicated period and classification breakdown. We compute standard errors using $\sqrt{p(1-p)/n}$ where p is the probability of agreement under random assignment and n is the number of jumps.

Other Types of Validation

- '**Monetary Policy & Central Banking**' codings are much more likely on **FOMC meeting dates (or the next day).**
- '**Macroeconomic News & Outlook**' codings are much more likely on release dates for the **Employment Situation Report,** the **CPI Report,** and the **Jobless Claims Report.**
- '**Elections & Political Transitions**' codings are much more likely the day after **national elections.**
- **Validation based on industry-level returns**: For certain jumps, the explanations offered in next-day newspaper accounts imply an amplified or dampened return in particular industries to the news that moved the overall market. We find that Industry-level returns do indeed exhibit the implied patterns of amplified and dampened responses.
- **Proof in the pudding**: Our newspaper-based classifications yield information that helps predict future stock market volatility.

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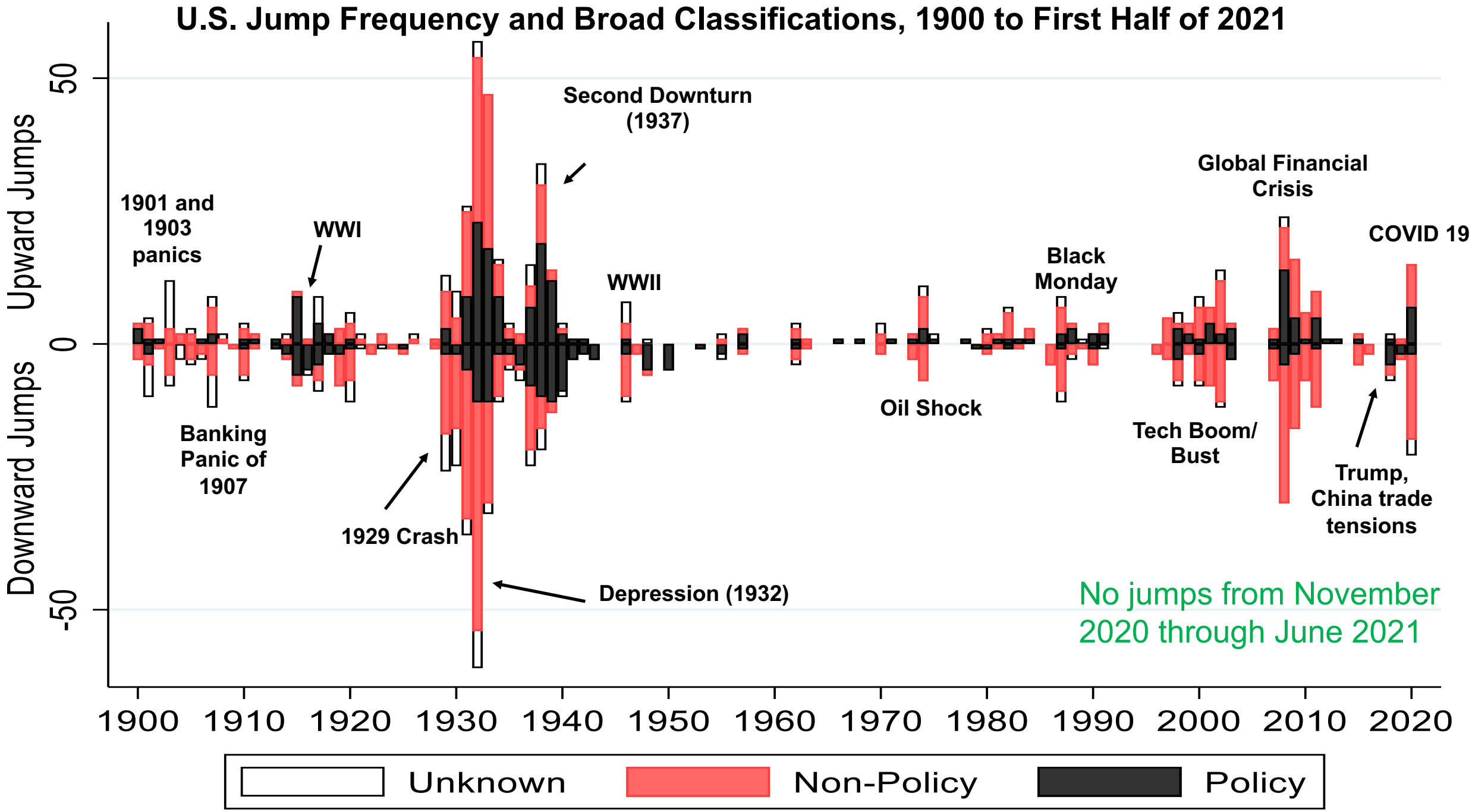
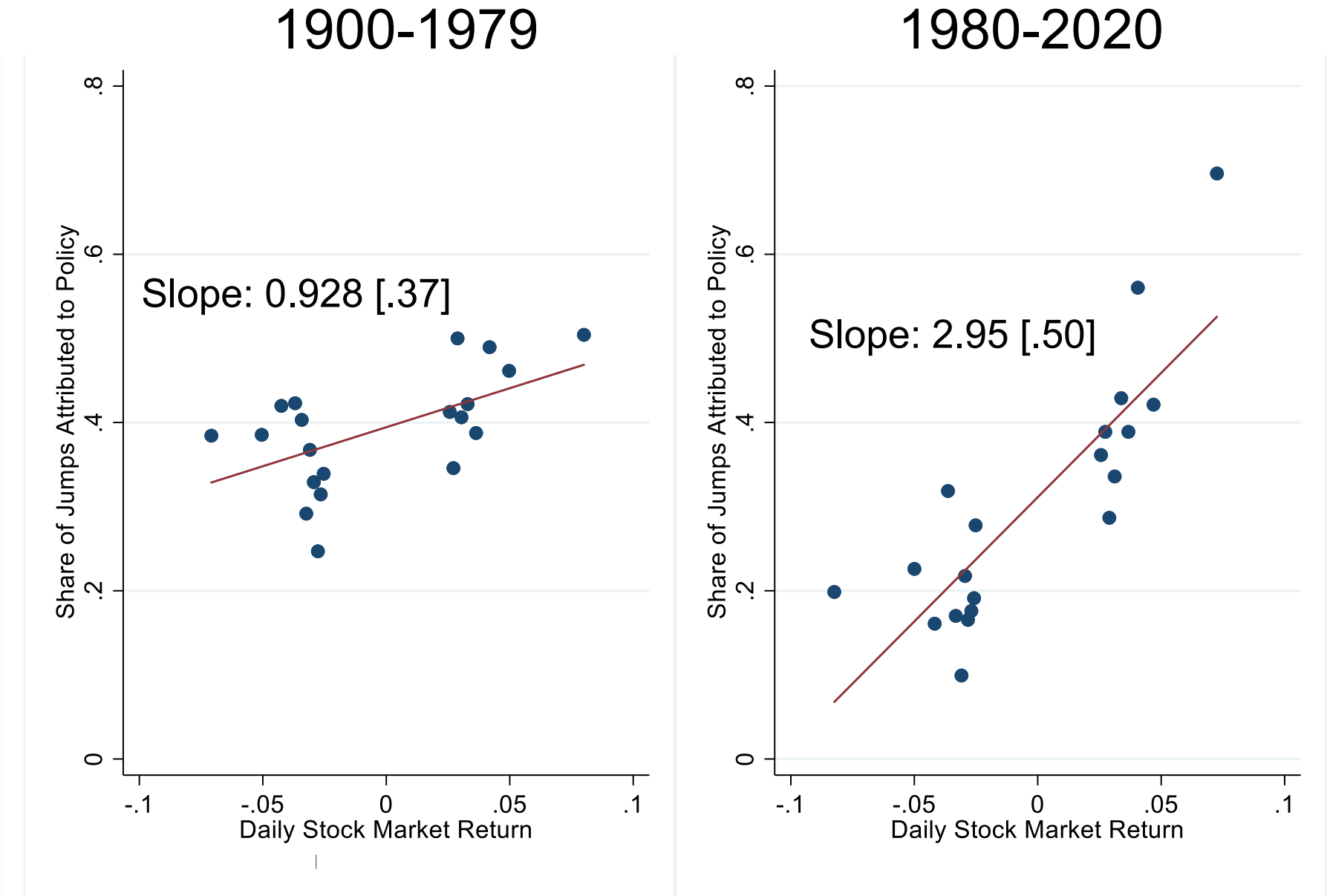

U.S. Jump Frequency and Broad Classifications, 1900 to First Half of 2021
Upward Jumps
Downward Jumps
50
0
-50
1901 and 1903 panics
WWI
Second Downturn (1937)
WWII
Banking Panic of 1907
1929 Crash
Depression (1932)
Oil Shock
Black Monday
Tech Boom/ Bust
Global Financial Crisis
COVID 19
Trump, China trade tensions
No jumps from November 2020 through June 2021
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
Unknown
Non-Policy
Policy

Policy News Triggers A Larger Share of Upward Jumps, Especially Since 1980, U.S. Data

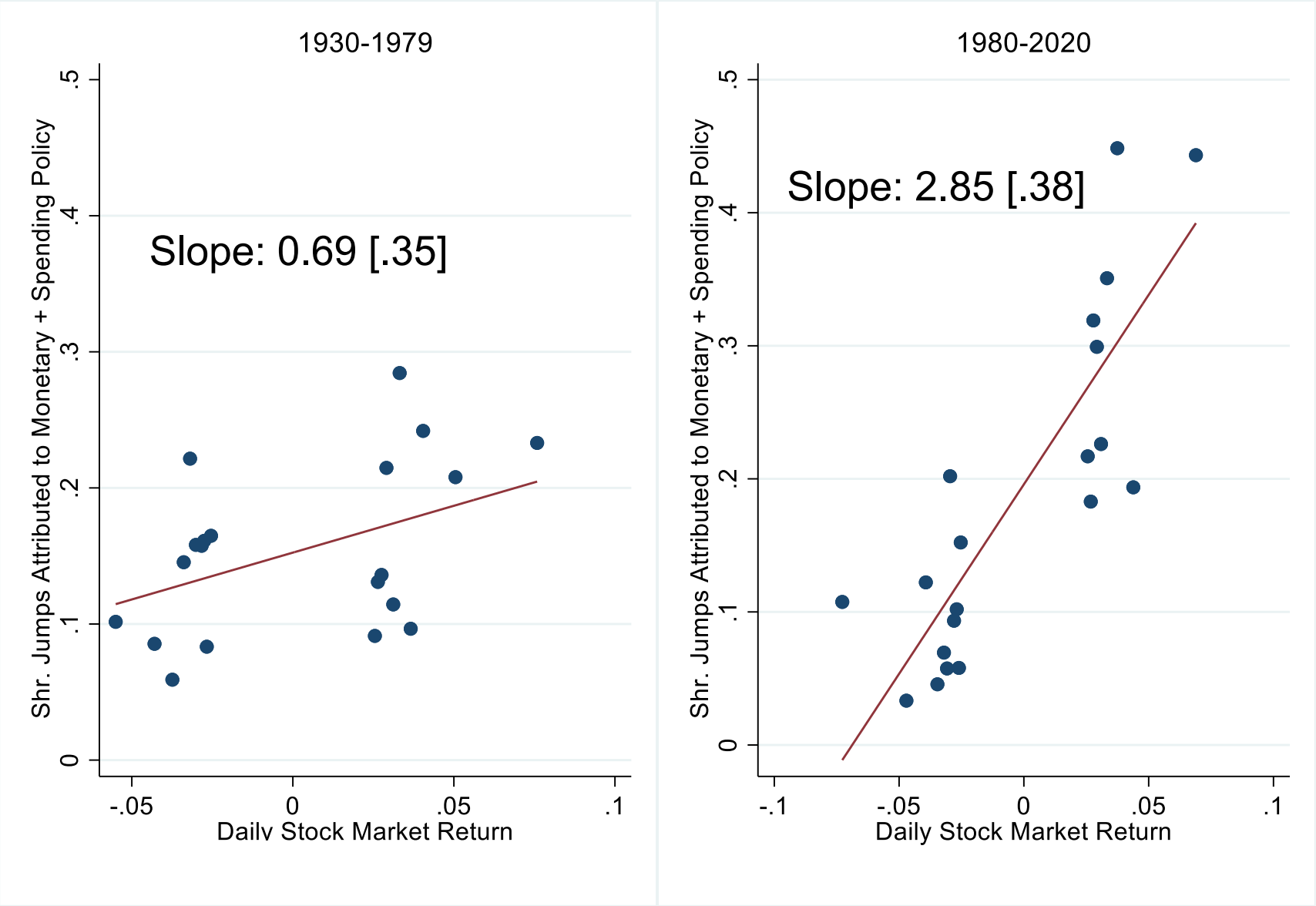


Difference in slopes: 2.03, t-stat = 3.13

Notes: Each plot is a binscatter (n=20) of jump-level policy scores against jump-day stock returns, where the policy score is the fraction of the codings for that jump attributed to policy-related news.

We also regress:
$policy_t = a + b\, return_t + c\, 1_{post80} + d\, return_t \times 1_{post80} + e_t$
on the sample of jump days, and report the coefficient on the interaction term *d*, and its t-statistic at the bottom of the figure.

Figure A5: Policy News Also Triggers a Larger Share of Positive than Negative Jumps, Especially After 1980, in U.K. Data from 1930 to 2020



Difference in slopes: 2.16, t-Stat: 4.21.

Notes: Each plot is a binscatter (n=20) of jump-level monetary + government spending policy scores against jump-day stock returns, where the monetary + government spending policy score is the fraction of the jump's codings attributed to monetary- and government spending-related news. For each sub-period, we regress jump-level monetary + government spending policy scores on jump-day returns and report the t-statistic on the return variable.

For jump days only we also run the following regression,

$$(monetary_t + \text{spending}_\text{t}) = a + b\, return_t + c\, 1_{post80} + d\, return_t \times 1_{post80} + e_\text{t}$$

and report the coefficient on the interaction term *d*, and its t-statistic at the bottom of the figure.

Positive Tilt of Policy-Driven Jumps Holds in 18 of 19 Countries

	Non-Policy		Monetary Policy		Government Spending		All Policy	
	Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive
Australia	79	32	2	9	5	15	13	31
Brazil	240	252	21	43	11	26	79	129
Canada	202	116	12	19	7	17	32	43
France	151	88	25	37	1	11	50	65
Germany	181	103	13	28	8	16	48	69
Greece	44	19	3	9	13	27	33	49
Hong Kong	123	84	8	17	7	15	42	56
India	118	106	8	13	4	12	42	60
Indonesia	96	71	8	16	3	11	36	51
Ireland	173	111	7	18	13	19	45	64
Japan	120	78	6	17	9	21	36	61
South Korea	122	96	6	15	5	22	43	81
New Zealand	29	11	0	1	0	1	0	2
Singapore	114	91	7	8	4	15	23	32
South Africa	162	119	9	18	6	14	29	48
Spain	190	127	24	55	26	38	92	124
Turkey	133	144	6	8	4	6	59	58
US	223	144	21	40	18	30	98	128
UK	315	236	26	52	20	47	195	213
All	2,814	2,027	210	422	163	362	995	1,362

Turkey is the sole exception.

Notes: Table entries report the number of negative and positive jumps in the indicated categories in data from 1980 to 2020 (fewer years in some countries

What Makes Turkey Distinctive?

Newspaper accounts attribute an unusually large share of jumps in the Turkish stock market to "Elections and Political Transitions" and "Sovereign Military & Security Actions." *Jumps in these categories do <u>not</u> exhibit a positive tilt, unlike those attributed to "Monetary Policy & Central Banking" and "Government Spending."*

Percent of All Jumps in Selected Categories, 1980 to 2020

	Turkey	United States	17 Other Countries
Sovereign Military & Security Actions	12.6%	3.2%	3.4%
Elections & Political Transitions	8.6%	1.6%	3.1%

Monetary Policy and Government Spending Drive the Positive Tilt

	Non-Policy		Monetary Policy		Government Spending		All Policy	
	Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive
Australia	79	32	2	9	5	15	13	31
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Greece	44	19	3	9	13	27	33	49
Hong Kong	123	84	8	17	7	15	42	56
India	118	106	8	13	4	12	42	60
Indonesia	96	71	8	16	3	11	36	51
Ireland	173	111	7	18	13	19	45	64
Japan	120	78	6	17	9	21	36	61
South Korea	122	96	6	15	5	22	43	81
New Zealand	29	11	0	1	0	1	0	2
Singapore	114	91	7	8	4	15	23	32
South Africa	162	119	9	18	6	14	29	48
Spain	190	127	24	55	26	38	92	124
Turkey	133	144	6	8	4	6	59	58
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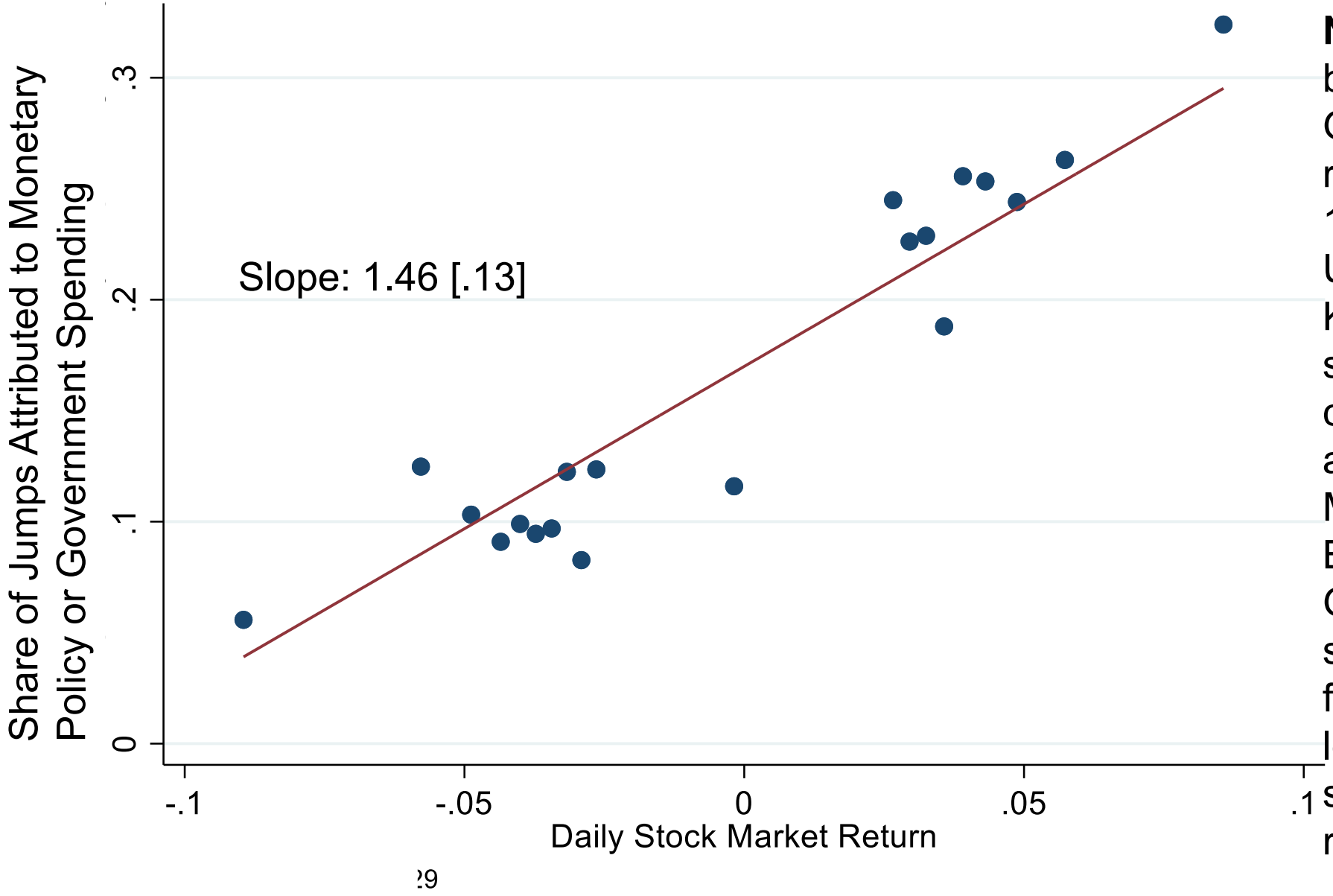
UK	315	236	26	52	20	47	195	213
All	2,814	2,027	210	422	163	362	995	1,362

Jumps attributed to Monetary Policy and those attributed to Government Spending show a positive tilt In all 19 countries.

Other policy jumps don't exhibit a positive tilt.

News about Monetary Policy and Government Spending Also Triggers a Larger Share of Upward than Downward Jumps from 1980 to 2020 in 17 Other Countries



Notes: The chart shows a binscatter of jump-level MP or GS scores on jump-day stock returns from 1980 to 2020 for 17 countries (excluding the United States and the United Kingdom). The jump-day score is the fraction of codings for the jump attributed to news about Monetary Policy & Central Banking or about Government Spending. The slope and standard error are from a regression of jump-level scores on a constant on same-day stock market returns.

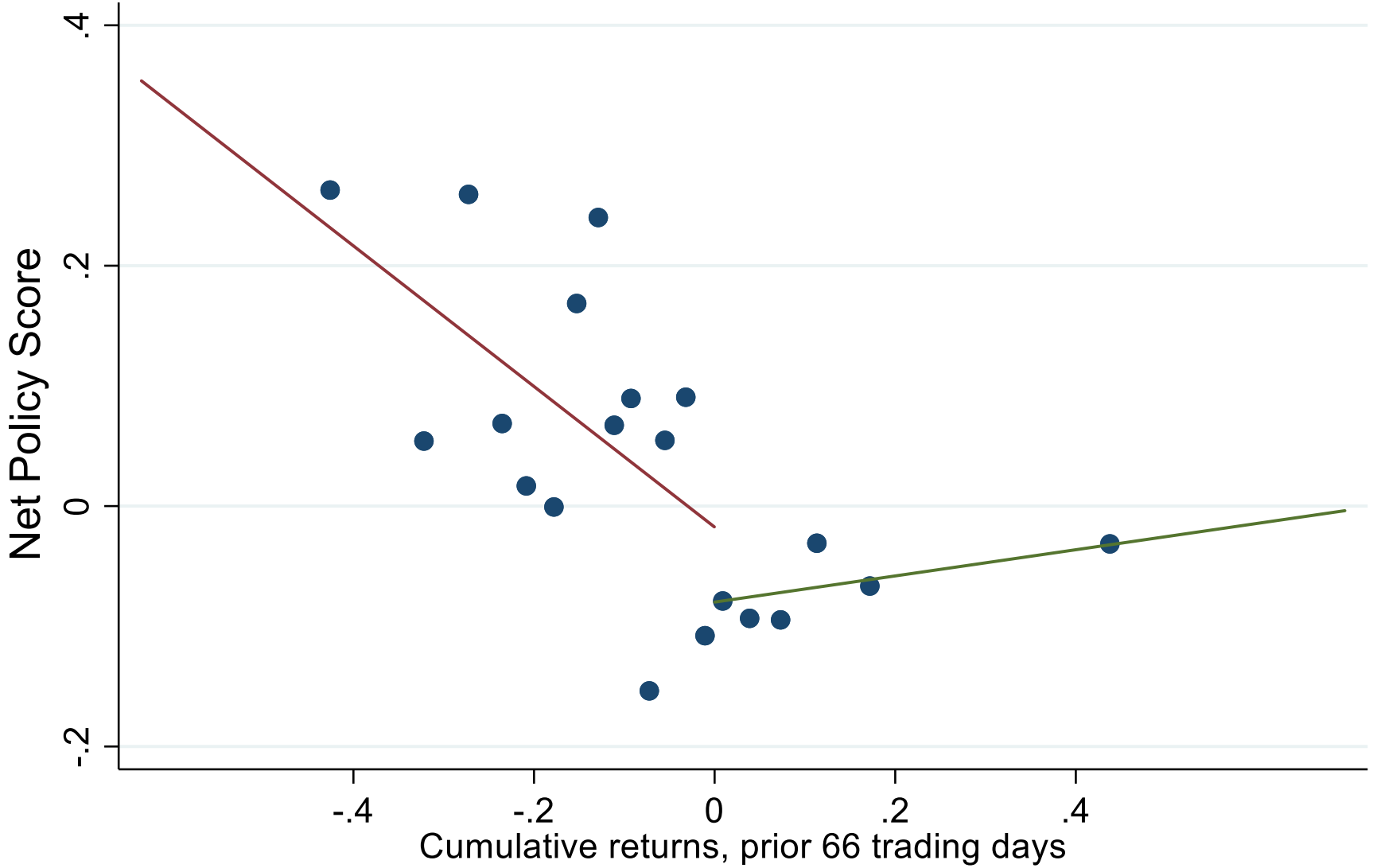
Why Do U.S. and U.K. Policy Jumps Exhibit A Greater Positive Tilt in Recent Decades?

Mainly Because the Mix of (Policy) Jumps Shifts to Monetary Policy and Government Spending

Percent of All Jumps in Selected Categories

	United States		United Kingdom	
	1900-1979	1980-2020	1930-1979	1980-2020
Monetary Policy & CB	5.3%	10.9%	7.5%	11.1%
Government Spending	5.2%	7.5%	7.9%	7.0%
All Other Policy Jumps	28.6%	11.1%	26.4%	11.4%

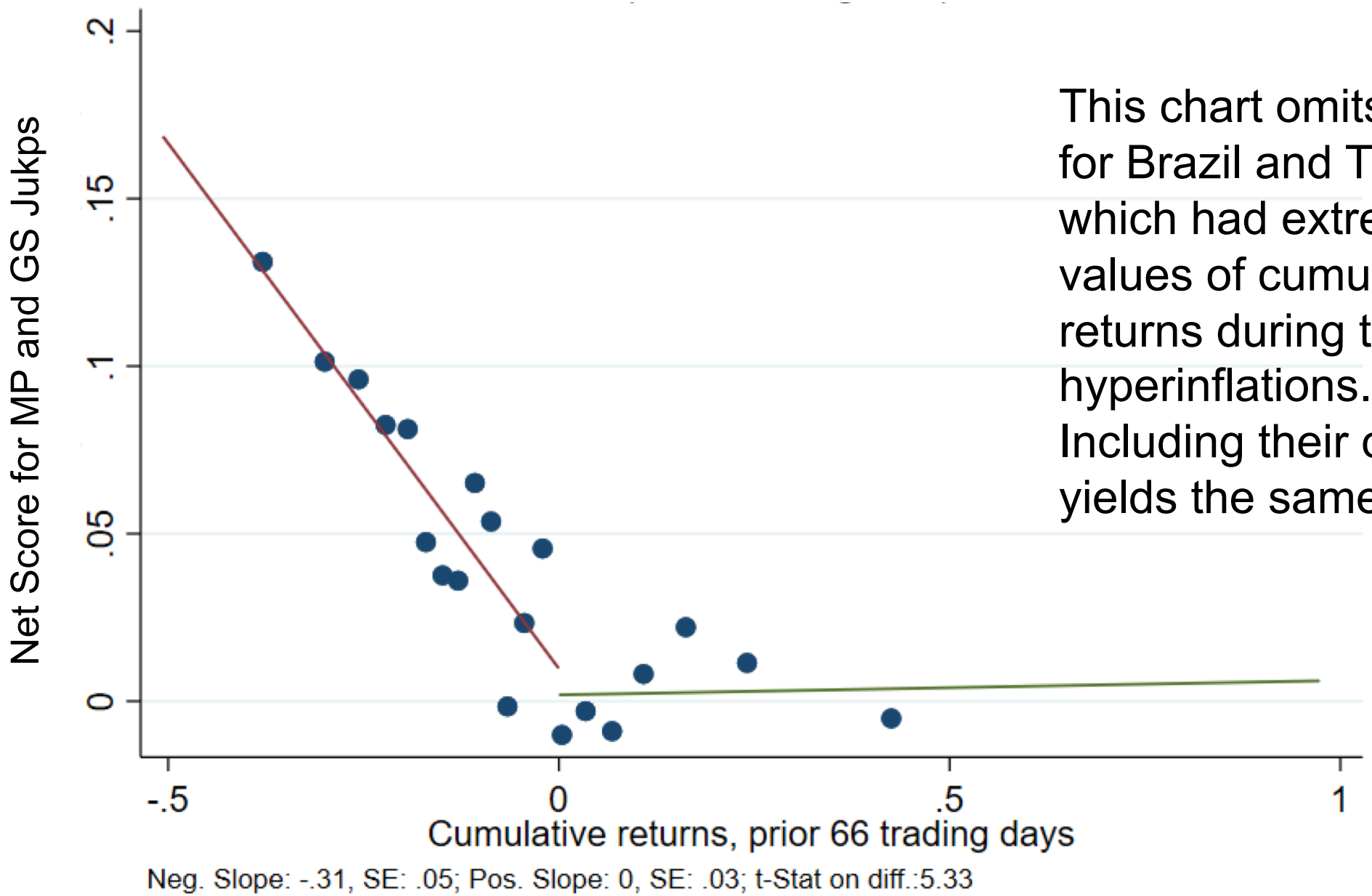
Policy News Is More Likely to Be the Trigger for Positive Jumps When the Market Has Been Falling, U.S. Data from 1900 to 2020



Neg. Slope: -.59; Pos. Slope: .11; t-Stat on diff.:2.76

Notes: This chart shows a binscatter of jump-level net policy scores (Y-axis) against the cumulative log returns over the prior 66 trading days. The net policy score is the share of codings attributed to policy developments for upward jumps and (-1) times the share of codings attributed to policy for downward jumps.

News about MP and GS Is More Likely to Be the Trigger for Positive Jumps When the Market Has Been Falling, 15 countries, 1980 to 2020



This chart omits data for Brazil and Turkey, which had extreme values of cumulative returns during their hyperinflations. Including their data yields the same pattern.

The Economics of the Fed Put

Anna Cieslak
Fuqua School of Business, Duke University, NBER and CEPR
Annette Vissing-Jorgensen
Haas School of Business, University of California, Berkeley, NBER

Review of Financial Studies, forthcoming

Abstract: Since the mid-1990s, ***negative stock returns*** comove with downgrades to the Fed's growth expectations and ***predict policy accommodations.*** Textual analysis reveals that policy makers pay attention to the stock market…. (Emphasis added)

Earlier work by Bernanke and Gertler (1999, Kansas City Fed Economic Review) and Rigobon and Sack (Quarterly Journal of Economics, 2003) also find that stock price drops predict declines in the target Fed Funds rate.

Open Questions

How are monetary and fiscal policy makers able to successfully “engineer” upward market jumps (on average) in the wake of falling equity prices?

How does the Fed put generate upward stock market jumps in reaction to (seemingly forecastable) monetary policy actions?

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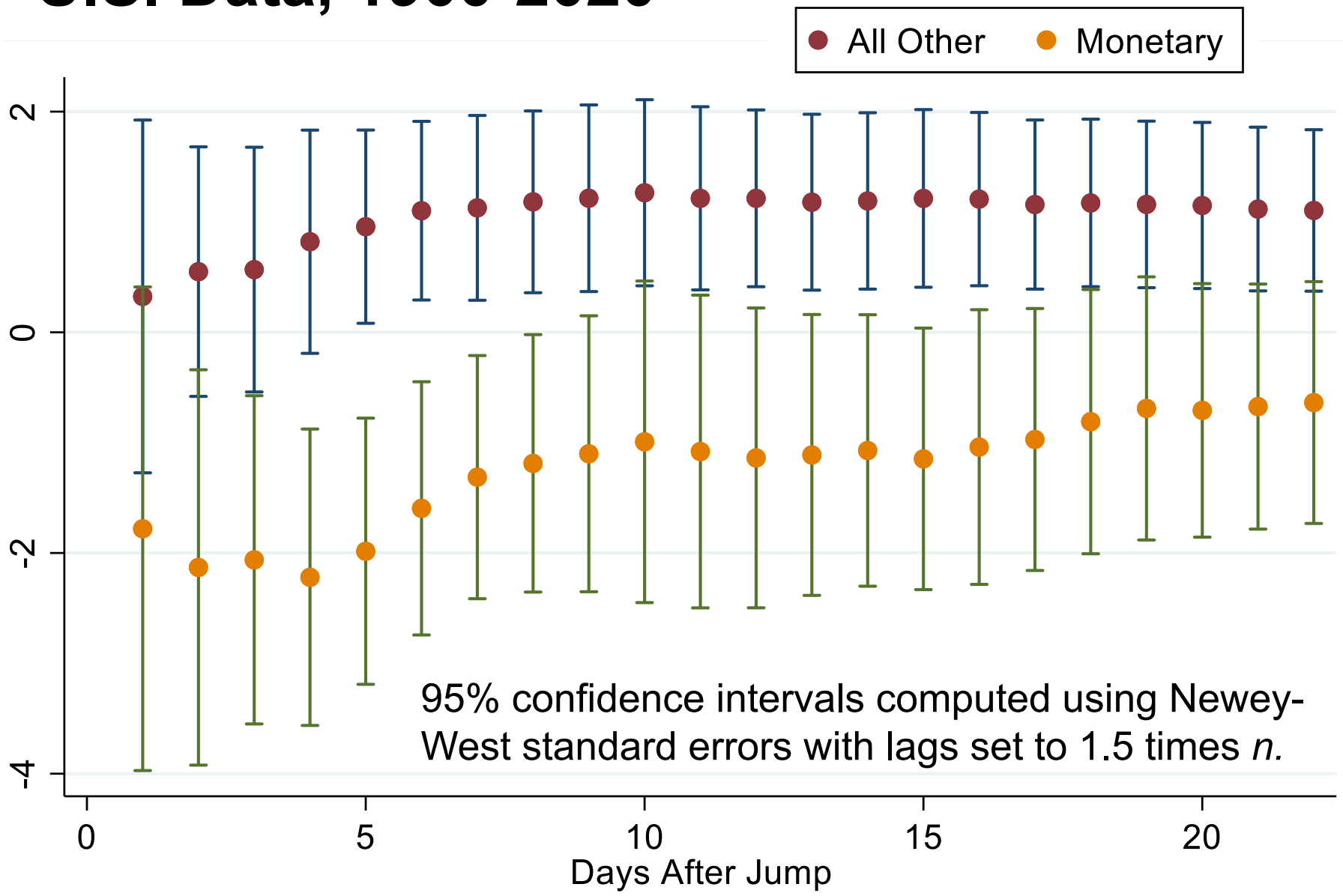
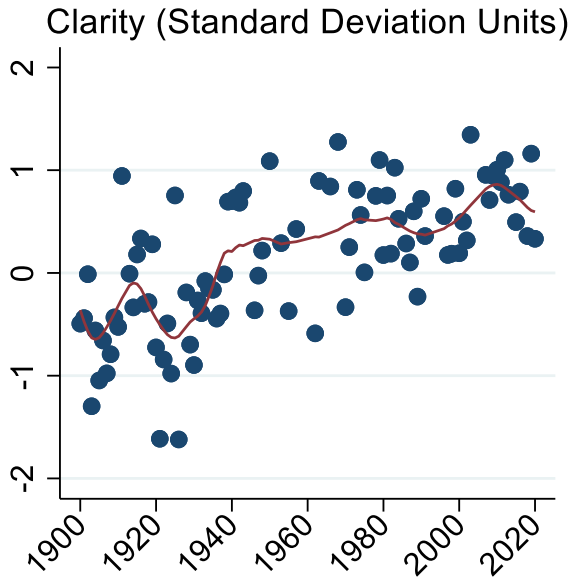
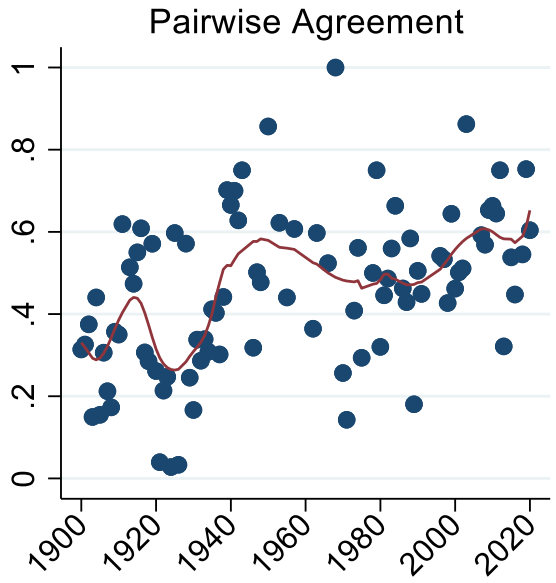
Jump Type Has Predictive Power for Post-Jump Volatility
U.S. Data, 1900-2020

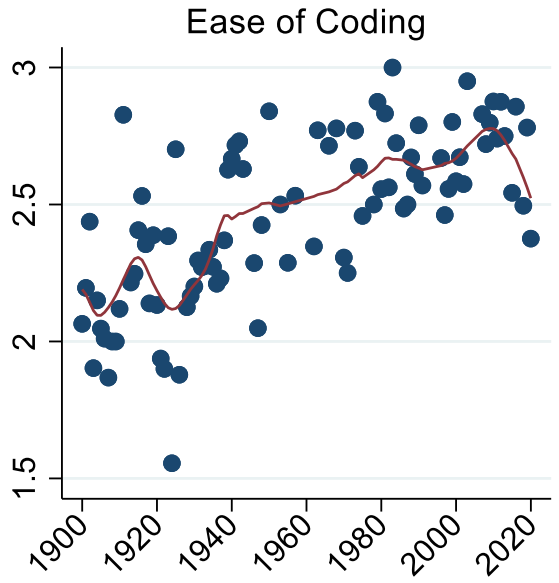


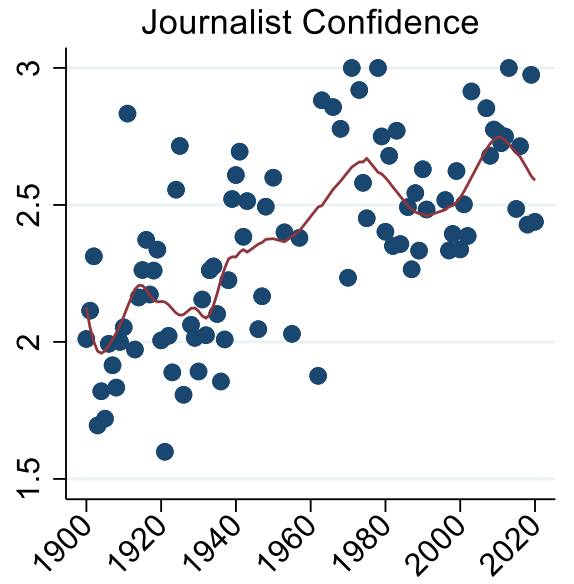
Notes: We regress average squared returns over the *n* trading days after a jump day on the fraction of codings that attribute the jump to Monetary Policy and the fraction that attribute it to All Other reasons. We run a separate regression for each *n*=1,2,…,22 and in each case control for jump-day return, split into positive and negative pieces, and volatility over the day, week and month preceding the jump day (HAR controls). The chart plots coefficients on the two jump-type measures. The time-series standard deviations of average volatility over 1, 5, 10 and 20 days are 5.13, 3.23, 2.80 and 2.45, respectively.

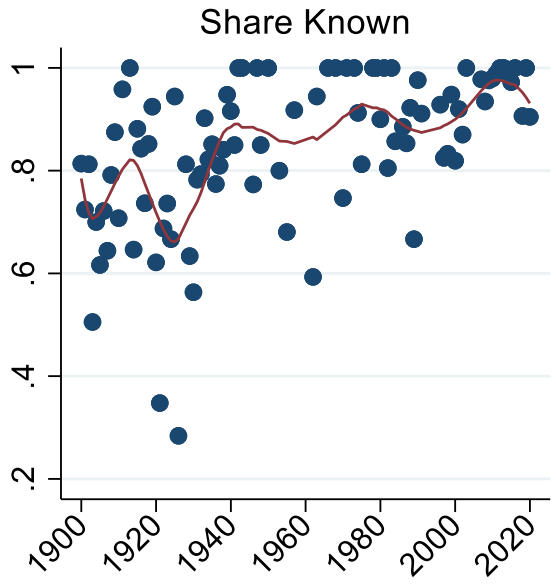
Our Index of Clarity as to Jump Reason, and Each of its Components, Have Trended Up Over Time, U.S. Data, 1900-2020







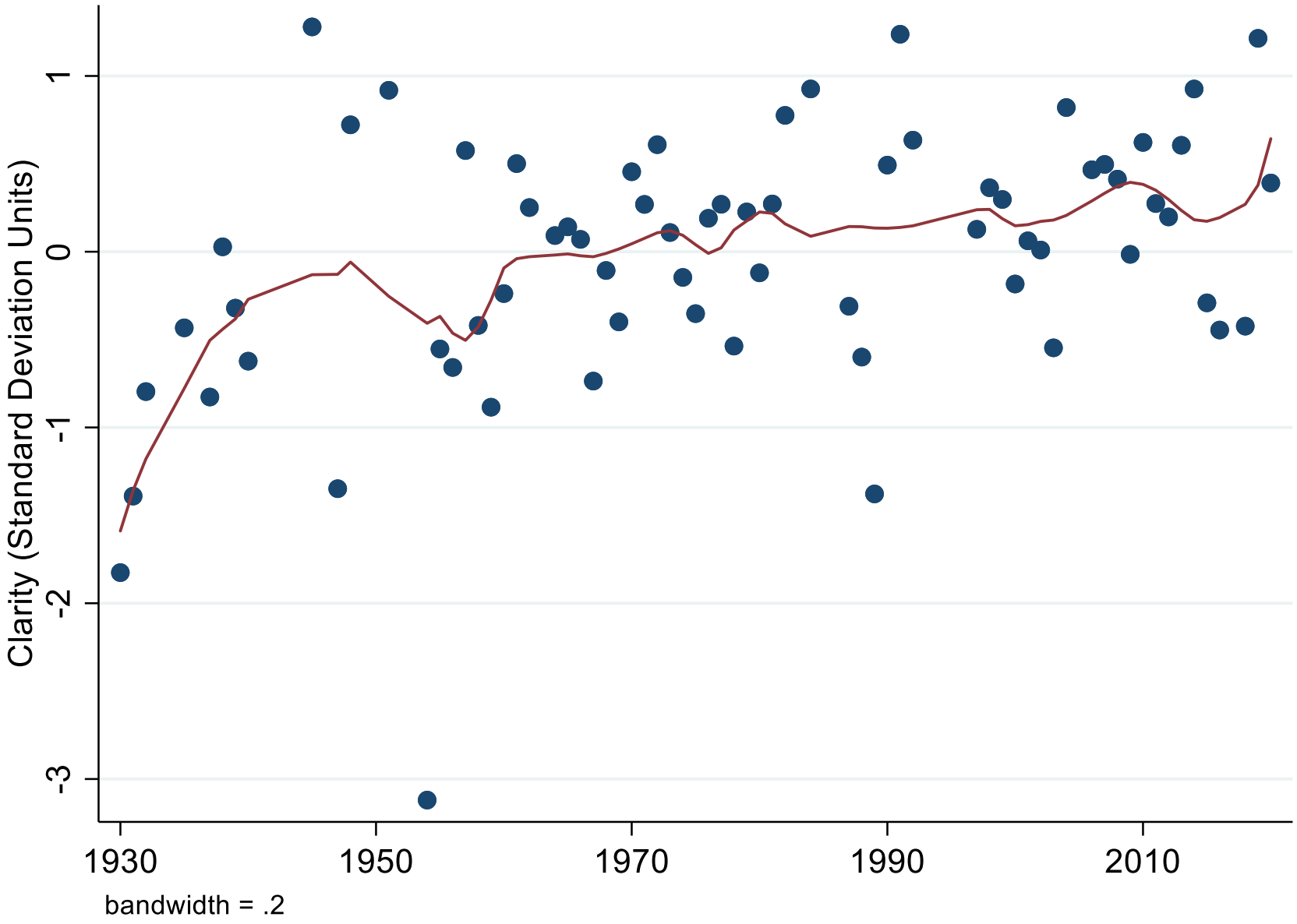




Notes: Each red line shows a LOWESS-smoothed fit to the data, with a bandwidth set to 20 percent of the whole sample. Clarity is the sum of Ease of Coding, Journalist Confidence, Pairwise Agreement Rate, and the Share of Codings not attributed to "Unknown or No Explanation Offered" after each component is scaled to zero mean and unit standard deviation. Clarity is also scaled to have zero mean and unit standard deviation.

Ease of Coding is rated on a 1-3 scale, with 3 being the easiest. Journalist Confidence is rated on a 1-3 scale, with 3 being the most confident. Pairwise Agreement is the average pairwise agreement rate in the codings for a given jump. There are up to 45 pairs arising from 5 newspapers per day and two coders per paper. Share Known is the percentage of codings for a given jump not coded as "Unknown or No Explanation Offered." 37

Figure A12: Clarity Index Over Time, UK Data from 1930 to 2020



Notes: Clarity is the sum of Ease of Coding, Journalist Confidence, Pairwise Agreement Rate, and the share of codings attributed to "Unknown or No Explanation Offered" (multiplied by -1) after each component is scaled to zero mean and unit standard deviation one. Clarity is also scaled to have zero mean and unit standard deviation. The red line shows a LOWESS-smoothed fit to the clarity data, with a bandwidth set to 20 percent of the data. See the notes to Figure A17 for a description of each Clarity component.

What Explains the Upward Drift in Clarity?

Better Information over Time

1. Huge advances in the scope, quality, granularity, and timeliness of government-provided statistical information about the economy.
2. Better information about the performance and outlook of listed firms (partly due to disclosure mandates.)
3. Faster, cheaper, better data processing technologies.
4. Greater transparency re the goals and conduct of monetary policy.
5. Recently, an explosion of timely, highly granular information about commercial activity, mostly from private sources.
6. Advances in business accounting systems?

What Explains the Upward Drift in Clarity?

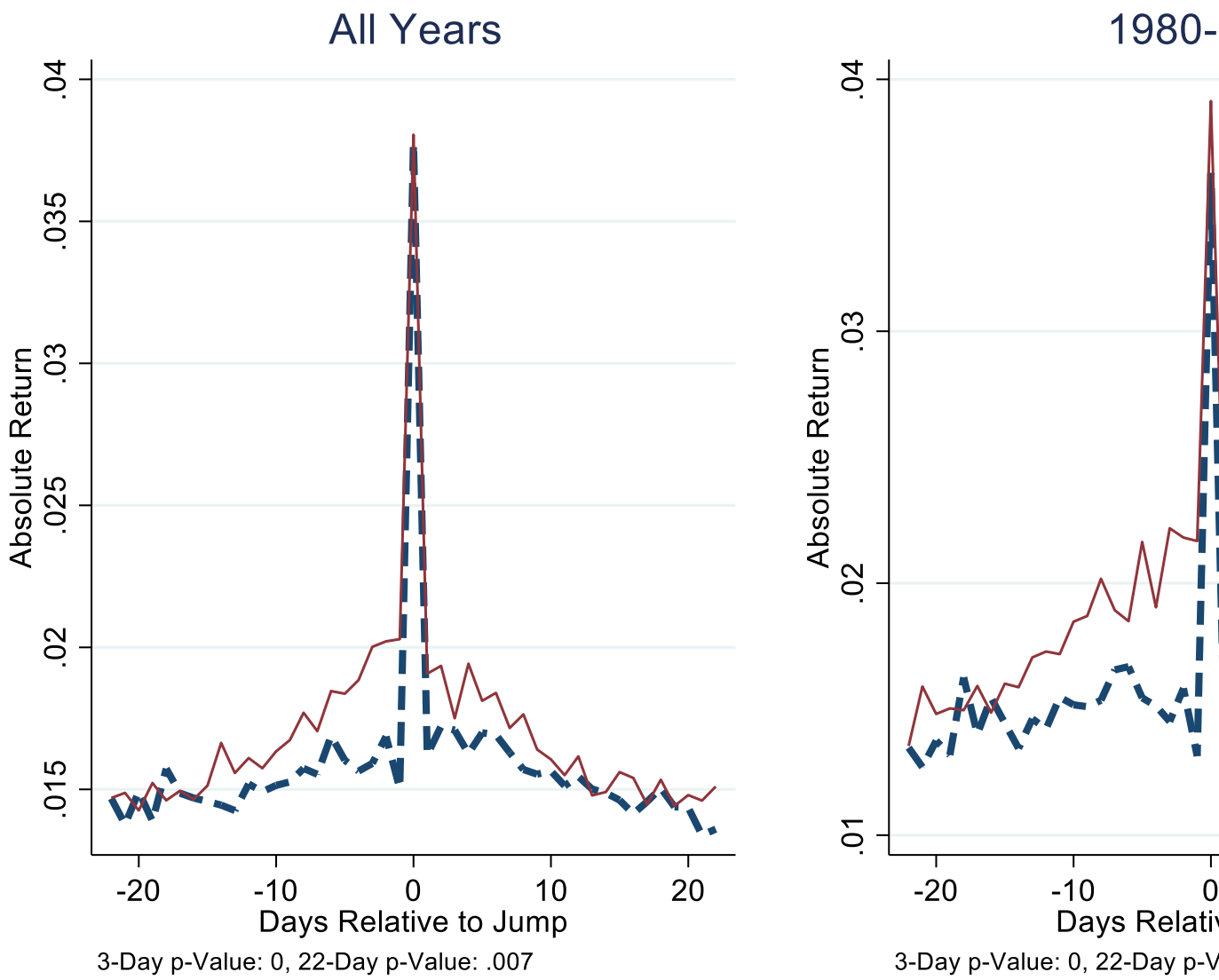
Incentives and Market Equilibrium

1. Bigger economy, larger market cap → greater demand for accurate, detailed reporting of market-relevant news → more and better-quality news in equilibrium (provided supply of market-relevant news is not completely inelastic).
2. For market participants, and for journalists who cover financial markets, greater resources became available over time, enabling timelier and more accurate reporting.
3. Greater scale supports professionalization and specialization among journalists who report on market-relevant news.
4. These effects are also evident in looking across countries with larger and smaller stock markets.

Evolution of the BLS Current Employment Statistics (CES) Program: A Sketch

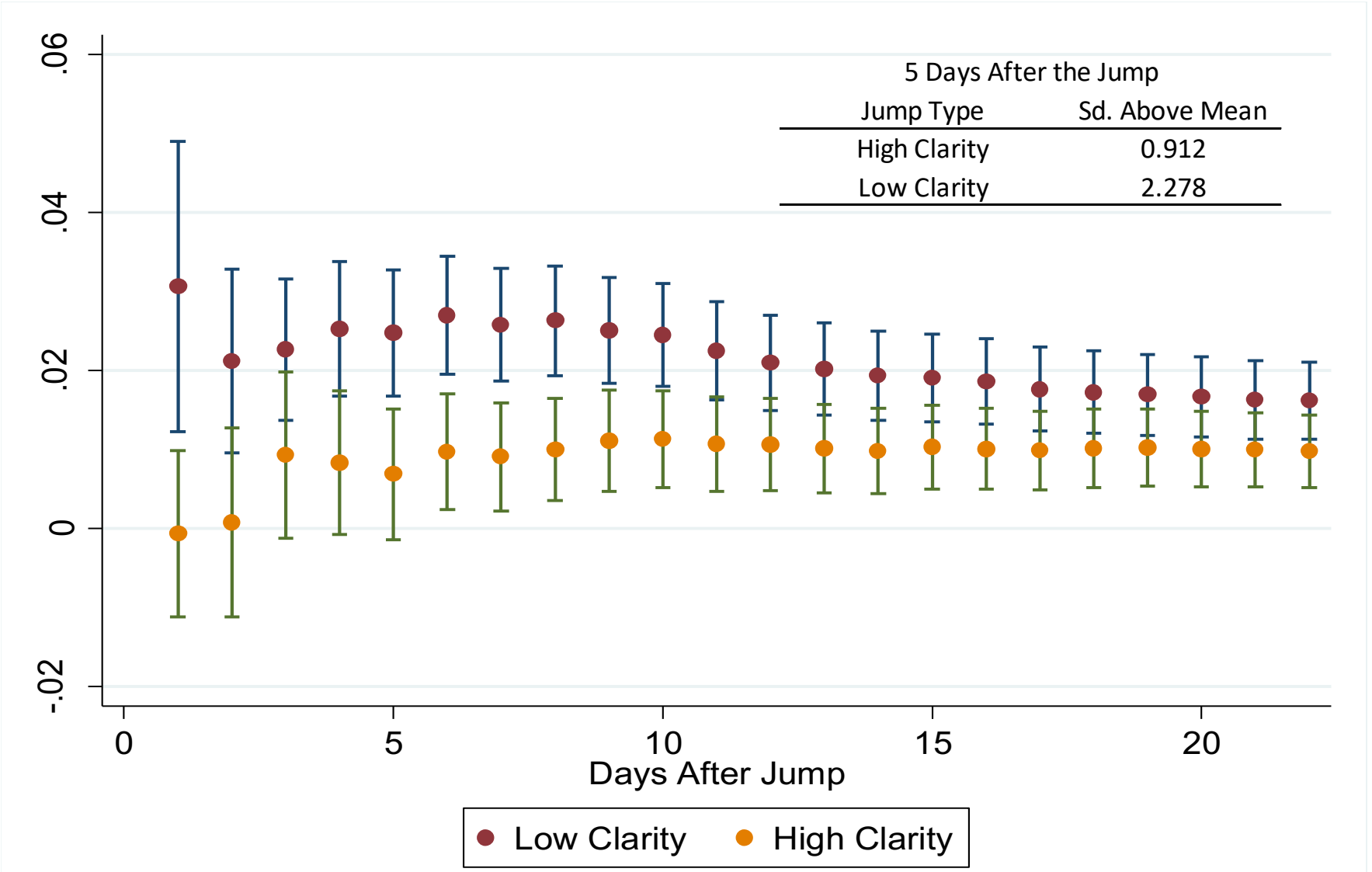
- 1915: 200 manufacturing firms in a sample of convenience
- Early decades: No formal sample design; a focus on mfg. sector
- Early 1950s: BLS began to apply formal sample design methods
- 1965: Significant improvements in sample design, further incremental improvements over the next 25 years
- 1982: Annual benchmarking to universe-level employment data
- 1995-2003: Transition to a probability-based sample design
- Sample sizes: From 107K establishments in 1964 to 620K business and government worksites by 2016.
- More timeliness, greater detail over time.

Figure 11: Volatility is Lower Around High-Clarity Jumps, U.S. Data from 1900 to 2020



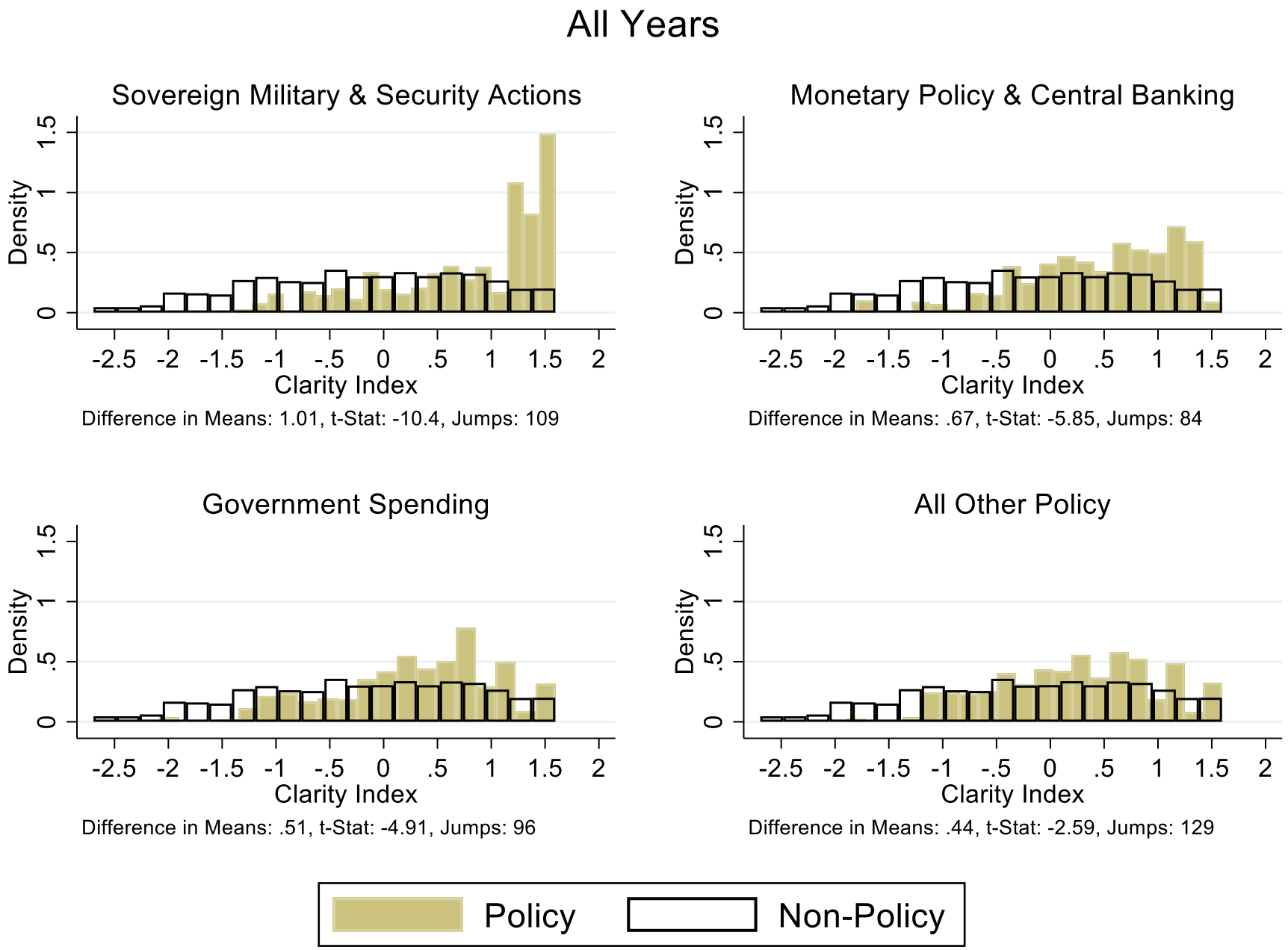
Notes: High (low) clarity is defined as clarity above (below) the sample median for either All Years (1900-2020) or 1980 onward. Each panel shows the average absolute return in a +/- 22-day window around jump days. The p-values are for t-tests of whether the mean absolute return in a +/- *n*-day window around the jump day differs between high-clarity and low-clarity jumps.

Greater Clarity → Less Post-Jump Volatility



Notes: We run a regression, where the left hand side is cumulative realized volatility over days t+1 to t+n. On the right hand side, have an indicator variable for jumps in the top 50% of clarity (high clarity) and bottom 50% of clarity (low clarity). HAR controls include volatility over the past day, week and month.

Figure 12: Policy Jumps have Higher Clarity Than Non-Policy Jumps on Average, 1900-2020



Notes: The difference in means is the difference in average clarity between each policy category, and all non-policy categories. The t-Stat is from a test of equal means. The number of jumps is the number of codings in each of the policy categories. Non-policy does not include unknown jumps. US data, 1900-2020. Average clarity is higher in every policy subcategory than the average for all non policy subcategories.

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Outline

More on Measurement and Methodology

Data: Validation

Some Key Patterns

Predictive Content of Jump Type and Clarity

Geographic Origin of Market-Moving News

Table 1: Distribution of (Primary) Jump Reasons by Era and Category

	US Equities		UK Equities	ROTW Equities	US Bonds
Time Period:	1900-2020	1980-2020	1930-2020	1980-2020	1970-2020
Macroeconomic News & Outlook	23.38	34.95	26.31	27.15	55.30
Corporate Earnings & Outlook	10.99	14.00	13.08	9.33	1.04
Sovereign Military & Security Actions	9.48	3.19	4.81	2.90	0.89
Monetary Policy & Central Banking	7.30	11.07	9.98	7.90	18.13
Government Spending	6.68	8.27	7.42	6.59	4.11
Commodities	5.57	1.68	2.42	2.39	1.18
Regulation	4.21	0.95	5.44	2.13	0.16
Other Non-Policy	4.29	6.66	3.84	3.44	2.50
Elections & Political Transitions	2.42	1.64	2.73	3.43	0.72
Other Policy	2.63	1.87	3.30	2.46	0.87
Taxes	1.71	1.10	1.12	0.65	1.18
Exchange Rate Policy & Capital Controls	1.07	0.86	1.00	1.20	0.34
International Trade Policy	0.91	1.54	0.36	0.38	0.01
Foreign Stock Markets	1.01	1.13	5.21	6.20	0.10
Terrorist Attacks & Non-State Violence	0.47	1.04	0.72	0.83	0.11
Unknown & No Explanation	17.44	10.08	10.58	9.79	8.82
No Article Found	0.43	0.00	1.68	13.23	4.53
Total	1,152	350	656	6,214	455

Notes: Thresholds for a day's stock market movements to be considered a 'jump' are listed in Table A1. Jumps are generally calculated for movements of the broadest composite index for a given country. Rest of the World (ROTW) countries include all countries in our sample except the US and UK. ROTW panel is not balanced between 1980 and 2020 (see Appendix Table 1). Data for US/UK stock jumps ends 2020. US bond jumps are defined as daily changes in the 10-year treasury yield of more than 15 basis points. This table reports the frequency distributions of the primary reason for the jump, according to newspaper articles. In practice, we often code a secondary (or even tertiary) reason as well, based on the article's explanation for the jump.

Bond jumps are defined as daily moves bigger than 15 basis points in 10-year Treasury yields.

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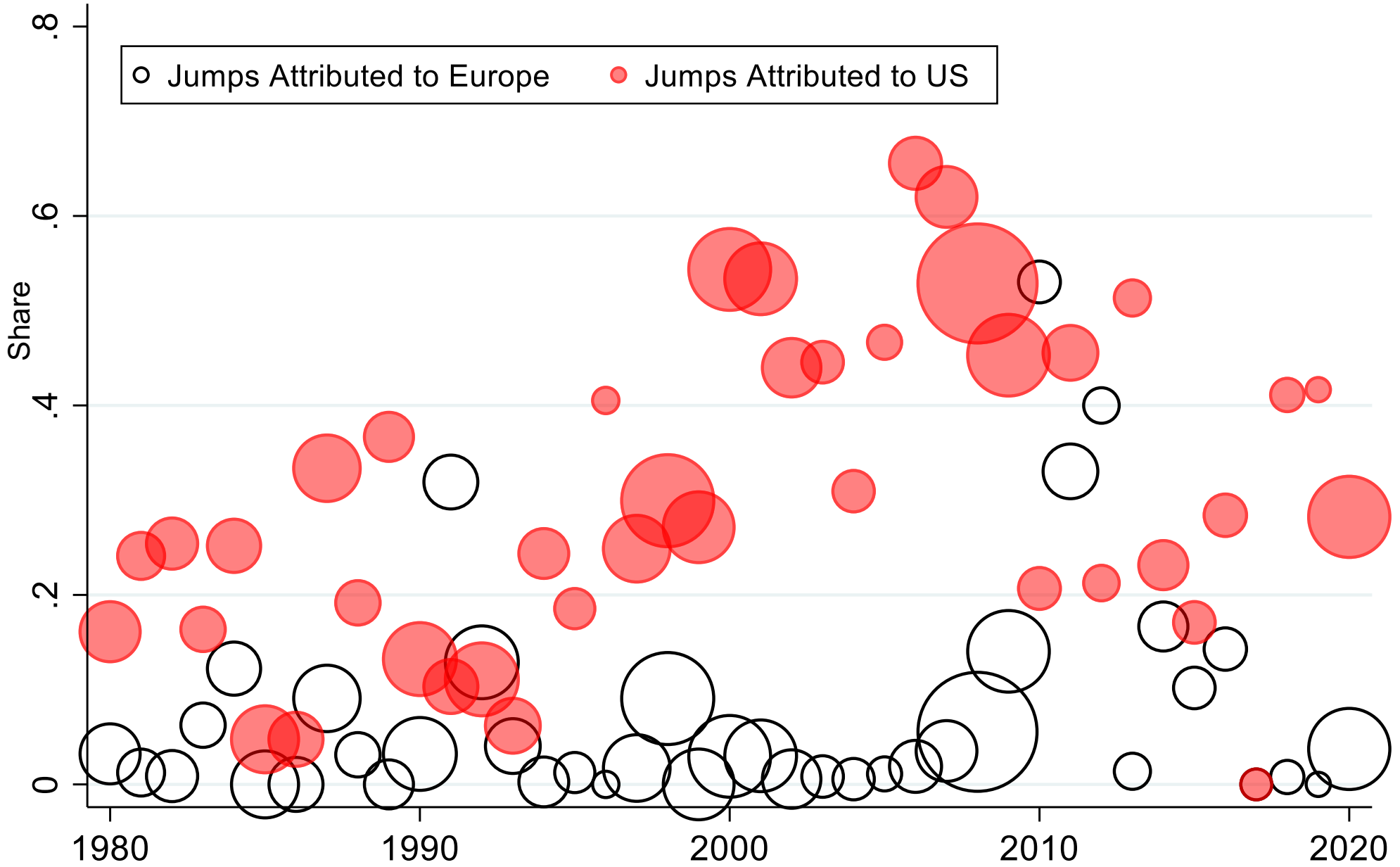
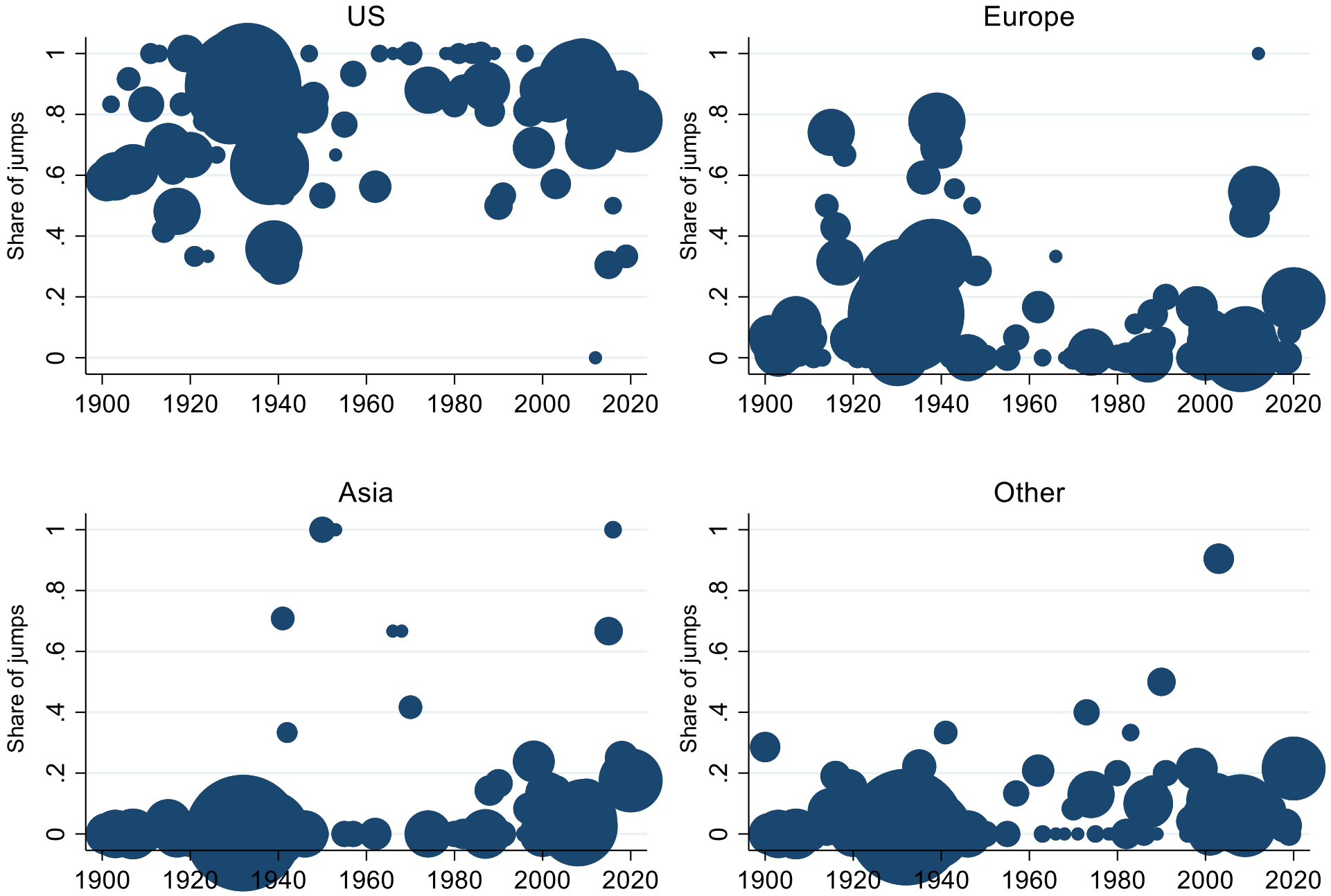
US News Triggers a Strikingly Large Share of Stock Market Jumps in Other Countries, a Pattern that Does Not Hold for Europe (except for Eurozone crisis)



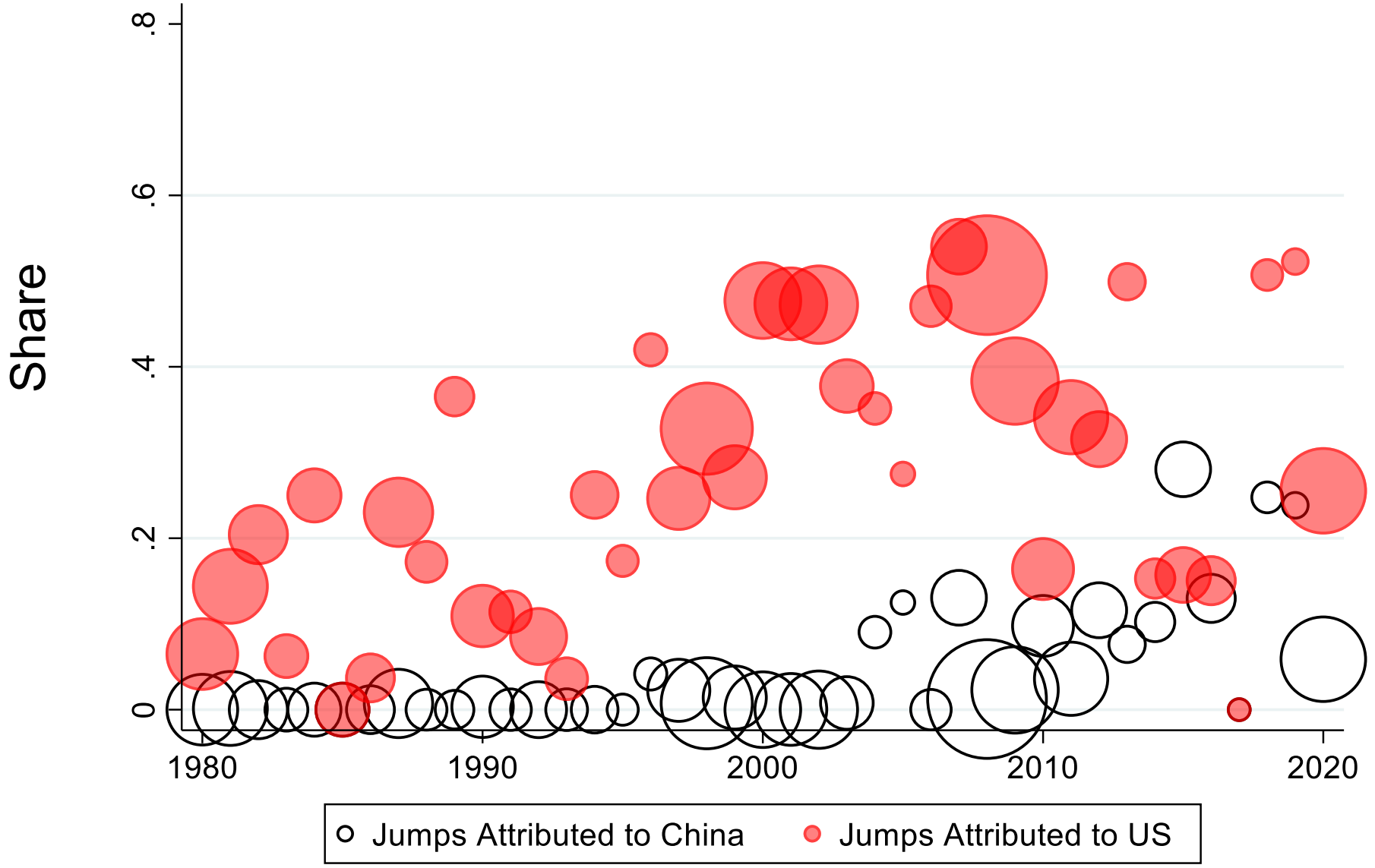
Notes: This figure shows the yearly share of daily stock market jumps in non-US, non-European countries (e.g. India or New Zealand) that leading own-country newspapers attribute to news about the United States and to news about Europe (or individual European countries). The sample runs from 1980 to 2020 but does not cover all countries in all years. Table A1 reports the sample period by country. Dot size is proportional to the average number of jumps per country in that year. Note, in comparison, that the average US share of global GDP is 19.3% and the average European share of global GDP is 27.1% (evaluated at PPP using IMF data).

Figure 5: Jumps in the US Stock Market Are Mostly Due to US News, 1900-2020



Notes: Dots show the yearly share of U.S. stock market jumps by the geographic origin stated at the top of the panel. Dot size reflects the number of jumps in that year. This chart excludes jumps classified as "Unknown or No Explanation Offered" and "No Article Found," which have no geographic attribution.

Figure A4: News about China Triggers Few Jumps in the National Stock Market Jumps of Third-Party Countries before 2005 and a Sizable Share from 2010 Onwards



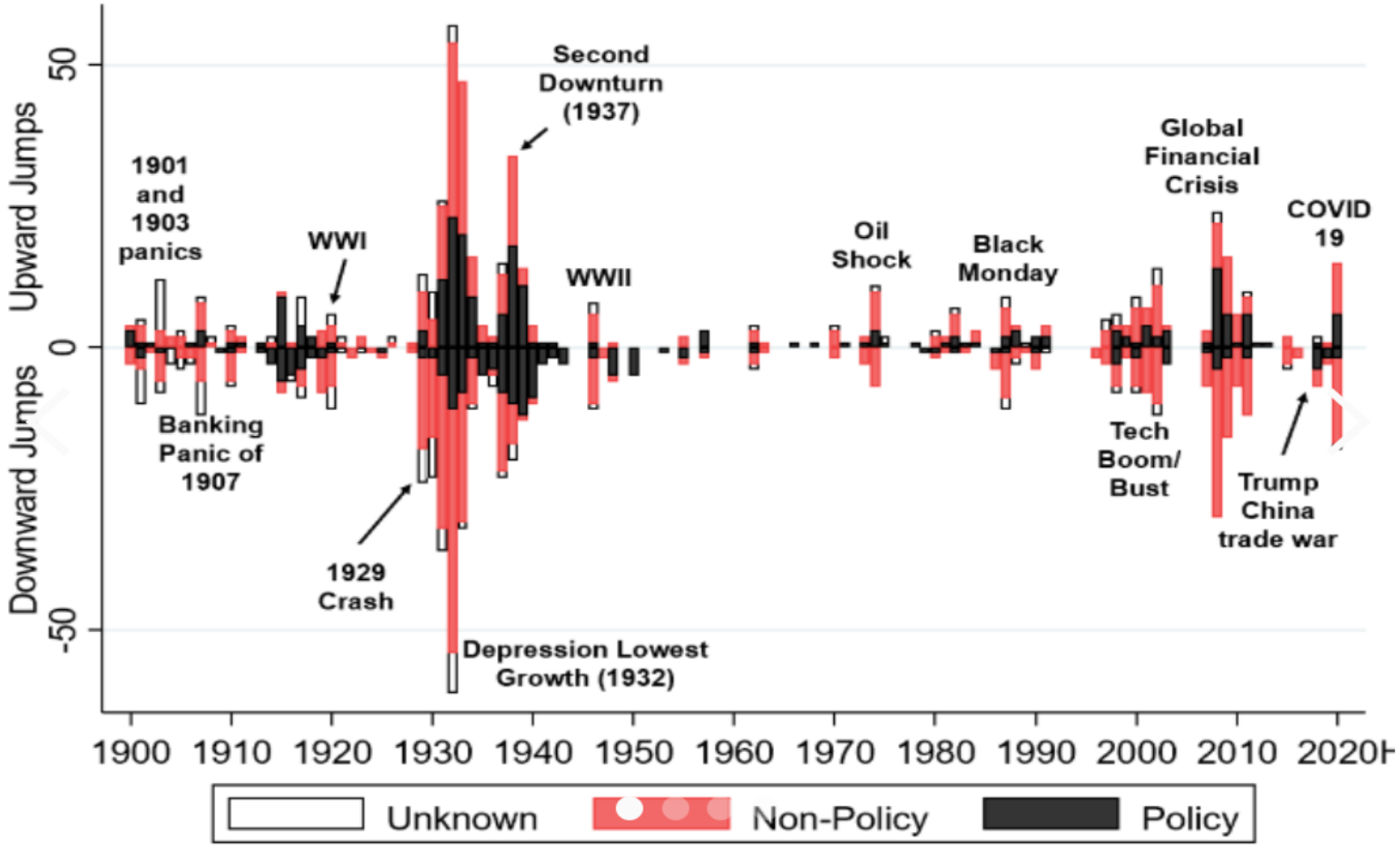
Notes: This figure shows the yearly share of daily jumps attributed to the US outside the US and the yearly share of daily jumps attributed to China outside of China and Hong Kong. The sample runs from 1980 to 2020 but does not cover all countries in all years. Dot size is proportional to the average number of jumps per country in that year. Table A1 reports the sample period by country.

Summary of Key findings

1. Policy jumps are distinctive: Unlike other jumps, those triggered by news about MP and GS drive a higher share of upward than downward jumps.
2. MP and GS jumps are counter cyclical: Their share of upward jumps rises in the wake of falling stock prices, more so the bigger the fall in prior months.
3. Jump type matters for volatility: Jumps attributed to Monetary Policy foreshadow much lower future stock market volatility than other jumps, unconditionally and conditional on a battery of controls.
4. Clarity matters: Greater clarity as to jump reason also foreshadows lower volatility. Clarity has trended upwards over the past 90 years in the U.S. and U.K.
5. Extraordinary U.S. Role: Excluding U.S. jumps, leading newspapers attribute 35% of jumps in their own national markets to U.S.-related news. The U.S. role in this regard dwarfs that of Europe and China.

Data and more available at www.stockmarketjumps.com

Stock Market Jumps Research Data About Us



Extra Slides

The Unprecedented Stock Market Impact of the Coronavirus

	Number of Daily U.S. Stock Market Jumps Greater than |2.5%|	Number Attributed to Economic Fallout of Pandemics	Number Attributed to Policy Responses to Pandemics
2 January 1900 to 21 February 2020	1,116	0	0
24 February 2020 to 30 April 2020	27	13.4	10.4

Note: Tabulated from results in Baker, Bloom, Davis and Sammon (2020), who consider all daily jumps in the U.S. stock market greater than 2.5%, up or down, since 1900. They classify the reason for each jump into 17 categories based on human readings of next-day (or same-evening) accounts in the *Wall Street Journal* (and *New York Times* in 2020). Fractional counts arise when newspapers differ in their jump attribution or human readers differ in their classification of the attribution. Number Attributed to Economic Fallout of Pandemics includes jumps on 3/12 and 3/16 that a subset of coders classified as Macroeconomic Outlook. It's clear from reading these articles that the journalist regarded the deterioration in the Macroeconomic Outlook as due to the spread of the coronavirus.[55]

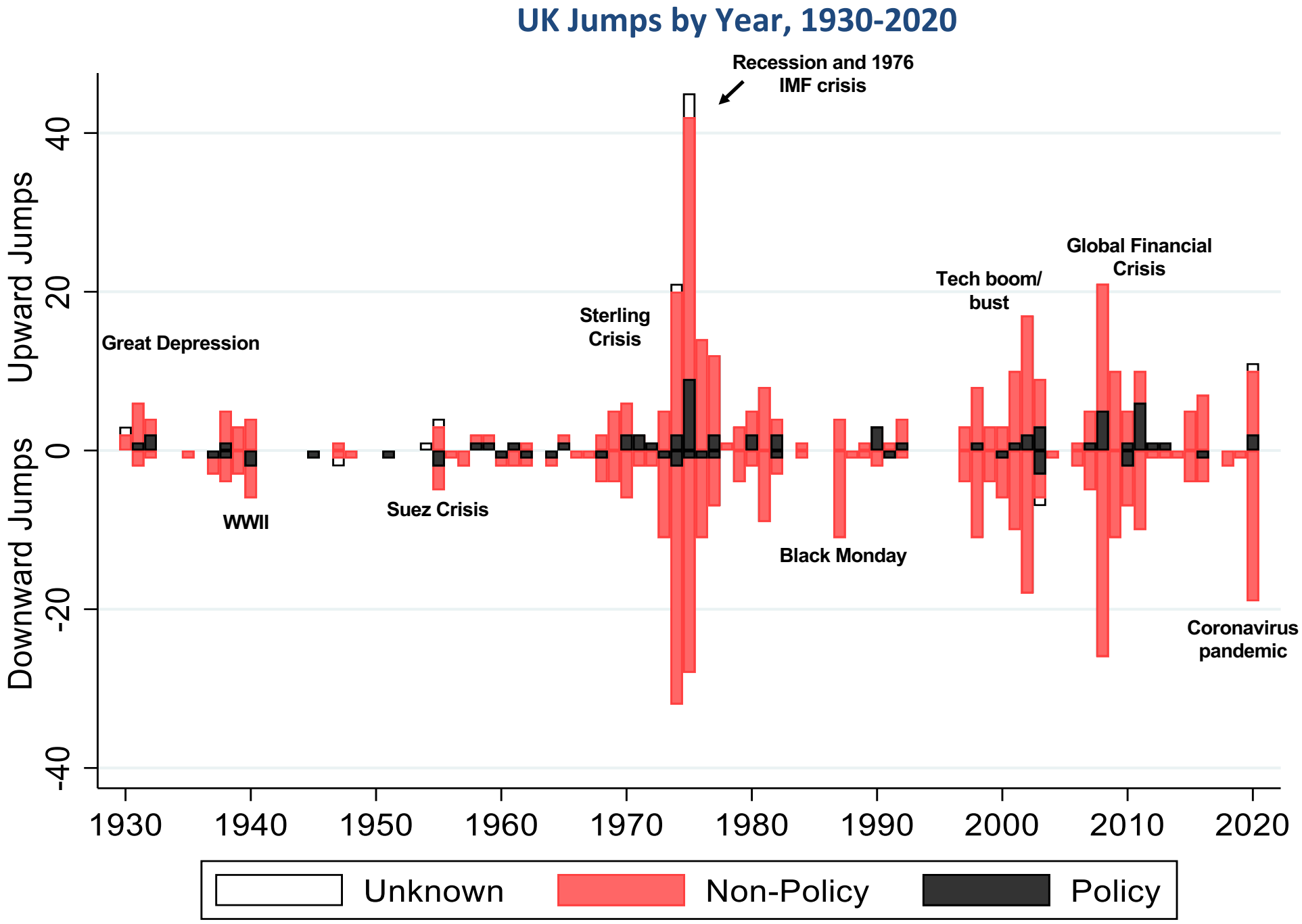
The Unprecedented Stock Market Impact of the Coronavirus: China

A. Shanghai Stock Exchange

Time Period	Jump Size	Number of Daily Stock Market Jumps	# Attributed to Economic Fallout of Pandemics	# Attributed to Policy Responses to Pandemics
26 December 1990 31 December 2019	$\geq \lvert 4\% \rvert$	384	0	0
2 January 2020 to 30 April 2020	$\geq \lvert 4\% \rvert$	1	1	0
	$\geq \lvert 3\% \rvert$ and $< \lvert 4\% \rvert$	5	4	1

The same pattern holds for the Hang Seng index (Hong Kong).

Reproduced from "Stock Prices, Lockdowns, and Economic Activity in the Time of Coronavirus" by Davis, Liu and Sheng (2021).



Notes: Each bar is the number of positive or negative jumps in that year. Shadings indicate the number of jumps triggered by "Policy", "Non-Policy" and "Unknown" news. Unknown includes "no article found". Data from 1930-2020.

Government Spending

News reports, forecasts, or concerns about government spending and its consequences, including spending matters related to stimulus programs, publicly funded pensions, social security, health care, etc.

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Government Spending, 2

THE WALL STREET JOURNAL.

Bailout Plan Rejected, Markets Plunge, Forcing New Scramble to Solve Crisis

By Sarah Lueck, Damian Paletta and Greg Hitt

2119 words
30 September 2008
The Wall Street Journal
J
A1
English

WASHINGTON -- The House of Representatives defeated the White House's historic $700 billion financial-rescue package -- a stunning turn of events that sent the stock market into a tailspin and added to concerns that the U.S. faces a prolonged recession if the legislation isn't revived.

The Dow Jones Industrial Average sustained its biggest point drop in history and its biggest closing decline since the day the markets re-opened after the Sept. 11, 2001, terrorist attacks. The Dow, which had opened sharply lower on fears of more possible bank failures, finished the day down 7%, with a 777.68 point drop to 10365.45. Losses to shares on the broader Dow Jones Wilshire 5000 index amounted, on paper, to $1.2 trillion -- eclipsing the size of the proposed bailout package. The Nasdaq Stock Market finished down 9.1%.

The widely watched VIX index, a measure of market volatility often called "the fear index," closed at its highest levels in its 28-year history. In early trading in Asia Tuesday, Japan's Nikkei was off 4.5%, and other markets also were down.

The 228-205 vote, which defied a full-court press from the president and the Treasury secretary, marked a dark moment in a month that has shaken the financial system to its core and forced the government to take a host of ad hoc measures to shore up confidence. Earlier Monday, U.S. authorities helped arrange the sale of Wachovia Corp. to Citigroup Inc., while the Federal Reserve joined other central banks in injecting more funds into credit markets.

The bailout was designed in part to get financial institutions lending again by ridding the market of the toxic mortgage-backed securities and other holdings that lenders fear could cause borrowers to default. If credit markets continue to seize, the impact on businesses and consumers could be widespread. Access to loans would be reduced, crimping spending and investment. Economists said the credit crunch could lead to increased layoffs in the U.S. and prompt a hefty rate cut from the Federal Reserve.

The primary jump reason for this article is coded as government spending because the first reason listed for the stock market plunge is the rejection of the government's bailout plan. The bailout plan itself involves the government spending money to help the economy, and even though it is a rejection of the plan, it is still coded as government spending.

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Macroeconomic News and Outlook

News relating to macroeconomic conditions, forecasts or reports such as inflation, housing prices, unemployment, employment, personal income, industrial production, manufacturing activity, etc. Also included are the following:

- News about credit conditions and financial crisis developments that does not fall into another category such as Monetary Policy and Central Banking.
- News about trade matters (trade surplus/deficit) and exchange rates NOT due to policy developments.
- Articles that attribute stock market moves to a shift in sentiment about the macroeconomic environment, even when the article does not point to a specific piece of news about the macroeconomic outlook.

Macroeconomic News and Outlook, 2

THE WALL STREET JOURNAL.

Monday's Markets

Recession Fears Send Blue Chips Down 269.50 --- Nasdaq and S&P Slide Further In Stocks' Third Straight Session Of Heavy Losses; Bonds Rise Again

By E.S. Browning

1022 words
6 August 2002
The Wall Street Journal
J
C1
English
(Copyright (c) 2002, Dow Jones & Company, Inc.)

THE STOCK MARKET'S latest obsession -- the risk of a double-dip recession -- pushed the Dow Jones Industrial Average down more than 3%, its second-sharpest percentage decline of the year, and sent the Nasdaq Composite Index to its lowest close in more than five years.

It was the third consecutive session of heavy losses, which now have taken away most of the 13% rally the industrial average enjoyed at the end of July, and have erased all of the 10% rebound in the Nasdaq.

When the buyers were in charge, late in July, hopes spread that the worst of the bear market was over. That optimism was shattered by news last week that the government had overstated the economy's strength and was revising its numbers. Then manufacturing activity came in weaker than expected and so did employment. Yesterday came another jolt: Last month's activity in the service economy, representing more than half of all economic activity, was weaker than expected.

In July, Federal Reserve Chairman Alan Greenspan reassured Congress that the economy was stronger than the doubters feared. Now, fears are spreading that a second dip into recession, which seemed an outside risk just two weeks ago, might not be so unlikely.

"Greenspan's testimony was pretty bullish. It is very unusual for Greenspan to be caught off base like that," said Alfred Kugel, senior investment strategist at Chicago money-management firm Stein Roe Investment Counsel. "You feel like asking, did anyone know about this or did they just forget to tell him?"

For the day, the Dow industrials fell 3.24%, or 269.50 points, to 8043.63. Of the 1,034 points that the industrial average rose from July 23 through July 31, only 341 points remain. The industrial average is down 20% since the year began and is 32% off its record close, hit in January 2000.

This article claims that the reason for the market move was a fear of a double-dip recession, a change in the Macroeconomic Outlook. Therefore the article would be coded as Macroeconomic News and Outlook. The confidence would be high because the article clearly declares that the fear of recession was the cause for the movement.

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Monetary Policy and Central Banking

Actions, possible actions, and concerns related to the conduct and policies of the central bank or similar authority. Such actions and policies pertain to interest rate changes and monetary policy announcements, inflation control, liquidity injections by the monetary authority, changes in currency-gold convertibility under a gold standard, changes in reserve requirements or other bank regulations used by the monetary authority to exercise control over monetary conditions, lender-of-last resort actions, and extraordinary actions by the monetary authority in response to bank runs, systemic financial crisis and threats to the payments system.

Note: See discussions below for guidance on how to distinguish (a) Monetary Policy & Central Banking from Macroeconomic News & Outlook and (b) Monetary Policy & Central Banking from Exchange Rate Policy & Capital Controls.

Table A3: Comparison to the Cutler, Poterba and Summers Characterization of the 50 Largest Daily Moves in the S&P Stock Index from 1946 to 1987

	Primary or secondary category agreement	Primary category agreement	Observations
New York Times			
High clarity	81%	75%	32
Low clarity	43%	38%	18
Total	67%	62%	50
Wall Street Journal			
High clarity	64%	55%	32
Low clarity	48%	37%	18
Total	58%	48%	50

Notes: Cutler, Poterba and Summers (CPS) attribute a "cause" to the 50 largest U.S. stock market jumps from 1946 to 1987 based on coverage in the New York Times. See their Table 4. For each jump, we map their description of the cause to a primary and, sometimes, a secondary category, using our classification scheme. We then compare the resulting CPS classification to our classification as follows: For any given coding of the jump in question, we set "Primary category agreement" to 1 if the CPS primary category matches ours, and 0 otherwise. We set "Primary or secondary category agreement" to 1 if there is any overlap between the CPS primary and secondary categories and our primary and secondary categories, and 0 otherwise. We then average over all codings for the jump in question to obtain an average agreement rate (over codings) for a given jump. Lastly, we average over jumps to obtain the entries reported in the table. "High" and "Low" clarity jumps have Clarity values greater or less than 0, respectively.

Table A3: Policy-Share by Jump Size and Period, US

Absolute Jump Size	US				Rest of the World	
	1900-1979		1980-2020		1980-2020	
	Positive	Negative	Positive	Negative	Positive	Negative
[Thresh,Thresh+0.5%)	41%	31%	35%	20%	38%	25%
[Thresh+0.5%,Thresh+1%)	41%	34%	38%	12%	48%	28%
[Thresh+1%,Thresh+1.5%)	40%	42%	46%	34%	42%	27%
Thresh+1.5% or Larger	48%	40%	55%	19%	57%	25%
All	45%	33%	43%	20%	41%	23%
p-Value	0.01		0.00		0.00	
Total	802		350		4,855	

Notes: *Positive* (*Negative*) columns are share of positive (negative) jumps attributed to policy categories. For rest of the world, we exclude jumps attributed to Unknown or No Article Found when computing the totals. p-Value is from a t-Test that share of policy-share is the same among positive and negative jumps. US data 1900-2020.

Table 5: Higher Clarity Jumps are Followed by Less Returns Volatility and Cross-Firm Dispersion

	Volatility			X-Sectional Std. Dev.		
	(1)	(2)	(3)	(4)	(5)	(6)
Clarity	-4.556***	-4.496***	-2.043	-0.286***	-0.266***	-0.0997***
	(1.56)	(1.38)	(1.25)	(0.04)	(0.04)	(0.03)
Observations	1,150	1,150	1,150	961	961	960
R-squared	0.007	0.155	0.247	0.041	0.196	0.541
Controls	None	Returns	+HAR	None	Returns	+HAR
Sample	All	All	All	All	All	All

Notes: For columns 1-3, left-hand-side is the sum of squared percentage returns over the 5 days following a jump day. US data, 1900-2020. For columns 4-6, left-hand-side is the average value-weighted cross-sectional standard deviation over the 5-days following the jump, multiplied by 100. This cross-sectional standard deviation is computed using all ordinary common shares traded on major exchanges in CRSP. US data, 1926-2020. Column 6 has 2 fewer observations because we are including lagged cross sectional standard deviation on the right-hand-side. For columns 2 and 4 controls are the jump day return, split into positive and negative components. For column 3, controls also include: 1-day, 5-day and 22-day lagged volatility (HAR controls). For column 6, controls also include: 1-day, 5-day and 22-day lagged cross-sectional standard deviation (i.e. HAR for cross-sectional standard deviation). Clarity has mean zero and standard deviation one. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

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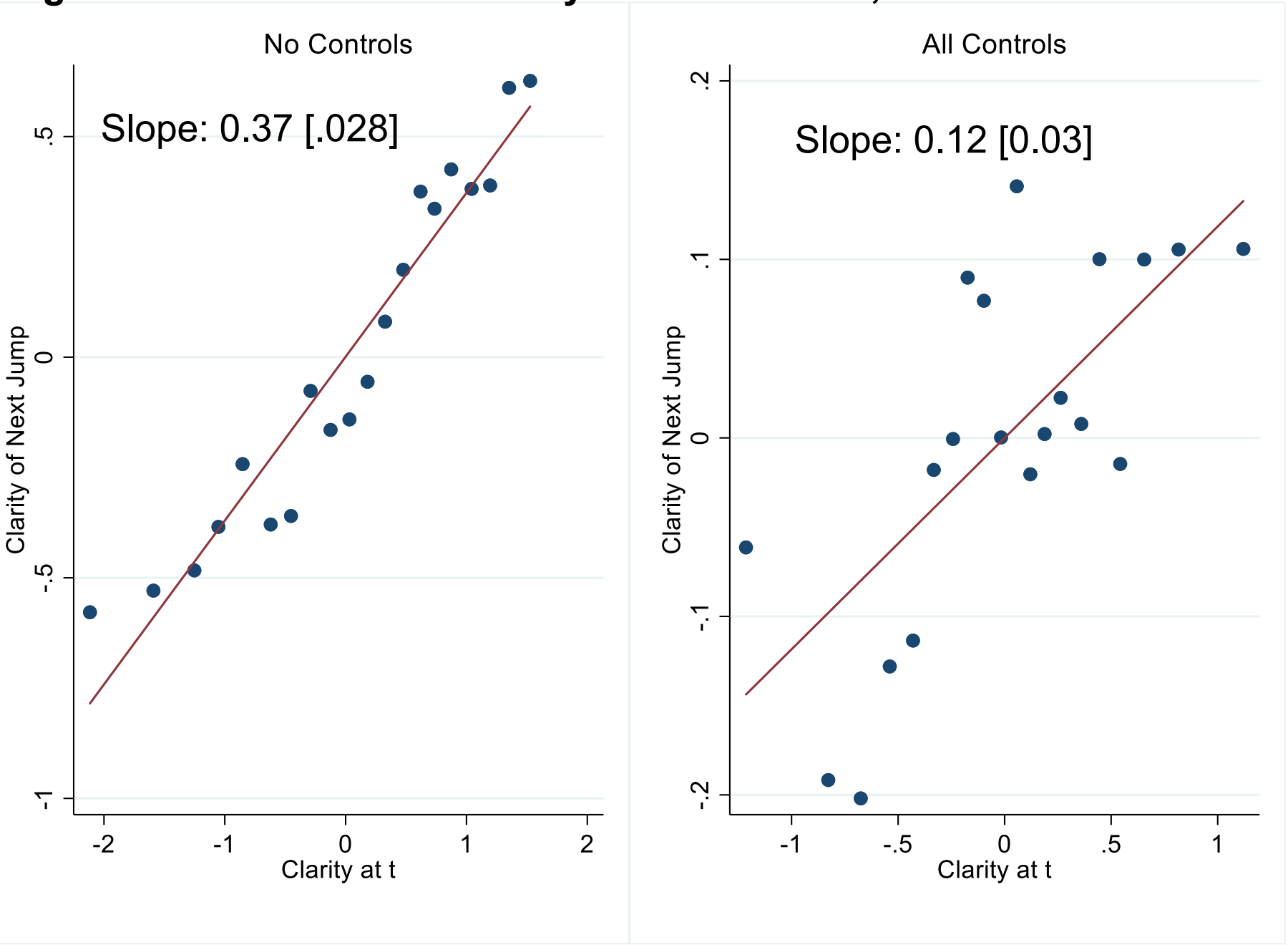
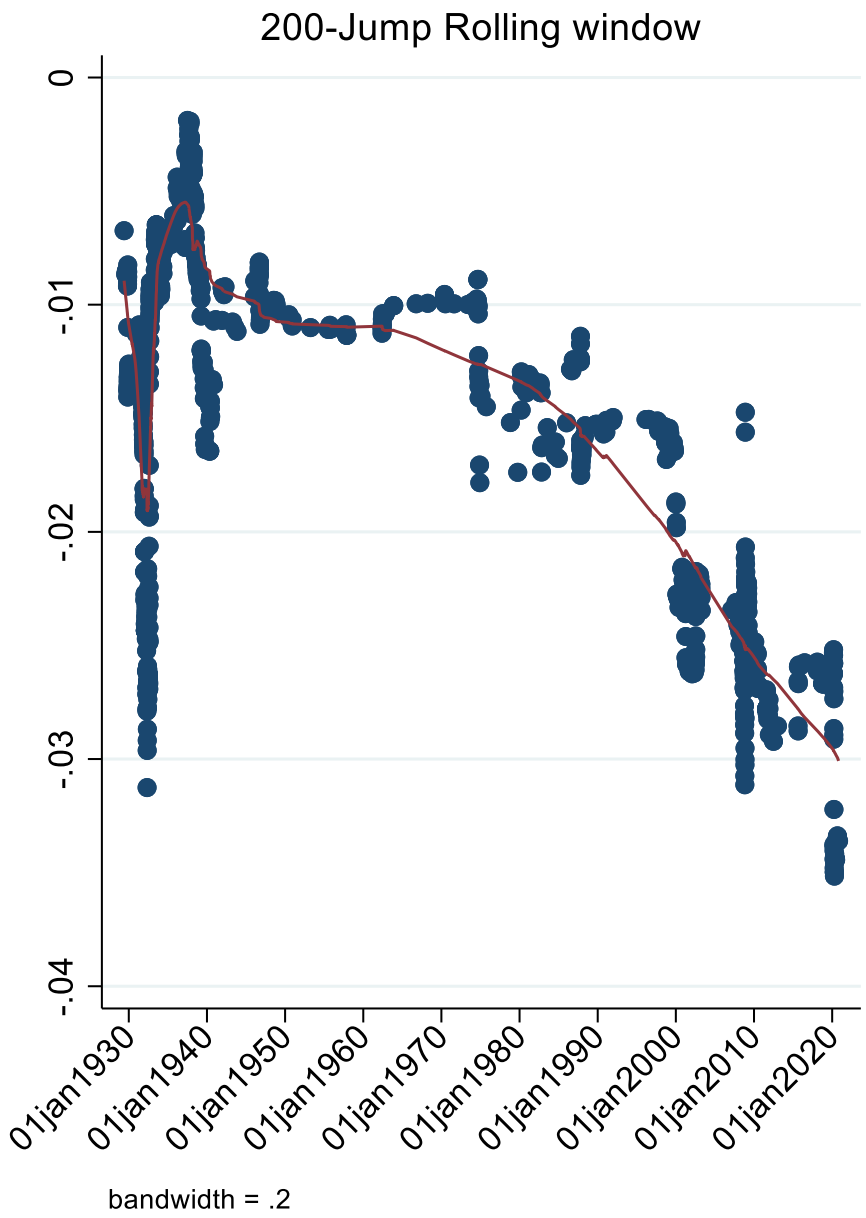
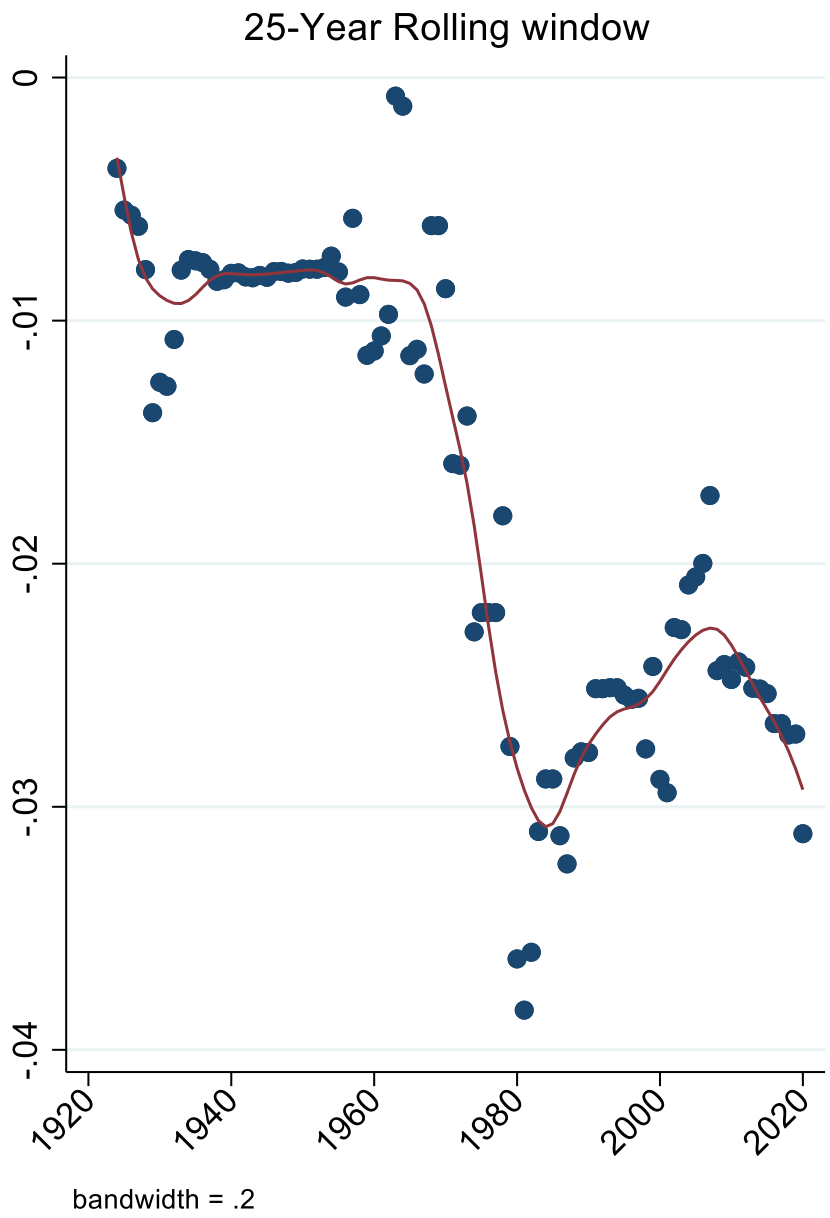
Figure 13: Movements in Clarity Tend to Persist, U.S. Data from 1980 to 2020



Notes: The left panel shows a binscatter (n=20) of Clarity of the next jump against Clarity of the current jump. The right panel shows a binscatter using Clarity values that are residualized on the current-day returns, split into positive and negative pieces, and HAR controls (volatility over the day, week and month before the current jump), the 17-way classification of the current jump, the 17-way classification of the next jump, a dummy variable for pre vs. post-World War II, a linear time trend, and the interaction between the time trend and the postwar dummy variable.

Figure 8: Countercyclicality of Fiscal and Monetary Policy Jumps, U.S. Data from 1900 to 2020





Notes: Fiscal policy is defined as the sum of government spending and taxes. Estimates from rolling regressions, where the left-hand-side variable is $return_t \times (Fiscal_t + Monetary_t)$. The right-hand-side variable is the cumulative returns on the aggregate stock market over the previous 66 trading days. The left panel runs these regressions in 200-jump rolling windows, while the right panel runs these regressions in 25-year rolling windows. The blue dots represent the point estimates, while the red lines represent a lowess filter applied to the point estimates with a bandwidth equal to 20% of the whole sample.

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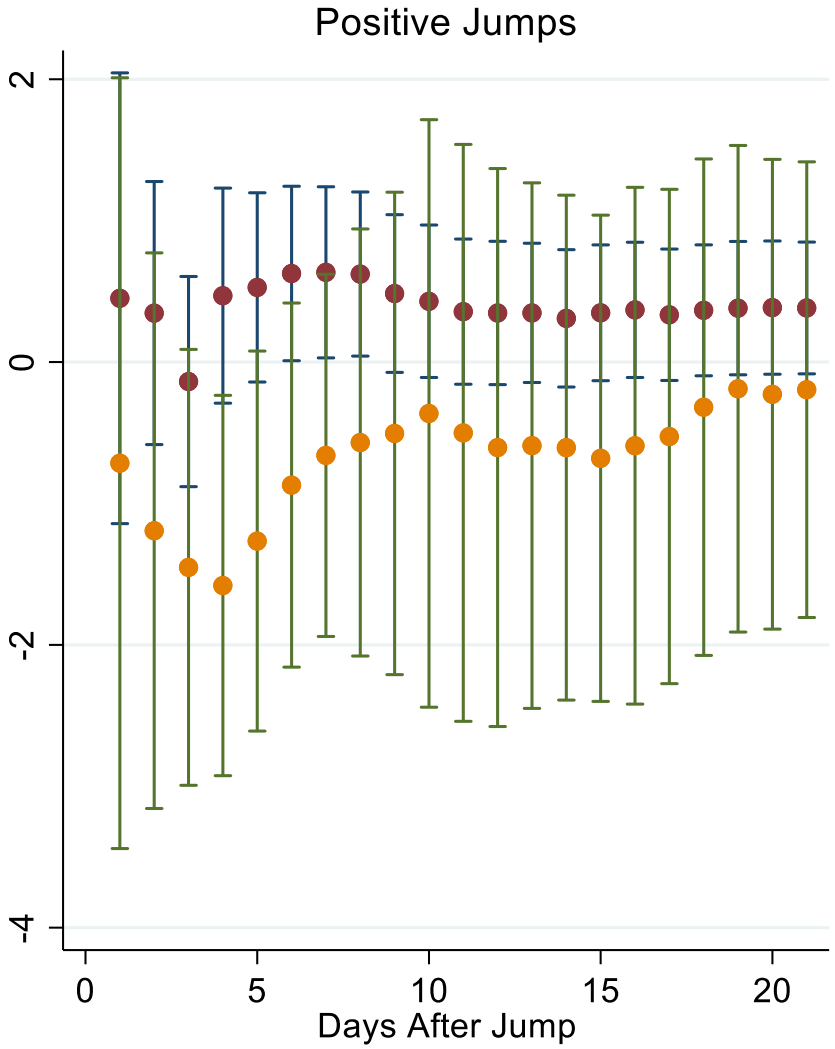
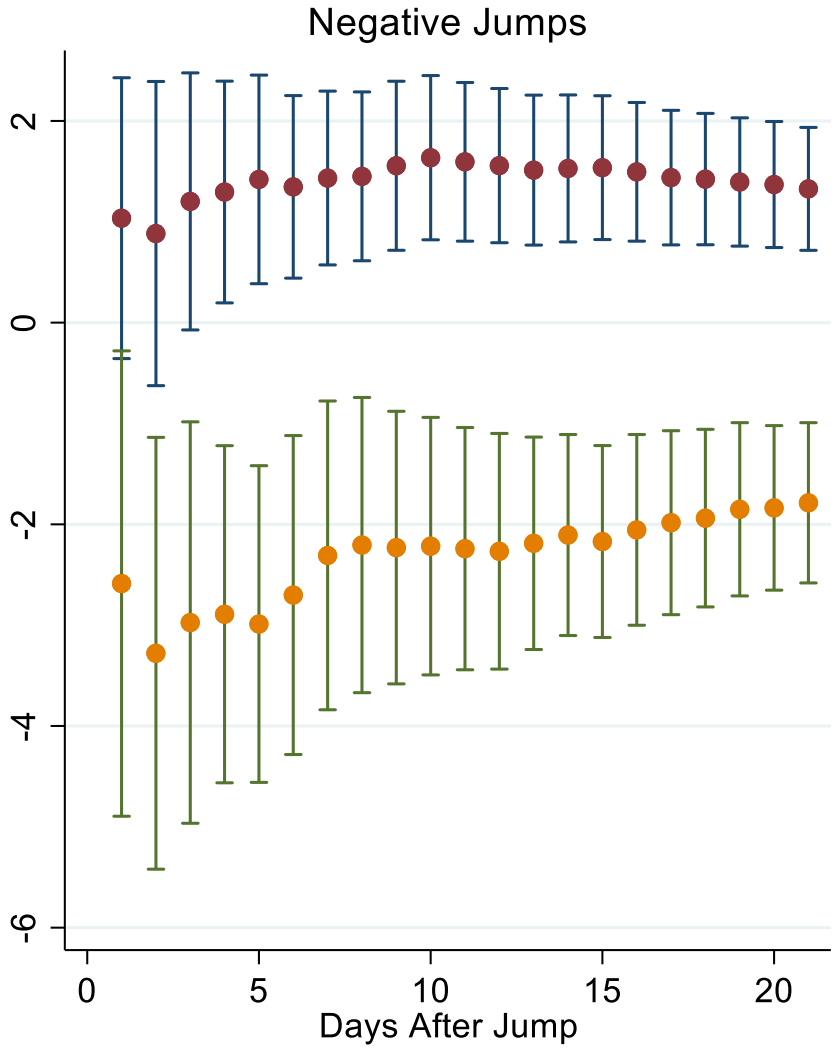
Figure A9: Volatility after Positive and Negative Jumps, Jumps Attributed to Monetary Policy and All Other News Compared, U.S. Data from 1900 to 2020

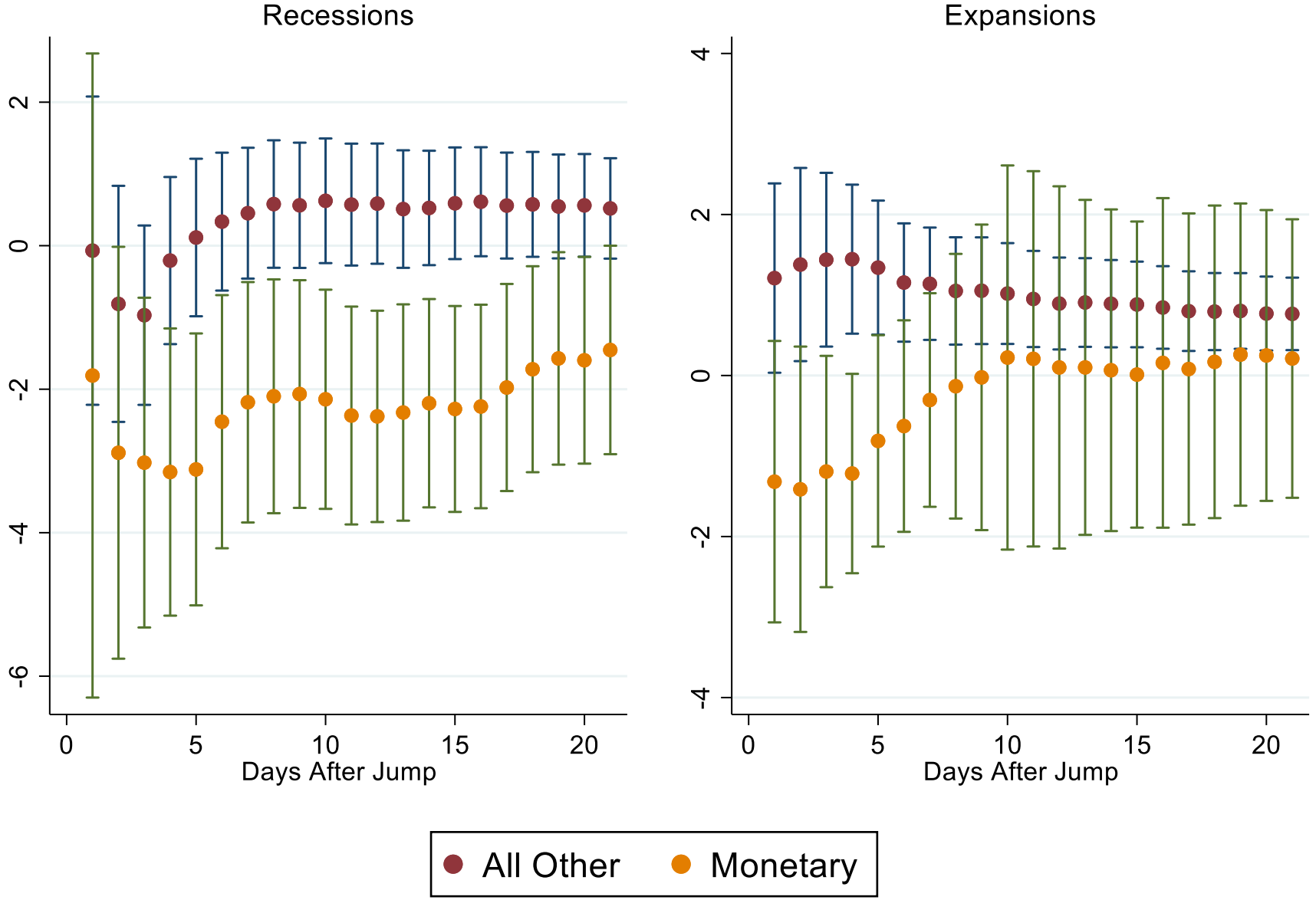




Notes: Volatility is the average squared percentage return over the next *n* days after a jump day. To construct the plots, we regress volatility on four jump-type indicators (positive and negative jumps attributed to Monetary Policy, and positive and negative jumps attributed to "All Other" news) and include controls for volatility over the day, week and month prior to the jump day (HAR controls). The 95 percent confidence intervals reflect Newey-West standard errors with lags errors with lags equal to 1.5 times *n*.

Bars represent a 95% confidence interval around the point estimate

Figure A10: Volatility after Jumps during Recessions and Expansions, Jumps Attributed to Monetary Policy and All Other News Compared, U.S. Data from 1900 to 2020



Notes: Volatility is the average squared percentage return over the next *n* days after a jump day. To construct the plots, we split the sample of jump days into recession and expansion periods. For each subsample, we regress we regress volatility on jump-type indicators for Monetary Policy and All Other and include controls for the jump-day return, split into positive and negative components, and volatility over the day, week and month prior to the jump day (HAR controls). The 95 percent confidence intervals reflect OLS standard errors.

Bars represent a 95% confidence interval around the point estimate

Table A4: Jump Counts by Sign, Category, Asset Class, and Period for the United States

	1900-1979		1980-2020		Bonds	
	Positive	Negative	Positive	Negative	Positive	Negative
Policy	**161**	**152**	**71**	**36**	**249**	**240**
Sovereign Military & Security Actions	33	65	5	6	14	5
Monetary Policy & Central Banking	30	16	29	9	169	164
Government Spending	36	12	18	10	41	38
Regulation	20	25	2	1	0	2
Taxes	7	9	4	0	16	8
All Other Policy	34	26	12	9	9	24
Non Policy	**134**	**185**	**76**	**132**	**554**	**517**
Macroeconomic News & Outlook	68	79	43	79	497	494
Corporate Earnings & Outlook	33	44	23	26	16	4
Commodities	24	34	2	4	12	4
All Other Non-Policy	8	27	9	22	29	15
All Categories	372	430	166	184	907	851

Notes: Table entries report the number of negative and positive jumps in the indicated categories. The first four columns pertain to daily jumps in the U.S. stock market, and the last two columns pertain to daily jumps in U.S. bond market markets from 1969 to 2020, as defined by yield changes greater than 15 basis points on 10-year U.S. Treasury securities. The “All Categories” row includes jumps attributed to “Unknown and No Explanation Offered” and those for which we find no next-day newspaper article.