High-Frequency Cross-Sectional Identification of Fiscal News Shocks

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Motivation

Defense spending is back

- Global military spending at a record ∼**$2.9tn in 2025** — the 11th consecutive rise
- NATO's 2025 Hague summit: members pledge toward **5% of GDP** on defense **by 2035**
- Ex. **US**: 2026 Pentagon's budget crosses ∼$1tn; **EU**: "*ReArm Europe*" ∼€800bn; **Germany**: €100bn *Zeitenwende* fund, **Poland** ∼4.7% of GDP (2025), **Japan**: ∼$300bn 5-y plan (2022)

Governments are committing to large, *anticipated* build-ups

How does the economy respond to *expected* changes in spending?

We look where **expectations** *strike first*: defense contractors' equity prices

Why Defense?

Economists are interested in defense spending...

- **Exogenous variation** in government spending (causal inference)
- (Fiscal) Multipliers of **military build-ups** (policy relevance)

... but there are well-known **identification challenges**:

- Spending effects are anticipated (Ramey, 2011; Mertens & Ravn, 2010)
- Measuring expectations is *tricky*

This paper takes a serious look at these issues, asking:

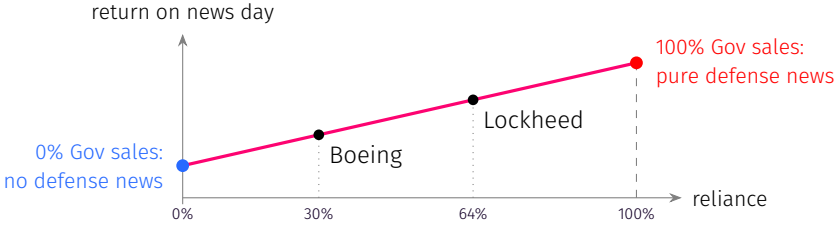
1. How can we measure expectations shocks in defense spending?
2. What impact do these expectations have on the economy?

"*The news over the weekend that the Pentagon is contemplating deeper spending cuts yesterday sent investors bailing out [...] The only major contractor to buck the trend was the Boeing Company, which relies on commercial aircraft orders for more than 70 percent of its sales [...] Most of the companies whose stocks were hit the hardest rely heavily or exclusively on Pentagon contracts.*"

— *The New York Times*, November 21, 1989, on Dick Cheney's budget cuts

THE IDEA: RETURNS REVEAL THE SHOCK

1. News about defense spending revises contractors' **expected profits**
2. The more a firm sells to the Government (**reliance**), the more its price moves
3. Heterogeneous exposure $\Longrightarrow$ Heterogeneous returns $\Longrightarrow$ **Cross-section reveals the news**



BEYOND DEFENSE: ANY SHOCK HITTING UNITS WITH HETEROGENEOUS EXPOSURE

Contribution: HFXS Identification; Theory & Empirics

New 2-step methodology to measure **news shocks**:

i. **Identify** HF-fiscal events through price movements (the event "radar")

ii. Leverage stocks XS-variation to **quantify** shifts in expected defense spending

→ Advantages:

i. **Model-implied**: parsimonious & grounded in asset pricing theory

ii. **Self-validating**: *estimates* & validates events, shocks **without narrative analysis**

iii. **Generalizable** to any context w/ units heterogeneously impacted by aggregate shocks

→ This paper's deliverables:

i. **Identification**: new **defense news shocks series**, 1960–2024

ii. **Application**: a long-run **spending multiplier** of about 1

The Literature: A Panorama

- **Forward Looking measures** of government spending shocks
  - **Narrative IV**: Ramey and Shapiro (1998), Ramey, 2011; Ramey and Zubairy, 2018, Ben Zeev and Pappa (2017)

  → Rely on subjective judgment ⟶ We read news off prices

  - **Stock-Price-Based IV**: Fisher and Peters (2010), McClure and Yding (2024)

  → An index of the largest contractors ⟶ We exploit the cross-section

  - **Stock-price responses**: Gorodnichenko and Weber (2016), Ozdagli and Weber (2017), Belo, Gala and Li (2013)

  → Take the shock as given ⟶ We estimate the shock

- **Fiscal Multiplier Literature**
  - **HF Identification:** Bandeira et al. (2025), Wiegand, 2025; Gomez-Cram et al., 2025; Hazell and Hobler, 2025
  - **TS multiplier:** Blanchard and Perotti (2002), Mountford and Uhlig (2009), Barro and Redlick (2011)
  - **XS multiplier**: Nakamura and Steinsson (2014), Auerbach et al. (2020)

HFXS Framework & Identification

a toy model
the general case

A Simple Model of Stock Prices

- Gordon (1959): model the stock price of firm j at time t as:

$$P_{j,t} := \sum_{h=1}^{\infty} \frac{D^e_{j,t+h}}{\Pi_{k=1}^{h}(1 + i^e_{t,t+k})}$$

  - $D^e_{j,t+k}, i^e_{t,t+k}$ are the expected $(t+k)$ profits and interest rate at time t

- Profits $D_{j,t}$ are

$$D_{j,t} := (1 - \tau_t) \cdot \underbrace{(V_{j,t} + G_{j,t})}_{\text{Total Sales}} \cdot \left(1 - \frac{1}{\mu_j}\right)$$

  - $V_{j,t}$ is commercial (non-government) sales
  - $G_{j,t}$ is government sales
  - μ_j is the markup; τ_t is a corporate tax

- Assume:

  i. Expected profits are proxied by current profits

  ii. Expectations hypothesis of the term structure holds

Then

$$P_{j,t} = \frac{D_{j,t}}{i_t} = \frac{1}{i_t} \cdot \underbrace{(1-\tau_t) \cdot (V_{j,t} + G_{j,t}) \cdot \left(1 - \frac{1}{\mu_j}\right)}_{D_{j,t}} \tag{1}$$

$\longrightarrow$ Contractors' stock prices are proportional to Government sales

- Focus on cross-section (XS) of contractors j

$$P_j = \frac{1}{i} \cdot (1-\tau) \cdot (V_j + G_j) \cdot \left(1 - \frac{1}{\mu_j}\right)$$

- Denote Reliance on G by $\lambda_j := \frac{G_j}{G_j+V_j}$ and log-Differentiate around an event:

$$d\log P_j = c + \lambda_j \cdot d\log G^e + (1-\lambda_j) \cdot d\log V^e + \varepsilon_j$$

$\lambda_j = 0$: Commercial news $\quad$ $\lambda_j = 1$: Defense news

$$\underbrace{d\log P_j}_{\text{OBSERVED}} = \underbrace{c + d\log V^e}_{\text{ESTIMATED: } \hat{\alpha}} + \underbrace{\lambda_j}_{\text{OBSERVED}} \cdot \underbrace{\left(d\log G^e - d\log V^e\right)}_{\text{ESTIMATED: } \hat{\gamma}} + \varepsilon_j \tag{2}$$

  - α: common news (rates, taxes, commercial demand $d\log V^e$)
  - ε_j: firm news (markups, firm-specific news)

Theorem (HFXS Identification) Assumptions Proof Generalization

Regress returns $d \log P_j$ on reliance λ_j across contractors:

$$d \log P_j = \alpha + \boldsymbol{\gamma} \cdot \lambda_j + \varepsilon_j \tag{3}$$

Then, as the number of contractors grows,

$$\hat{\boldsymbol{\gamma}}_{\text{OLS}} \xrightarrow{p} d \log G^e - d \log V^e \qquad \& \qquad \hat{\boldsymbol{\alpha}}_{\text{OLS}} \xrightarrow{p} d \log V^e$$

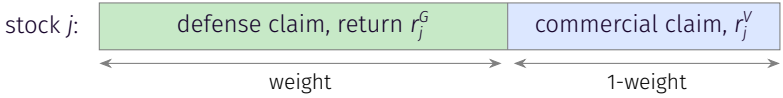
Corollary: $\hat{\boldsymbol{\alpha}}_{\text{OLS}} + \hat{\boldsymbol{\gamma}}_{\text{OLS}} \xrightarrow{p} d \log G^e$, the revision in expected defense spending

Idea: OLS recovers the shock given the exposures

a pure commercial firm ($\lambda = 0$): $\hat{\alpha}$ a pure contractor ($\lambda = 1$): $\hat{\alpha} + \hat{\gamma}$

Beyond Gordon: Each Stock Is a Portfolio of Two Claims

- Any asset-pricing model: $P_j = \sum_{h\geq 1} \mathbb{E}\left[m_h D_{j,h}\right]$ (**SDF** m; Gordon: $m_h = (1+i)^{-h}$)
- Split D by sales line: each stock holds a **defense claim** and a **commercial claim**



- If a dollar has the same equity value across claims, λ_j *is* **defense weight** in the stock

the stock's return: $$\underbrace{r_j}_{d\log P_j} = \lambda_j r_j^G + (1-\lambda_j) r_j^V$$

each claim's return, $X \in \{G, V\}$: $$r_j^X = \underbrace{\nu^X}_{\text{"X" NEWS}} + \underbrace{(b_j^X)'f}_{\substack{\text{EXPOSURES} \times \text{FACTORS} \\ \text{e.g. beta} \times \text{market fall}}} + \underbrace{\varsigma_j^X}_{\text{FIRM NEWS}}$$

The general case buys model-implied controls: a multivariate regression

weighting the two claims: $r_j = \underbrace{\nu^V}_{\alpha} + \underbrace{\left(\nu^G - \nu^V\right)}_{\gamma} \cdot \lambda_j + \underbrace{b_j' f}_{\text{OTHER FACTORS}} + \varepsilon_j$

Theorem (HFXS Identification, General Case) Assumptions Proof Generalization

Regress returns r_j on reliance λ_j and pre-event betas $\boldsymbol{\beta}_j$ across contractors:

$$r_j = \alpha + \boldsymbol{\gamma} \cdot \lambda_j + \boldsymbol{\varphi}' \boldsymbol{\beta}_j + \varepsilon_j \tag{4}$$

Then, as the number of contractors grows,

$$\hat{\boldsymbol{\gamma}}_{\text{OLS}} \xrightarrow{p} \nu^G - \nu^V \qquad \& \qquad \hat{\boldsymbol{\alpha}}_{\text{OLS}} \xrightarrow{p} \nu^V$$

COROLLARY: $\hat{\boldsymbol{\alpha}}_{\text{OLS}} + \hat{\boldsymbol{\gamma}}_{\text{OLS}} \xrightarrow{p} \nu^G$ (DEFENSE NEWS)

XS PRICES THE DEFENSE SHOCK NET OF OTHER SHOCKS HITTING FIRMS UNEVENLY

Data & Measurement: From Events to a *Radar*

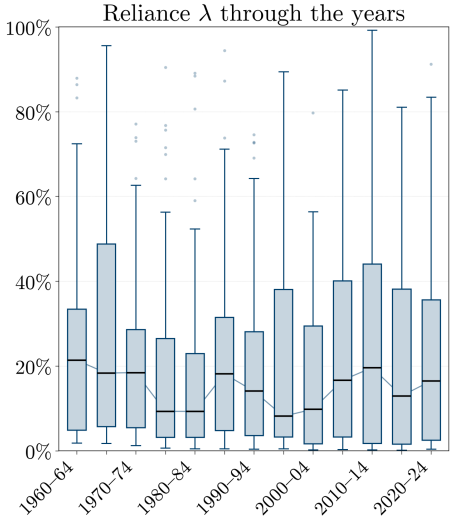
contractors
the daily regression
case studies
the radar

- DoD *Top 100 Reports*, FY1958–2024, digitized

⟶ Universe: 224 publicly traded contractors
  - CRSP–Compustat match, **lineage** built

- **Reliance** $\lambda_{j,s} = \frac{G_{j,s}}{G_{j,s}+V_{j,s}}$: DoD obligations / sales

⟶ Sample: 147 contractors, FY1961–2024
  - with reliance and betas; ∼42 a year
  - median reliance 14%, IQR 4–35%



For every trading day t, one cross-section of contractors j:

$$\underbrace{r_{j,t}}_{\text{DAILY EXCESS RETURN}} = \alpha_t + \underbrace{\gamma_t}_{\text{DEFENSE FACTOR}} \cdot \underbrace{\lambda_{j,s}}_{\text{RELIANCE}} + \underbrace{\varphi_t' \beta_{j,s}}_{\text{CONTROLS}} + \varepsilon_{j,t}$$

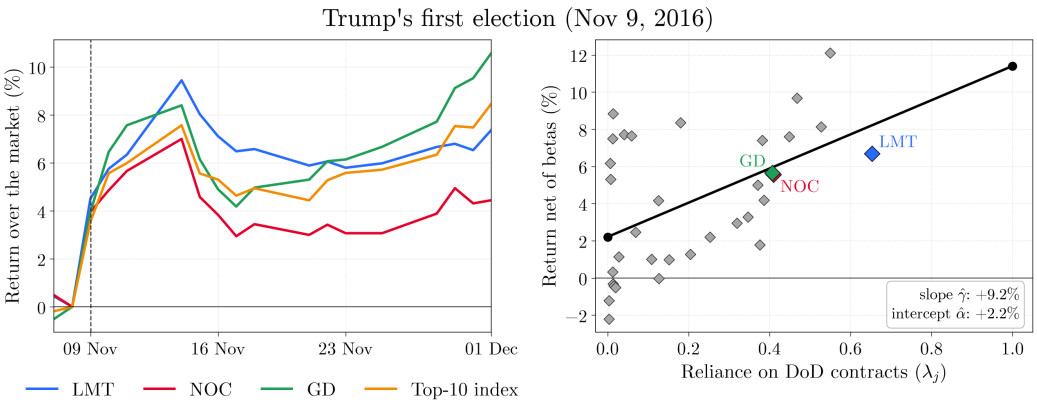
OBSERVED ESTIMATED EACH DAY

- **Observed** loadings: reliance, and $\beta_{j,s}$: **market**, **airline**, **duration** betas from year $s-1$
- Theorem: $\hat{\alpha}_t$ is commercial news, $\hat{\alpha}_t + \hat{\gamma}_t$ the **defense news**

LET'S SEE HOW THE HFXS METHOD DOES ON EVENTS WE HAVE A PRIOR ON

Example 1: Trump Election (2016Q4)

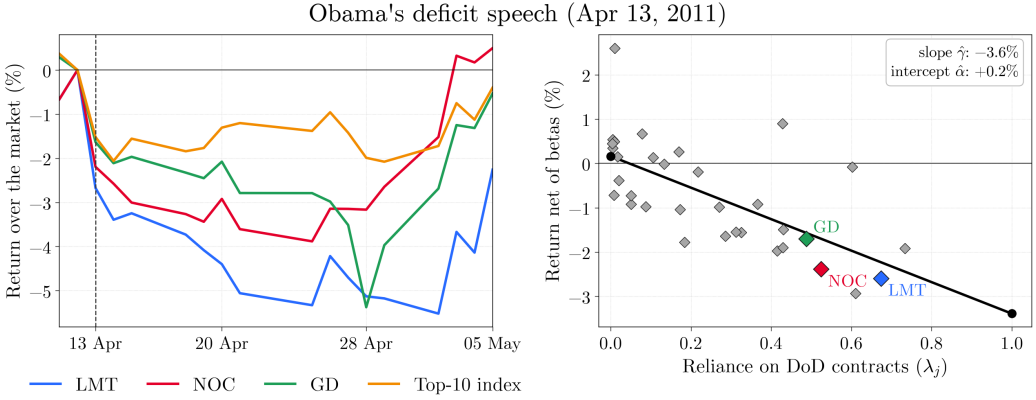
Trump campaigned on "*Peace through Strength*" $\Longrightarrow$ expect a positive shock



Estimated defense news shock $(\hat{\gamma} + \hat{\alpha})$: +11.4% (4.8)

Example 2: Obama's Deficit Speech (2011Q2)

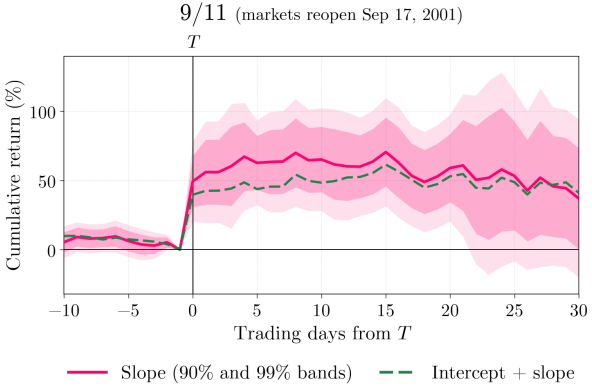
$400bn of security savings by 2023 $\Longrightarrow$ expect a NEGATIVE shock



Estimated defense news shock ($\hat{\gamma} + \hat{\alpha}$): -3.4% (1.0)

9/11: the Slope and the Intercept

On Sep 17, 2001, defense and commercial demand moved in *opposite* directions



- **Slope**: +49.2%, defense rises sharply
- **Intercept**: −9.6%, market & airlines fall
- **Intercept + slope**: +39.6%, the largest

The intercept "cleans" the common fall: defense news = intercept + slope

Estimates of HFXS Defense News Shocks

Event	Shock Trading Date	Expected Sign	d log G_t^e (%)	p-value	N	Defense Index
U-2 Spy Plane Shot Down over the USSR	May 9, 1960	+	+19.0	0.000	40	+3.9%
Soviet Tanks Leave Checkpoint Charlie	Oct 30, 1961	−	−6.6	0.005	40	−1.9%
Kennedy's FY1963 Defense Budget	Jan 11, 1962	+	+13.6	0.000	40	+1.5%
Nuclear Test Ban Treaty Talks Open	Jul 15, 1963	−	−14.2	0.000	47	−2.4%
Johnson Asks Contractors to Cut Costs	Dec 2, 1963	−	−9.5	0.000	47	−2.3%
Vietnam Escalation: McNamara to Saigon	Jul 13, 1965	+	+16.7	0.000	49	+2.9%
Congress Passes the FY1968 Defense Bill	Sep 12, 1967	−	−10.0	0.000	50	−3.1%
Iran Hostage Crisis Turns Military	Nov 20, 1979	+	+22.3	0.000	58	+5.4%
Soviet Invasion of Afghanistan	Dec 26, 1979	+	+21.1	0.000	58	+1.9%
Reagan Elected President	Nov 5, 1980	+	+11.5	0.000	54	+6.1%
Gramm–Rudman–Hollings Deficit-Cut Bill	Sep 9, 1985	−	−18.3	0.000	46	−1.1%
Cheney Orders $180bn in Defense Cuts	Nov 17, 1989	−	−13.9	0.003	50	−5.7%
9/11 Terrorist Attacks	Sep 17, 2001	+	+39.6	0.001	27	+8.5%
Obama's Deficit Speech	Apr 13, 2011	−	−7.9	0.000	33	−1.8%
Pentagon Cutbacks Ahead of Sequestration	Jan 10, 2013	−	−17.8	0.000	27	−0.6%
Trump Elected President	Nov 9, 2016	+	+13.3	0.005	34	+5.6%
U.S. Warns of Imminent Invasion of Ukraine	Feb 11, 2022	+	+10.6	0.003	30	+2.3%

Expected sign: RZ's shock. $d \log G_t^e$: mean cumulative slope after the shock (9/11: intercept + slope). p: HC1, firms clustered; N: firms.
Defense Index: five-session return over the market of the previous year's ten largest contractors, equal weights (1960–2024 10th/90th pct.: −2.0%, +2.2%).

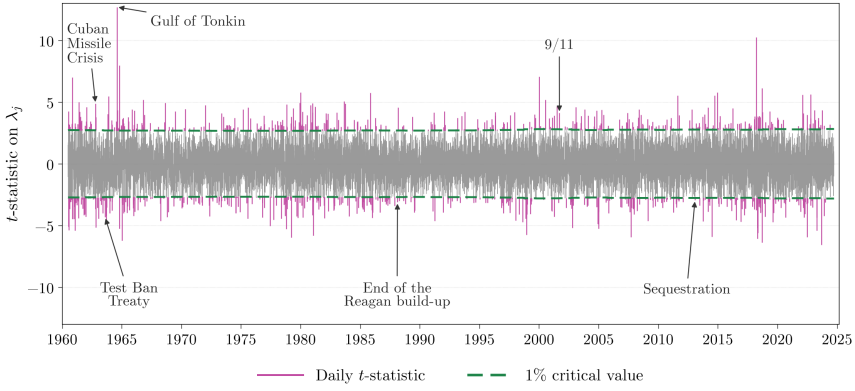
(i) expected signs (ii) sensible sizes (iii) sharper than a contractor index

HFXS Identification:

A Radar for Fiscal News

► click *anywhere* to play · Adobe Acrobat only

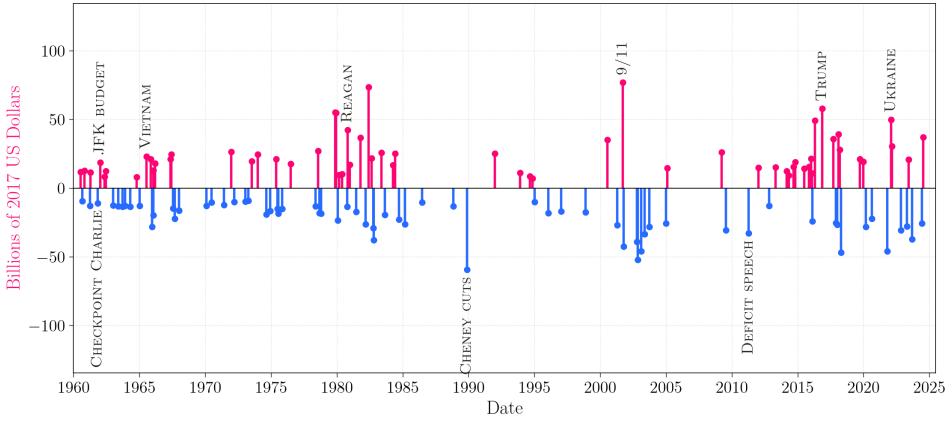
Every Trading Day: the Radar



Self-validating: test $H_0 : \gamma_t = 0$ → reject $\Longrightarrow$ candidate event; not reject $\Longrightarrow$ *non-event*

Spikes beyond the 1% bars cluster on geopolitical and budget events

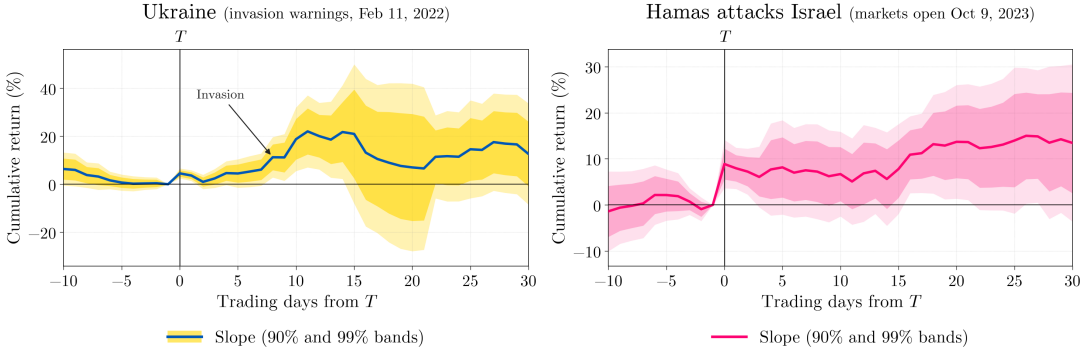
From Radar Spikes to Shocks, 1960–2024



Neighbouring spike days merge into one episode; episodes whose move beats placebo windows and passes the rule become shocks: 126 in all.

Each shock maps into billions of dollars of expected defense spending

No record after 2015: does the radar find the news?



The radar finds the news

Results: News, Spending and GDP

forecasts
instrument power
multipliers

Is the Factor News about Future Spending?

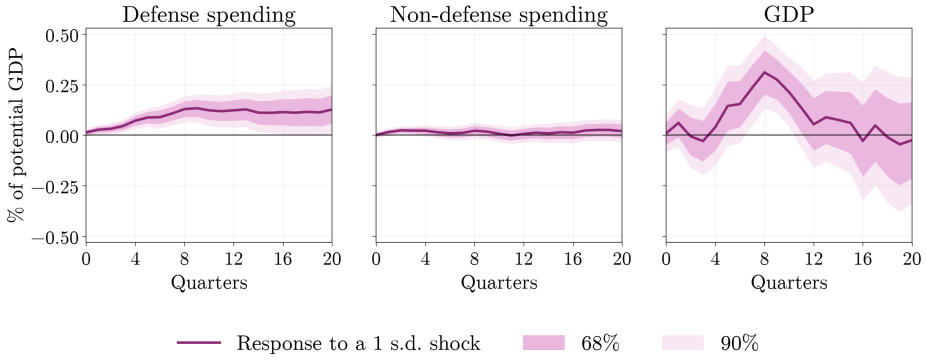
- **Why**: news about future spending must come **before** spending, forecasts and narratives
- **Test**: does the factor predict them, and do they predict the factor?

	Variable	Factor predicts it?	It predicts the factor?
spending	Defense spending growth	Yes	No
forecast	SPF expected government spending	Yes	No
other shock series	Ramey–Zubairy defense news	Yes	No
	Fisher–Peters contractor index	Yes	No

Bivariate Granger tests, quarterly, four lags; every "yes" at $p < 0.03$, every "no" at $p \geq 0.21$

Our series predicts spending, forecasts and other shock series

Does the HFXS series move defense spending, and then GDP?

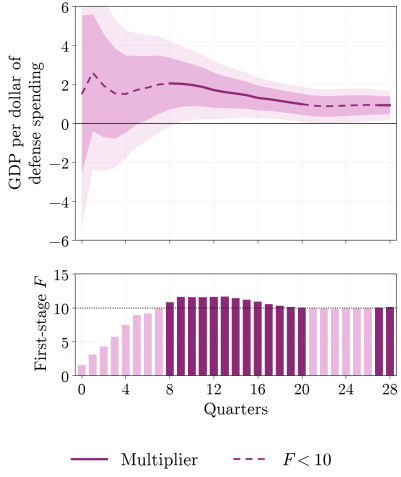


HFXS series summed by quarter; LPs with four lags of the outcome, the series and the T-bill rate; 1961Q3–2024Q3

Specification

Instrument does predict Defense spending! + has expansionary effects

$$\sum_{h=0}^{H} y_{t+h} \;=\; \mathcal{M}_H \sum_{h=0}^{H} g^{def}_{t+h} \;+\; \Phi_H(L)\, \boldsymbol{x}_{t-1} \;+\; \varepsilon_{t,H}$$



- y: GDP; g^{def}: defense spending, instr. by z, the monthly HFXS series
- $\boldsymbol{x}$: four lags of y, g^{def}, g^{nd}, z and the T-bill rate i
- Multiplier: ≈ 2 at 2 years, ≈ 1 from year 5
- First-stage F: 9.9–11.7 Vs. RZ, F&P

Conclusions

beyond defense

takeaways

- New **methodology**: news shocks identified from the cross-section of stock returns
  - **Estimate & test** shocks from the data: asset-pricing HFXS regressions, daily
  - **Self-validating**: sign & significance
  - \+ **Generalizable** to any aggregate shock with observable, heterogeneous exposure

- Detection & Measurement: a daily defense factor and a radar-detected series
  - Prices date news earlier, and catch shocks the narrative record misses

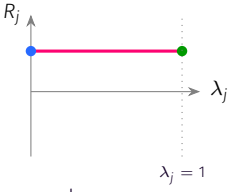
- Effects: the factor **leads** spending, forecasters, other shocks series
  - HFXS series raises defense spending and GDP
  - Short/Long Run spending multiplier of about 2/1

Appendix

Reading an Event: Four Cases

Defense news needs a slope and a move of the pure contractor at $\lambda_j = 1$

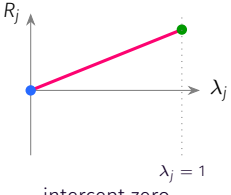
All firms alike



slope zero

common news: out

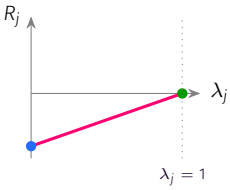
Defense news



intercept zero

size = slope

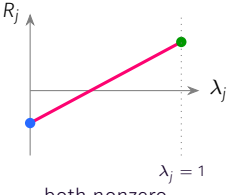
Commercial news



pure contractor at zero

commercial news: out

Both



both nonzero

size = intercept + slope

The rule: $\hat{\gamma}$ n.s. $\Longrightarrow$ no event $\quad$ $\hat{\alpha}$ n.s. $\Longrightarrow \hat{\gamma}$ $\quad$ both sig. $\Longrightarrow \hat{\alpha} + \hat{\gamma}$ if sig.

The slope finds the event; intercept + slope sizes it

- Shock in \$bn = size × that year's obligations ÷ deflator:

$$\underbrace{\text{Shock}_t}_{\text{bn 2017\$}} = \text{Size}_t \cdot \underbrace{G_s^{\text{nom}}}_{\text{nominal \$bn}} \cdot \underbrace{\frac{100}{p_t}}_{\text{to 2017\$}}$$

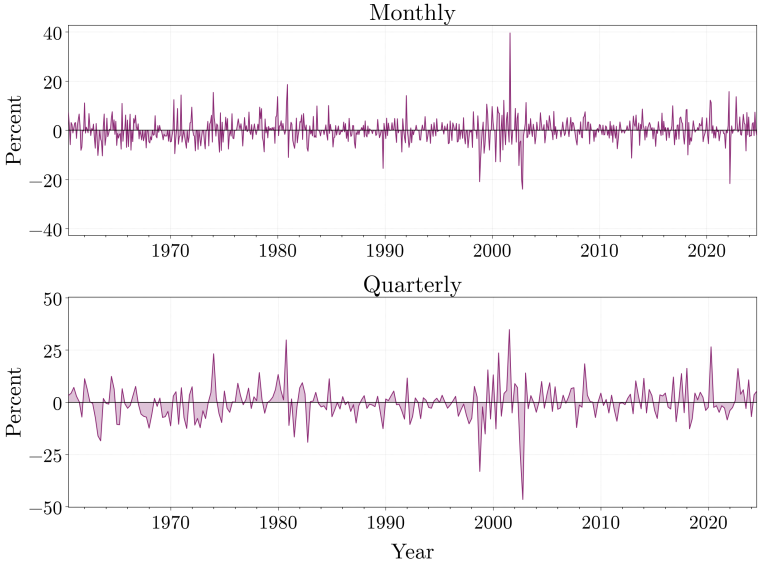
  - G_s^{nom}: total DoD prime obligations in fiscal year s (Top 100 reports: obligations ÷ share)
  - p_t: GDP deflator, 2017 = 100

→ **Worked example — Trump's election (Nov 2016)**: size = 13.3%, $G_{2017}^{\text{nom}} \approx$ \$321bn, $p = 98.9$

$$0.133 \times \frac{321}{0.989} \approx \$\,43 \text{ bn (2017)}$$

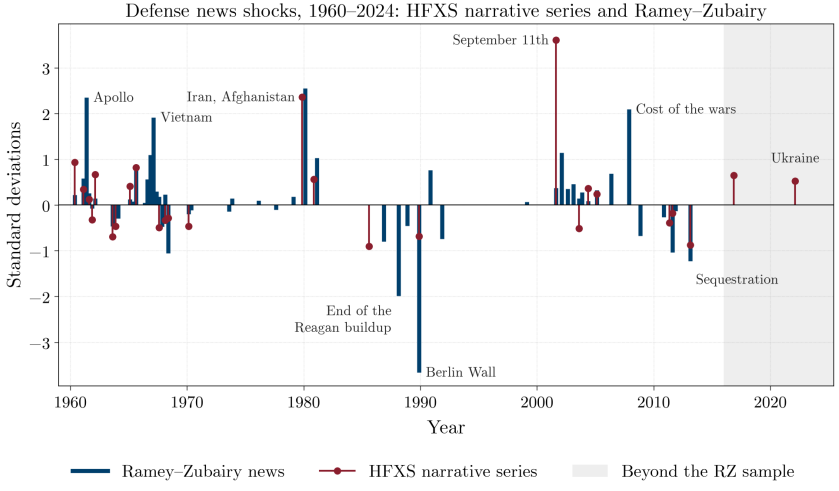
The Defense Factor, 1960–2024

Back



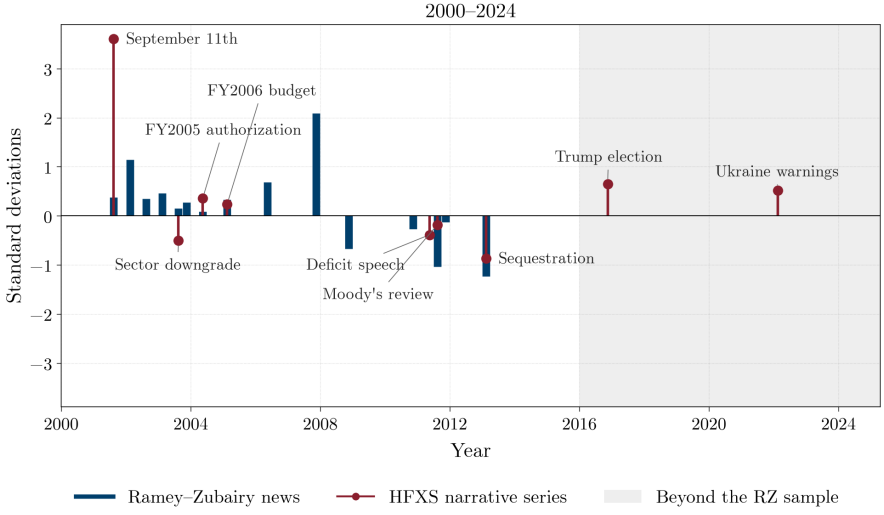
Each day: $\hat{\gamma}_t$ if significant, $\hat{\alpha}_t + \hat{\gamma}_t$ when the intercept is significant too and the sum is significant ($|t| \geq 2.5$); summed within months and quarters

Each tested event becomes one observation: a narrative series built from prices



HFXS narrative series: 27 events (26 quarters); RZ news for comparison; both in s.d. of their nonzero quarters

2000–2024 up close: which events the market priced, and when

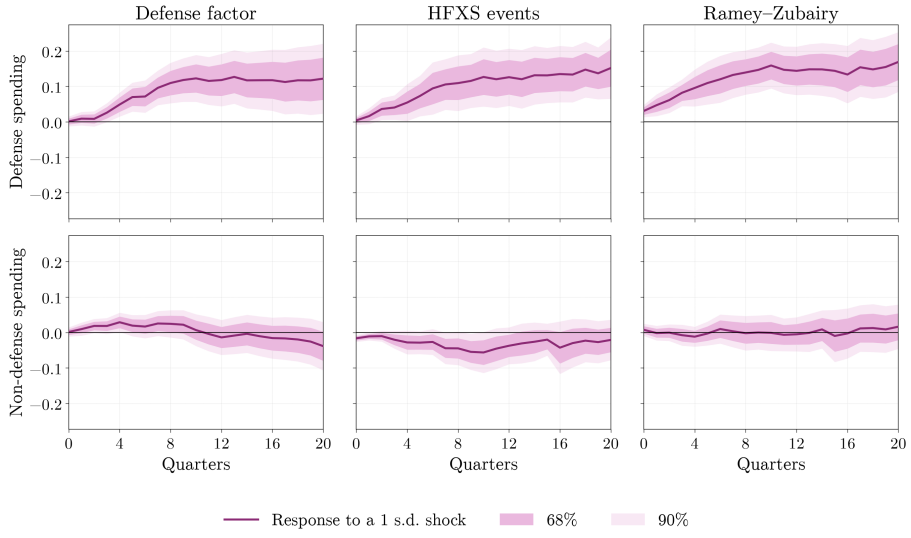


Narrative-Validated Events, 2001–2024

Anchor	Historical Context	Size (%)	RZ Quarter
Dated in the narrative record (to 2015)			
17 Sep 2001	Attacks of September 11th; markets reopen	+73.5	2001q3
23 Sep 2003	Smith Barney cuts the defense sector before the open	−10.4	2003q3
18 May 2004	The House takes up the FY2005 authorization	+7.3	2004q2
7 Feb 2005	The FY2006 budget and the coming supplemental	+4.8	2005q1
13 Apr 2011	The President's deficit speech ($400bn security savings)	−7.9	2011q3
14 Jul 2011	Moody's review; the President's news conference	−3.7	2011q3
10 Jan 2013	Pentagon's precautionary measures for sequestration	−17.8	2013q1
After 2015: no narrative record			
9 Nov 2016	Trump wins campaigning on a military build-up	+13.3	—
11 Feb 2022	Warnings of an imminent invasion of Ukraine	+10.6	—

Notes: Size: plateau of the cumulative defense factor after the anchor. Out by the rule: CBO's estimate of the cost of occupying Iraq (Oct 2003) and the Senate's FY2018 NDAA votes (Sep 2017).

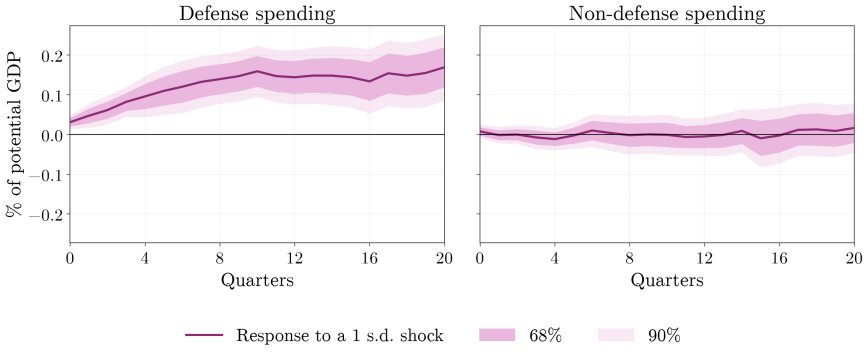
IRFs: Defense Factor, HFXS Narrative Series, RZ



LPs with GDP, defense, non-defense spending, T-bill; 1 s.d. shock; HFXS events: the narrative-validated series; RZ: Ramey–Zubairy news

Comparison with Ramey–Zubairy: the Same System

Back



RZ news, 1961–2015: a defense response **of the same shape** as the factor's

Back

Start from the present value $P_{j,t} = \sum_{h\geq 1} D^e_{j,t+h} \Big/ \prod_{k=1}^{h}(1+i^e_{t,t+k})$

1. Assumptions (i)–(ii) $D^e_{j,t+h} = D_{j,t}, \qquad \prod_{k=1}^{h}(1+i^e_{t,t+k}) = (1+i_t)^h$ for every $h \geq 1$
2. Substitute, with $q := \frac{1}{1+i_t}$ $P_{j,t} = D_{j,t} \cdot S, \qquad S := \sum_{h\geq 1} q^h = q + q^2 + q^3 + \ldots$
3. The sum repeats itself $S = q\left(1 + \underbrace{q + q^2 + \ldots}_{S}\right) = q\,(1+S) \implies S = \dfrac{q}{1-q}$
4. Simplify $\dfrac{q}{1-q} = \dfrac{1/(1+i_t)}{i_t/(1+i_t)} = \dfrac{1}{i_t}$

$$P_{j,t} = \frac{D_{j,t}}{i_t}$$ current profits capitalized at the rate

Proof (1/2): From Prices to Returns

Start from $P_j = \frac{1}{i}(1-\tau)(G_j + V_j)\left(1 - \frac{1}{\mu_j}\right)$, reliance $\lambda_j := \frac{G_j}{G_j+V_j}$

1. Log-differentiate $d\log P_j = \underbrace{-d\log i + d\log(1-\tau)}_{c} + \underbrace{\lambda_j\, d\log G_j^e + (1-\lambda_j)\, d\log V_j^e}_{d\log(G_j+V_j)} + d\log\left(1-\frac{1}{\mu_j}\right)$
2. Aggregate + firm news $d\log G_j^e = d\log G^e + d\log\omega_j^e \quad (\omega_j := G_j/G), \qquad d\log V_j^e = d\log V^e + \tilde{v}_j$
3. Collect firm news $\varepsilon_j := \lambda_j\, d\log\omega_j^e + (1-\lambda_j)\,\tilde{v}_j + d\log\left(1-\frac{1}{\mu_j}\right)$
4. Substitute $d\log P_j = c + \lambda_j\, d\log G^e + (1-\lambda_j)\, d\log V^e + \varepsilon_j$
5. Rearrange $d\log P_j = \underbrace{c + d\log V^e}_{\alpha} + \lambda_j \underbrace{\left(d\log G^e - d\log V^e\right)}_{\gamma} + \varepsilon_j$

PROOF (2/2): ASSUMPTIONS AND THE OLS LIMITS

A1 **Firm news is unrelated to reliance** $\mathbb{E}[\varepsilon_j \mid \lambda_j] = 0$; firms independent; $\mathrm{Var}(\lambda_j) > 0$

A2 **No interest-rate or tax news in the window** $c = 0$ (used for the intercept only)

Firm news ε_j: markup news, news on the firm's DoD share $d\log\omega_j^e$, firm-specific commercial news $\tilde{v}_j$

Regress $d\log P_j = \alpha + \gamma\,\lambda_j + \varepsilon_j$ across N contractors (bars: cross-sectional means)

Slope
$$\hat{\gamma} = \frac{\sum_j(\lambda_j - \bar{\lambda})\, d\log P_j}{\sum_j(\lambda_j - \bar{\lambda})^2} = \gamma + \frac{\frac{1}{N}\sum_j(\lambda_j - \bar{\lambda})\,\varepsilon_j}{\frac{1}{N}\sum_j(\lambda_j - \bar{\lambda})^2}$$

by A1 and the LLN
$$\hat{\gamma} \xrightarrow{p} \gamma + \frac{\mathrm{Cov}(\lambda_j, \varepsilon_j)}{\mathrm{Var}(\lambda_j)} = \gamma = d\log G^e - d\log V^e$$

Intercept, by A1, A2
$$\hat{\alpha} = \overline{d\log P} - \hat{\gamma}\,\bar{\lambda} = \alpha + \bar{\varepsilon} - (\hat{\gamma} - \gamma)\,\bar{\lambda} \xrightarrow{p} \alpha = c + d\log V^e = d\log V^e$$

COROLLARY: $\hat{\alpha} + \hat{\gamma} \xrightarrow{p} d\log V^e + \left(d\log G^e - d\log V^e\right) = d\log G^e$

Rates or risk prices that move firms unevenly call for the general case

$$\underbrace{d \log P_{j|t=\tau}}_{\text{RETURNS}} = \underbrace{\alpha_\tau}_{d \log V^e_\tau} + \underbrace{\left(d \log G^e_\tau - d \log V^e_\tau\right)}_{\gamma_\tau \,:\, \text{FACTOR}} \cdot \underbrace{\lambda_{j|t=\tau}}_{j\text{-LOADING}} + \varepsilon_{j,\tau}$$

- γ_τ: defense news **relative** to commercial news, common to all: the latent **factor**
- $\lambda_{j|t=\tau}$: the observed factor **loading**, each contractor's DoD reliance
- α_τ: the commercial news every firm shares; a narrow window keeps rate and tax news out

$\hat{\gamma}_\tau$ RECOVERS THE FACTOR, $\hat{\alpha}_\tau + \hat{\gamma}_\tau$ THE DEFENSE NEWS

- Investor FOC with SDF m, iterated with no bubbles: $p_{j,t} = \sum_{h\geq 1} \mathbb{E}_t[m_{t,t+h} D_{j,t+h}]$
- profits by sales line, sales per share fixed across the event: $D_{j,t+h} = \bar{G}_j \, a^G_{j,h} + \bar{V}_j \, a^V_{j,h}$
- Value of one sales dollar of line $X \in \{G, V\}$:

$$\kappa^X_j = \sum_{h\geq 1} \mathbb{E}_t[m_{t,t+h} a^X_{j,h}] = \sum_{h\geq 1} \underbrace{q_{t,h}}_{\text{PRICE OF TIME}} \underbrace{\mathbb{E}_t[a^X_{j,h}]}_{\text{PROFITS}} \big(1 + \underbrace{\rho^{a^X_j}_{t,h}}_{\text{PRICE OF RISK}}\big)$$

- Event-window return of each line, to first order ($w^X_{j,h}$: share of value due at h):

$$r^X_j \simeq \sum_{h\geq 1} w^X_{j,h} \Big(\Delta \log \mathbb{E}[a^X_{j,h}] + \Delta \log q_{t,h} + \Delta \log(1 + \rho^{a^X_j}_{t,h}) \Big)$$

- Curve news enters via **duration**, risk news via **risk exposure** $\Longrightarrow r^X_j = \nu^X + (b^X_j)' f + \varsigma^X_j$
- Gordon is the case $q_{t,h} = (1+i)^{-h}$, $\rho = 0$, one profit per sales dollar in both lines

Identifying Assumptions

- **A1. Valuation neutrality**: $\kappa_j^G = \kappa_j^V$ pre-event $\implies$ value share $\chi_j = \lambda_j$ Relaxing A1
- **A2. Event factor structure**: $r_j^X = \nu^X + (\boldsymbol{b}_j^X)'\boldsymbol{f} + \varsigma_j^X,\ X \in \{G, V\}$
- **A3. Firm news has mean zero**: $\mathbb{E}[\varsigma_j^X \mid \lambda_j, \boldsymbol{b}_j] = 0$; LLN across firms; λ_j varies beyond $(1, \boldsymbol{b}_j)$
- **A4. Pre-event exposures $\boldsymbol{\beta}_j$**: their **span** suffices for $\hat{\gamma}$; $\hat{\alpha}$ also needs their **level**

κ_j^X: equity value of one sales dollar of line X, its level free across firms · ς_j^X: firm news · $\boldsymbol{b}_j$: true exposures, $\boldsymbol{\beta}_j$: their pre-event estimates

Step 1 A1, A2. With $\chi_j = \lambda_j$, plug both component returns into $r_j = \lambda_j r_j^G + (1-\lambda_j) r_j^V$:

$$r_j = \nu^V + \gamma\,\lambda_j + \boldsymbol{b}_j'\boldsymbol{f} + \varepsilon_j, \qquad \gamma := \nu^G - \nu^V, \quad \boldsymbol{b}_j := \lambda_j \boldsymbol{b}_j^G + (1-\lambda_j)\boldsymbol{b}_j^V, \quad \varepsilon_j := \lambda_j \varsigma_j^G + (1-\lambda_j)\varsigma_j^V$$

Step 2 Frisch–Waugh–Lovell. $\hat{\lambda}_j^{res}$, the residual of λ_j on $(1, \boldsymbol{b}_j)$, sums to zero and is orthogonal to $\boldsymbol{b}_j$:

$$\hat{\gamma} = \frac{\sum_j \hat{\lambda}_j^{res} r_j}{\sum_j \hat{\lambda}_j^{res} \lambda_j} = \gamma + \frac{\frac{1}{N}\sum_j \hat{\lambda}_j^{res} \varepsilon_j}{\frac{1}{N}\sum_j (\hat{\lambda}_j^{res})^2} \qquad \text{exact in sample}$$

Step 3 A3. $\mathbb{E}[\varepsilon_j \mid \lambda_j, \boldsymbol{b}_j] = \lambda_j\, \mathbb{E}[\varsigma_j^G \mid \cdot] + (1-\lambda_j)\, \mathbb{E}[\varsigma_j^V \mid \cdot] = 0$

- LLN: the numerator $\to 0$; rank: the denominator $\to \mathrm{Var}(\lambda_j^{res}) > 0 \implies \hat{\gamma} \xrightarrow{p} \gamma$
- The same moments make OLS consistent for every coefficient, the constant included: $\hat{\alpha} \xrightarrow{p} \nu^V$

Step 4 A4. Replace $\boldsymbol{b}_j$ by pre-event $\boldsymbol{\beta}_j$

- $\hat{\gamma}$ uses the controls only through their span: Steps 2–3 go through
- $\hat{\alpha}$ needs their level: a common error, $\boldsymbol{\beta}_j = \boldsymbol{b}_j + \boldsymbol{a}$, shifts $\hat{\alpha}$ by $-\boldsymbol{a}'\boldsymbol{f}$ and leaves $\hat{\gamma}$ unchanged

$$\hat{\alpha} + \hat{\gamma} \xrightarrow{p} \nu^V + \left(\nu^G - \nu^V\right) = \nu^G \qquad \blacksquare$$

Back

- Wedge $\zeta_j := \log(\kappa_j^G/\kappa_j^V)$: the defense value share χ_j departs from reliance

$$\chi_j = \frac{\lambda_j e^{\zeta_j}}{1-\lambda_j+\lambda_j e^{\zeta_j}} = \lambda_j + \underbrace{\lambda_j(1-\lambda_j)\,\zeta_j}_{\substack{\text{LARGEST AT MID RELIANCE}\\ \text{ZERO FOR PURE PLAYS}}} + O(\zeta_j^2)$$

- Regressing on λ_j when returns load on χ_j rescales the slope:

$$\operatorname{plim}\hat{\gamma} = \gamma\,\frac{\operatorname{Cov}(\lambda_j^{res},\chi_j)}{\operatorname{Var}(\lambda_j^{res})} \qquad \lambda_j^{res}\text{: reliance net of the controls}$$

- Consistency needs only $\operatorname{Cov}(\lambda_j^{res},\chi_j-\lambda_j)=0$; A1 is the interpretable sufficient case

A zero slope stays zero at any wedge: detection and dating survive

Risk in the Model and in the Regression

Risk enters a stock through its **premium** and through **news about risk**. Four cases:

- **Rates or risk prices move on the day**: each stock reprices by its exposure, so the betas $\varphi_t'\beta_{j,s}$ absorb it; news common to all firms goes to α_t
- **Premia differ across firms**: they weigh near against distant profits; harmless unless they line up with reliance (A3)
- **A different premium per sales line**: rescales the slope; a zero slope stays zero (A1) Wedge
- **Defense contracts become riskier or safer**: part of defense news, detected and dated; spending news only under (iii) Quantity Reading

Left to the assumptions: a priced risk outside the three betas that lines up with reliance. Size is the candidate; a size beta moves the factor no more than a random loading does
What Reliance Sorts On

When does the revaluation ν^G equal g, the % revision in expected defense spending?

(i) **Proportional revision**: aggregate procurement scales by $1+g$ at every horizon and state

(ii) **No common allocation news**: firms' shares and profit per procurement dollar unchanged

then, exactly: $$\nu^G = \underbrace{g}_{\substack{\text{SPENDING}\\ \text{REVISION}}} + (1+g)\cdot \underbrace{\nu^{G,\rho}}_{\substack{\text{REVALUATION OF}\\ \text{CONTRACTS IN PLACE}}}$$

(iii) **Contracts in place keep their value**: $\nu^{G,\rho} = 0 \implies \nu^G = g$

Likely failure: escalation lifts contracts in place, $\nu^{G,\rho} > 0 \implies$ dollars are upper bounds

DETECTION AND DATING REST ON γ ALONE: ONLY DOLLAR MAGNITUDES NEED (I)–(III)

Why this test: RZ's 51 press-dated shocks (1960–2015) are the benchmark for defense news. If our factor reads the same news, it must move on those dates, in RZ's direction.

Q1 Does the factor see RZ's news?

Priced by the factor	**23** (45%)
before RZ's date	**15** (29%)
on RZ's date	4 (8%)
after RZ's date	4 (8%)
Not identified	28 (55%)

Priced: the factor responds to a dated act and holds. Early: by 6 weeks at the median.

Q2 When does the market learn it?

	In RZ's direction	Significant?
3 months before	**+6.8%**	**Yes**
on RZ's date	+2.2%	**Yes**
the month after	−0.6%	No

Factor's move over 60 days before, on, and 20 days after RZ's date, averaged over the 51 shocks, cuts sign-flipped. Significant: beyond 95% of averages with all dates shifted by a year or more.

HFXS dates defense news when markets learn it, weeks before the press

The Daily HFXS Regression: Specification

$$r_{j,t} = \alpha_t + \gamma_t \lambda_{j,s} + \boldsymbol{\varphi}_t' \boldsymbol{\beta}_{j,s} + \varepsilon_{j,t} \qquad \text{one cross-section per trading day } t \text{ of fiscal year } s$$

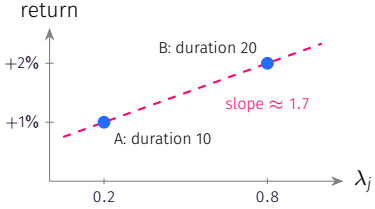
- **Returns** $r_{j,t}$: daily stock return in excess of the risk-free rate — CRSP; Fama–French
- **Reliance** $\lambda_{j,s}$: DoD contracts over sales, mean of the 3 previous years — Top 100; Compustat
- **Betas** $\boldsymbol{\beta}_{j,s}$: exposure to the market, airlines and the 10-year yield, from last year
- **Sample**: listed Top-100 contractors, 27–59 a day, FY1961–2024; OLS with robust (HC1) errors

From slope to shock: $\hat{\gamma}$ n.s. $\Rightarrow 0$; only $\hat{\gamma}$ significant $\Rightarrow \hat{\gamma}$; both $\Rightarrow \hat{\alpha} + \hat{\gamma}$ if significant, else 0

Bars: 1% on the radar; 1% for months (5% in the 28 narrative months). The duration beta enters from July 1962.

When rates move, firms with longer-lived cash flows move more: their **duration** is higher

TOY: YIELDS FALL 0.1 PP, NO DEFENSE NEWS



- Return = duration × yield fall: A +1%, B +2%
- Slope ≈ 1.7 with no defense news: reliance tracks duration
- In general: $\text{plim}\,\hat{\gamma}^{unc} = \gamma + \frac{\text{Cov}(\lambda_j, \text{Dur}_j)}{\text{Var}(\lambda_j)} \times (-\Delta y_t^{10Y})$
- The sign flips with the curve; war scares move the curve

Baseline: add each firm's exposure to $\text{DUR}_t := -\Delta y_t^{10Y}$, estimated over the prior fiscal year

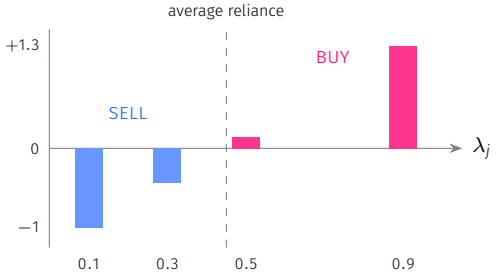
Robustness, two factors only {MKT, C-AERO}: the factor barely moves

- correlation with the baseline factor from FY1963: 0.984 daily, 0.987 quarterly
- duration exposure and reliance are nearly unrelated: pooled correlation −0.05
- spending is predicted in both: Granger $F = 4.39$ and 4.28 ($p = 0.002$); IRF peak 0.13% and 0.12%

The Slope Is the Return of a Long–Short Portfolio

The day's slope is a weighted sum of the day's returns: $\hat{\gamma}_t = \sum_j w_j r_{j,t}$

Four contractors: the weight on each



- **Weights** sum to zero: sell low reliance, buy high
- **Market day**: all $+2\%$ $\Longrightarrow$ slope $= 0$
- **Defense day**: each $+10\% \times \lambda_j$ $\Longrightarrow$ slope $= 10\%$

As in Fama–French factors: a zero-cost bet on reliance; with the betas in the regression, market and airline moves cancel too

Common moves cancel; moves that rise with reliance remain

The idea: a shock g revalues a share λ_j of unit j by $\eta_j\, g$, with η_j a pre-set **elasticity**

$$r_j = \underbrace{\mu}_{\text{COMMON}} + \underbrace{\lambda_j}_{\text{SHARE HIT}} \cdot \underbrace{\eta_j}_{\text{ELASTICITY}} \cdot \underbrace{g}_{\text{SHOCK}} + (1-\lambda_j) \cdot \underbrace{\nu^W}_{\text{EXTRA NEWS}} + \underbrace{b_j' f}_{\text{OTHER SHOCKS}} + \varepsilon_j$$

Theorem (HFXS Identification, Generalized)

Regress returns on the **exposure** $x_j := \lambda_j \eta_j$, the share λ_j and pre-event betas $\boldsymbol{\beta}_j$:

$$r_j = \alpha + \boldsymbol{\gamma} \cdot x_j + \delta \cdot \lambda_j + \boldsymbol{\varphi}' \boldsymbol{\beta}_j + e_j \qquad \Longrightarrow \qquad \hat{\boldsymbol{\gamma}} \xrightarrow{p} g \quad \& \quad \hat{\boldsymbol{\alpha}} \xrightarrow{p} \mu + \nu^W$$

- **Defense**: $\eta_j = 1$, so $x_j = \lambda_j$: intercept + slope $\to \mu + g$, the defense news ν^G
- **Common elasticity** η: slope $\to \eta\, g - \nu^W$; with no extra news on the rest, slope$/\eta \to g$
- **Whole unit hit**: $\lambda_j = 1$, regress on η_j: slope $\to g$, as with duration and yields

Exposure = share hit × elasticity: its slope is the shock

Beyond Defense: Share Hit, Elasticity, Shock

Each application names three objects: the share hit λ_j, the elasticity η_j, the shock g

News	Share hit λ_j	Elasticity η_j	Priced news
Defense (here)	Pentagon sales	one	spending revision
Monetary policy	the whole firm	cash-flow duration	fall in yields
Tariff	sales to the country	$-$ trade elasticity	tariff change
LTV cap	high-LTV mortgages	common, unknown	mortgage news
Carbon price	the whole firm	$-$ emissions/profit	carbon price news
Technology	input's payroll share	common: price elasticities	productivity news

Each unit needs a market price on the news day: regions and countries enter through traded claims on them

Known elasticity sizes the shock; the share alone detects and dates it

Corporate Lineage: Lockheed Martin

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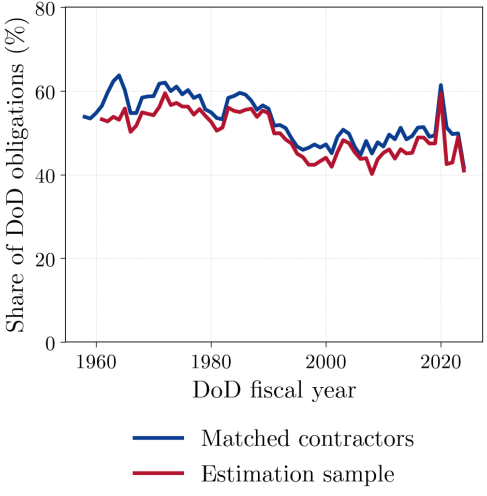
We link each renamed or merged contractor to one firm, so its data form one history

Company Name	Ticker	GVKEY	PERMCO	PERMNO	SIC	First	Last	Top-100 FYs
The Lockheed line								
Lockheed Aircraft Corp	LMT	006774	21110	21178	3720	1947	1977	1958–1977
Lockheed Corp	LMT	006774	21110	21178	3721	1978	1995	1978–1995
Lockheed Martin Corp	**LMT**	006774	21110	21178	3761	1996	2024	1996–2024
The Martin line, merged into Lockheed Martin in 1995								
Glenn L. Martin Co	ML.3	007077	21160	20562	3720	1947	1957	
Martin Co	ML.3	007077	21160	20562	3720	1958	1961	1958–1961
Martin Marietta Corp	ML.3	007077	21160	20562	3761	1962	1993	1962–1993
Martin Marietta Corp	ML.3	007077	21160	20562	3761	1994	1995	1994

- Hand-built lineage, anchored on CRSP **PERMNO**/**PERMCO** and Compustat **GVKEY**
- Fundamentals on the federal fiscal-year grid; full histories in the supplemental appendix

Coverage of DoD Prime Contracts

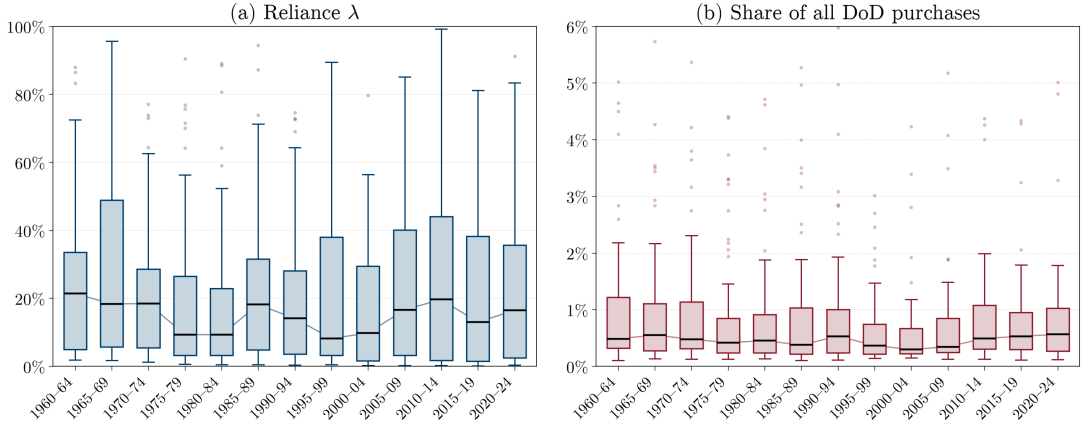
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The sample holds about half of all DoD prime contracts

Reliance across Five-Year Periods

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Each box: firms' median loadings within a five-year period; (a) reliance λ, (b) share of DoD obligations ω; 147 firms, FY1961–2024

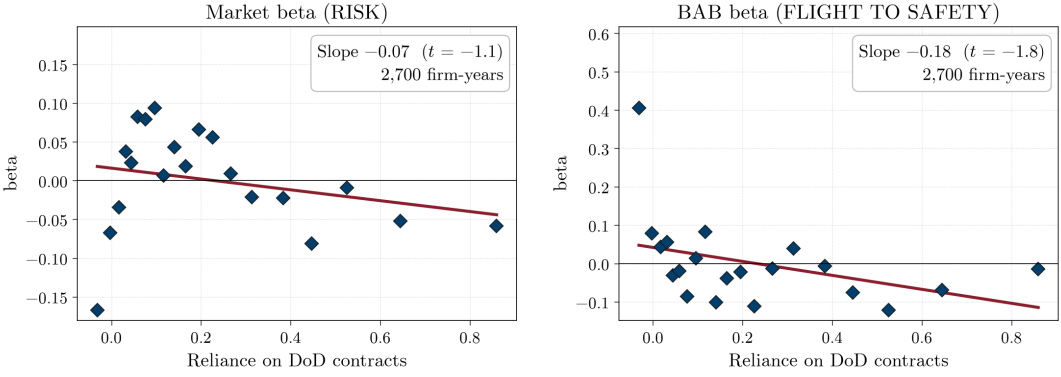
Within-year slope of each firm exposure on reliance, FY1961–2024, firm-clustered t

		Yearly correlation		Slope		Slope, controls fixed	
Observable	Firm-years	median	$\lvert\rho\rvert > 0.2$ [noise]	b	t	b^c	t
Controls in the daily regression							
A. Market beta (RISK)	2,700	−0.12	0.52 [0.21]	−0.07	−1.1	*control*	
B. Airline beta (COMMERCIAL DEMAND)	2,700	+0.09	0.34 [0.21]	+0.07	+1.8	*control*	
C. Rate beta (DURATION)	2,622	+0.03	0.44 [0.21]	−0.52	−1.2	*control*	
Other exposures							
D. Implied equity duration (DURATION)	2,471	−0.11	0.49 [0.22]	−1.2	−1.6	−1.1	−1.4
E. Market leverage (LEVERAGE)	2,680	0.00	0.42 [0.21]	+0.017	+0.4	−0.001	0.0
F. BAB beta (FLIGHT TO SAFETY)	2,700	+0.01	0.47 [0.21]	−0.18	−1.8	−0.13	−2.0
G. Market capitalization (SIZE)	2,696	−0.55	1.00 [0.21]	−3.77	**−6.4**	−3.51	**−6.7**
H. SMB beta (SIZE RISK)	2,700	+0.37	0.77 [0.21]	+1.04	**+6.5**	+1.06	**+7.5**

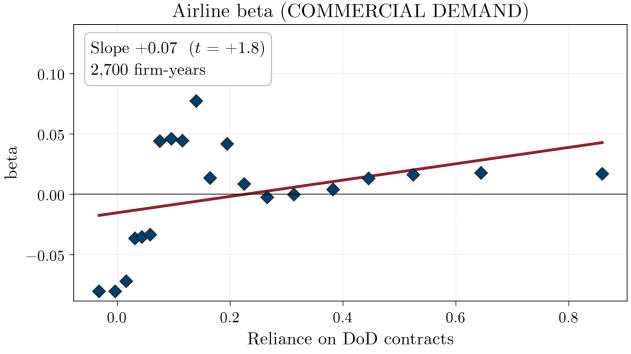
Risk · Commercial Demand · Duration · Leverage · Size

Only size sorts strongly: high-reliance contractors are smaller; market and BAB betas sort weakly

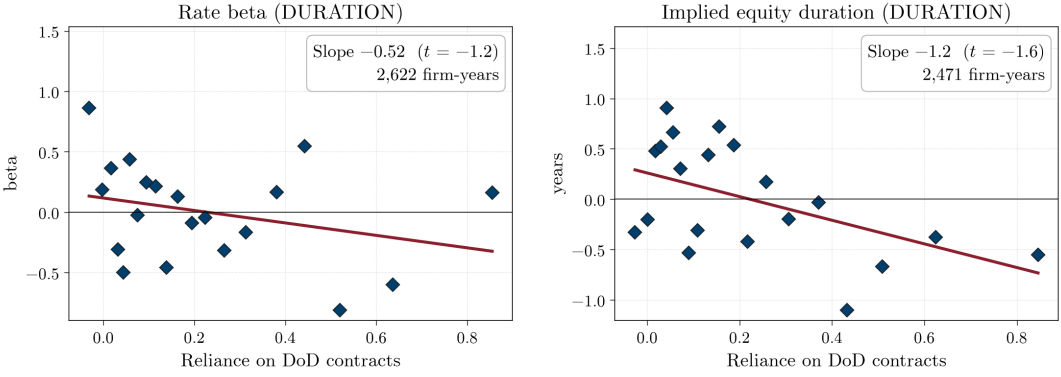
Defense reliance and market risk and flight to safety, FY1961–2024 (within-year comparison)



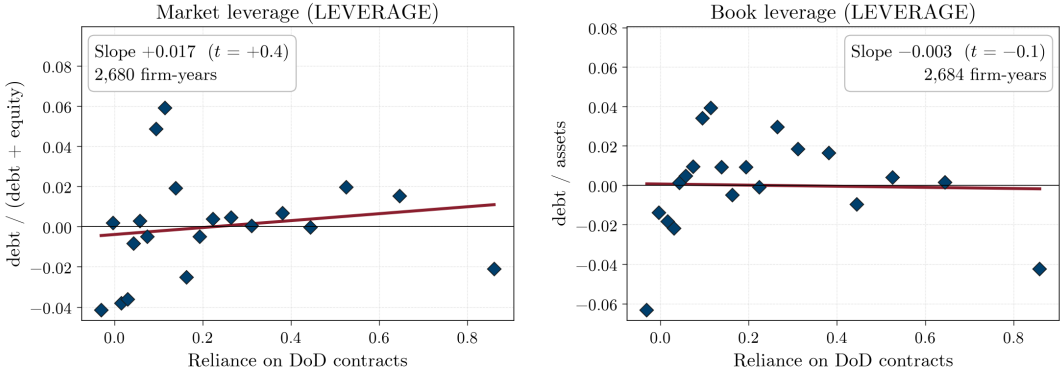
Defense reliance and commercial demand, FY1961–2024 (within-year comparison)



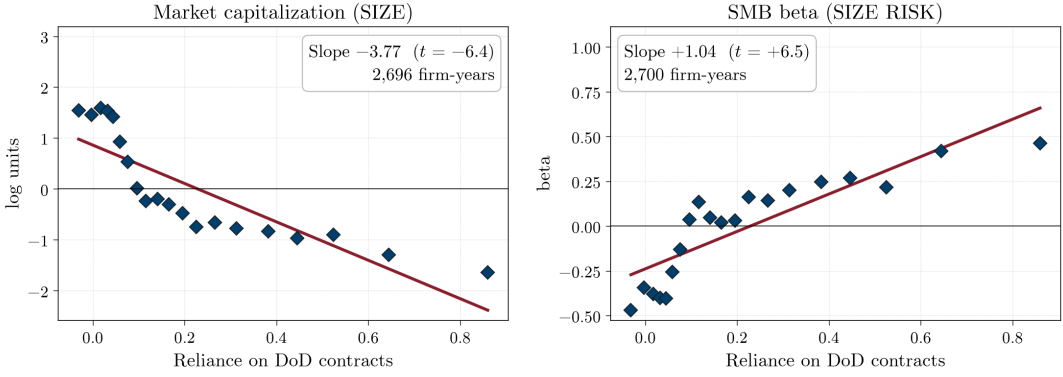
Defense reliance and duration, FY1961–2024 (within-year comparison)



Defense reliance and leverage, FY1961–2024 (within-year comparison)



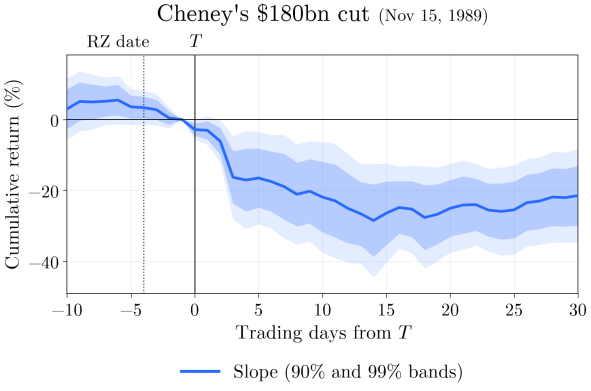
Defense reliance and size, FY1961–2024 (within-year comparison)



Case: The Berlin Wall vs. Cheney's $180bn Directive (1989)

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Dating: which news did investors price?

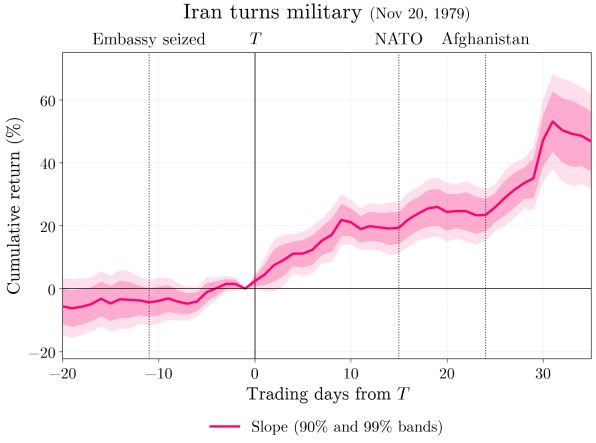


- RZ's **largest** post-1960 shock: the **Wall**
- Around Nov 9: no significant move
- Nov 15–17: Cheney's **$180bn** directive

The market prices the budget directive, the week after the Wall

Case: The Iran Crisis Turns Military (Nov 1979)

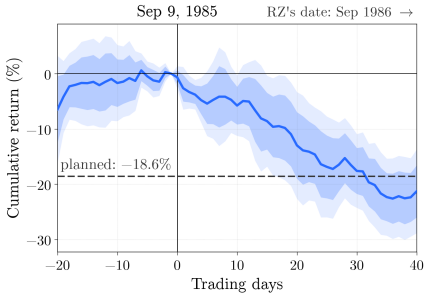
Investors price the crisis in November, two months before RZ's date



- RZ: zero in 1979q4; their shock is Jan 1980
- Embassy seizure (Nov 4): no move
- Nov 20, trial threat: $\hat{\gamma} = +2.4\%$ ($t = 2.6$)

Gramm–Rudman–Hollings (Sep 1985)

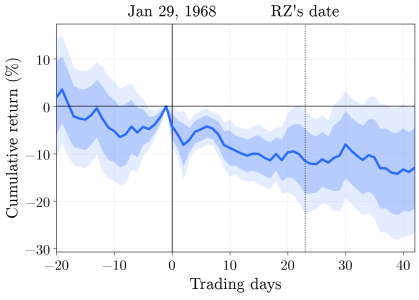
Congress moves to force a balanced budget by automatic cuts; the Pentagon rewrites its five-year plan



- Priced a year before RZ's date (Sep 1986)
- Size: planned cut −**18.6%**, priced −**18.3%**

The Tet Offensive (Jan 1968)

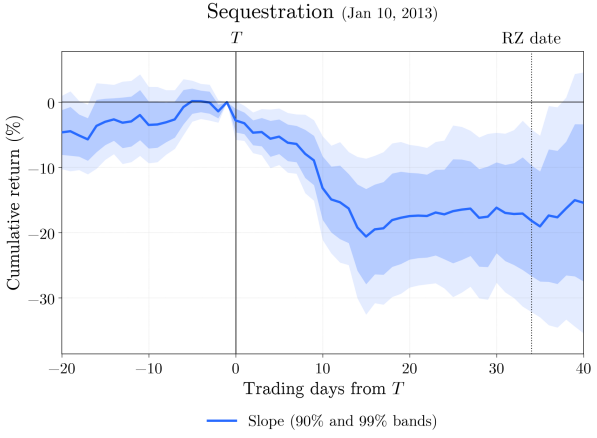
A surprise offensive across South Vietnam turns US opinion; on Mar 31 Johnson limits the bombing and seeks talks



- RZ: **+$5bn** for the troop increase after Tet
- Factor: −**6.8%**, a bet on de-escalation

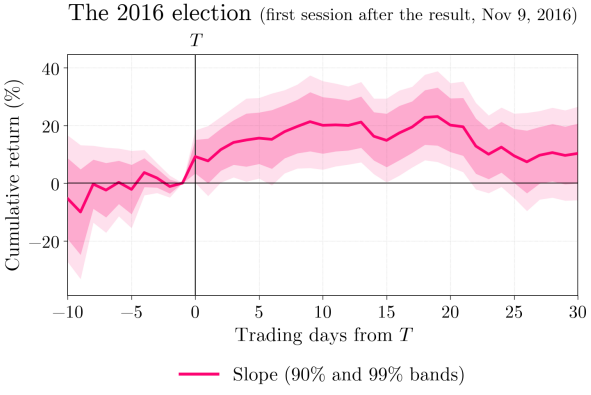
Cumulative slope from the session before the first response; 90% and 99% bands. Planned: projected FY1990 defense spending, $488.1bn → $397.2bn (*Washington Post*, 8 Sep 1985). Same check on Cheney's 1989 cut: planned −12%, priced −13.9%.

Investors price sequestration in January, seven weeks before RZ's date



- RZ: Mar 1, 2013, the cut takes effect
- Jan 10: Panetta announces precautions
- Mar 1: no move; known since 2011

Election night: defense contractors rise against commercial aerospace

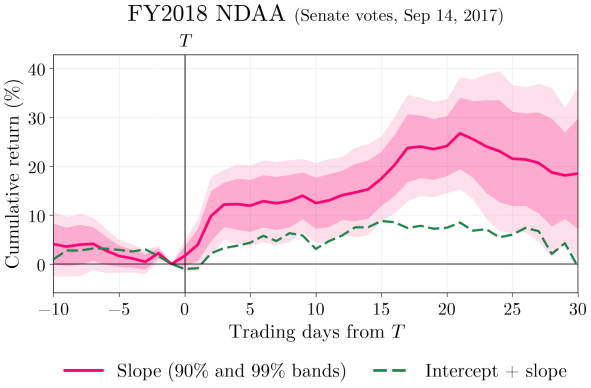


- **Slope**: +9.2% on day 0 ($t = 2.6$)
- **Intercept**: insignificant
- **Intercept + slope**: +11.4% ($t = 2.4$)

The Rule at Work: a Slope without Defense News (Sep 2017)

Back

Sep 14, 2017: the Senate votes $700bn for defense, above the $549bn budget cap



- **Slope**: +9.8% ($t = 3.2$)
- **Intercept**: −7.6% ($t = -3.2$)
- **Intercept + slope**: +2.2% ($t = 0.7$)

The pure contractor does not move: the rule drops the day

RZ Shocks Priced on or before RZ's Date

RZ quarter	RZ's date	Priced on	What happened that day	Factor (%)
On RZ's date (4)	the factor responds on the session of RZ's date			
1960q2	17 May 1960	9 May 1960	The U-2 incident and the collapse of the Paris summit	+19.0
1961q3	25 Jul 1961	25 Jul 1961	Kennedy's address on the Berlin crisis	+2.5
1970q1	7 Feb 1970	9 Feb 1970	Nixon's fiscal-1971 budget	−9.5
2001q3	11 Sep 2001	17 Sep 2001	The attacks of September 11th (markets reopen)	+73.5
Earlier (15)	the factor responds to an earlier act of the same episode			
1961q1	4 Mar 1961	30 Jan 1961	Kennedy's State of the Union	+7.0
1961q4	9 Dec 1961	30 Oct 1961	The end of the standoff at Checkpoint Charlie	−6.6
1962q1	24 Feb 1962	11 Jan 1962	The State of the Union and the fiscal-1963 budget	+13.6
1963q3	6 Aug 1963	15 Jul 1963	The Moscow talks on the Limited Test Ban Treaty	−14.2
1964q1	1 Feb 1964	2 Dec 1963	Johnson's letter to defense contractors	−9.5
1965q1	6 Mar 1965	8 Feb 1965	The reprisal strikes after Pleiku	+8.5
1965q3	28 Jul 1965	13 Jul 1965	The announcement of McNamara's mission to Saigon	+16.7
1967q4	16 Dec 1967	12 Sep 1967	The votes on the fiscal-1968 defense appropriation	−10.0
1968q1	2 Mar 1968	29 Jan 1968	The Tet Offensive‡	−6.8
1980q1	20 Jan 1980	26 Dec 1979	The Soviet invasion of Afghanistan	+21.1
1981q1	18 Feb 1981	5 Nov 1980	The election of Ronald Reagan	+11.5
1986q4	29 Sep 1986	9 Sep 1985	Gramm–Rudman–Hollings and the revised five-year plan	−18.3
2005q1	14 Feb 2005	7 Feb 2005	The fiscal-2006 budget and the coming supplemental	+4.8
2011q3	2 Aug 2011	13 Apr 2011	The President's deficit speech	−7.9
		14 Jul 2011	Moody's review and the President's news conference	−3.7
2013q1	1 Mar 2013	10 Jan 2013	The Pentagon's precautionary measures for sequestration	−17.8

Factor: cumulative move of the defense factor once the response settles. ‡ Opposite sign to RZ.

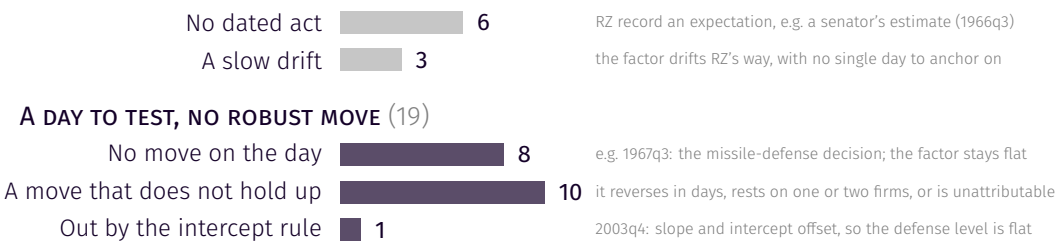
Priced Later, Just Missed by RZ, after 2015

RZ quarter	RZ's date	Priced on	What happened that day	Factor (%)
Later (4)	the factor responds to a later act of the same episode			
1968q2	6 Apr 1968	20 Jun 1968	The votes on the Revenue and Expenditure Control Act	−5.8
1989q4	9 Nov 1989	17 Nov 1989	Cheney's $180bn directive	−13.9
2003q3	7 Sep 2003	23 Sep 2003	Smith Barney's report on the defense sector‡	−10.4
2004q2	6 May 2004	18 May 2004	The House takes up the fiscal-2005 authorization	+7.3
Just missed by RZ (1)	RZ code the quarter at zero			
1979q4		20 Nov 1979	The Iran hostage crisis turns military	+22.3
After RZ's sample (2)	RZ's series ends in 2015			
		9 Nov 2016	The presidential election	+13.3
		11 Feb 2022	The warnings of an imminent invasion of Ukraine	+10.6
Out by the intercept rule (2)	slope and intercept offset, so the defense level is flat			
2003q4	28 Oct 2003	28 Oct 2003	CBO's estimate of the cost of occupying Iraq	+7.2
		12 Sep 2017	The Senate's votes on the FY2018 NDAA	+23.1

Factor: cumulative move of the defense factor once the response settles; for the two events out by the rule, the slope alone. ‡ Opposite sign to RZ.

Why 28 RZ Shocks Are Not Identified

Each RZ shock gets one test day: RZ's date, or the next dated act of the episode



- One by one, these 28 fail: no day to test, or no robust move on it
- Pooled, they move RZ's way: **+1.6%** on RZ's date, **+21%** over the year before

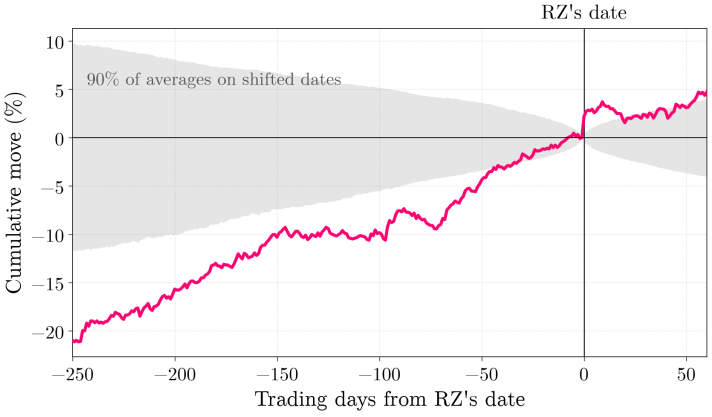
Pooled, the 28 still move RZ's way

Pooled: average of the factor's cumulative move over the 28, RZ's cuts with the sign flipped. RZ's date: $p = 0.002$; year before (days -250 to -1): $p = 0.025$; p from shifting the 28 dates together by a year or more.

The Factor around RZ's 51 Dates: the Average Path

Back

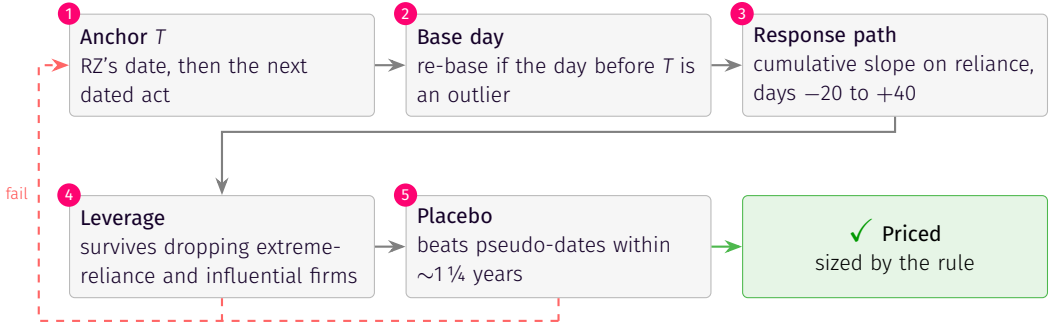
Day by day around RZ's 51 dates: the factor's average cumulative move in RZ's direction



Daily factor, demeaned, cumulated from the session before RZ's date; RZ's cuts enter with the sign flipped. Grey: 90% range of the same average with all 51 dates shifted together by a year or more.

Most of the move comes before RZ's date

HOW WE TEST A DATED ACT OF THE NARRATIVE RECORD: FIVE CHECKS, IN ORDER



Any check fails: move to the next dated act of the episode; none left: **not identified**

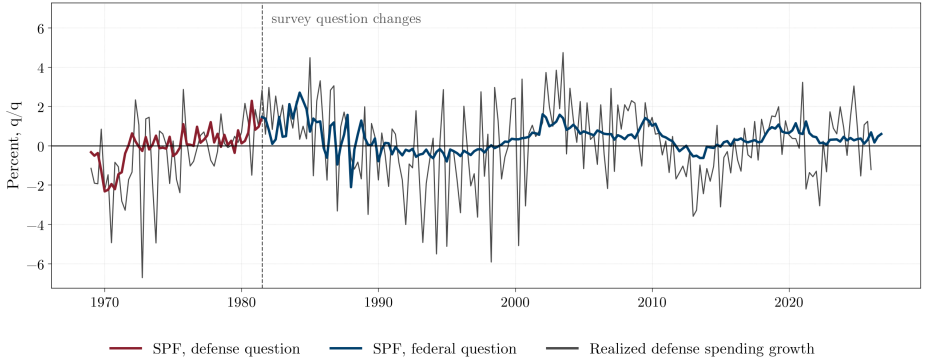
Path: returns from $T-1$ on $\lambda_{j,s}$ and betas. The placebo replaces HC1 t, too large when firms share industry shocks.

Why: news must lead spending and forecasts, and must not be predicted by them

		Series predicts it?			It predicts the series?		
Variable	Sample	F	p		F	p	
(1) HFXS defense factor							
Defense spending growth $\Delta\%G^{def}$	1961Q3–2024Q3	4.39	0.0019	Yes	0.79	0.5300	No
SPF expected spending	1969Q4–2024Q3	3.55	0.0080	Yes	0.40	0.8096	No
RZ defense news	1961Q3–2015Q4	2.89	0.0232	Yes	1.46	0.2153	No
Fisher–Peters index	1961Q3–2024Q3	3.04	0.0181	Yes	1.22	0.3009	No
(2) HFXS events, earlier version (Aug 2026)							
Defense spending growth $\Delta\%G^{def}$	1961Q1–2024Q4	3.04	0.0178	Yes	0.84	0.5008	No
SPF expected spending	1969Q4–2024Q4	3.03	0.0186	Yes	0.40	0.8106	No
RZ defense news	1961Q1–2015Q4	3.45	0.0093	Yes	0.17	0.9549	No
Fisher–Peters index	1961Q1–2024Q4	1.20	0.3119	No	0.37	0.8318	No

Two-variable VAR, four quarterly lags, OLS with a constant; F tests the four lags of the predictor

What we do: build expected spending growth from a forecaster survey; test it



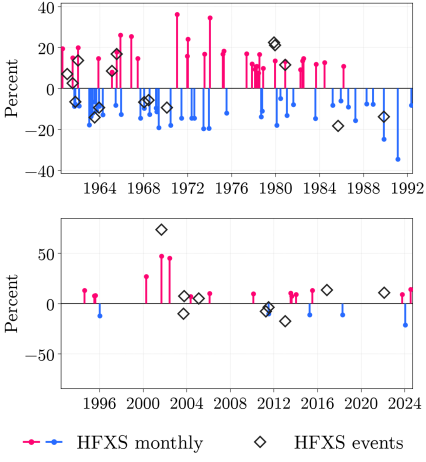
- $F(1,1)_t$: one-quarter-ahead growth, built within each survey (Forni and Gambetti, 2016)
- Real federal spending from 1981Q3; earlier, nominal defense (Ramey, 2011), survey-deflated
- Predicts real defense spending growth ($p < 0.001$); the reverse fails ($p = 0.28$)

Most months carry no defense news: keep a month only when the evidence is clear

One regression a month, ∼40 contractors:

- $\hat{\gamma}_m$ insignificant $\Longrightarrow$ 0
- $\hat{\alpha}_m$ insignificant $\Longrightarrow$ $\hat{\gamma}_m$
- Both significant $\Longrightarrow$ $\hat{\alpha}_m + \hat{\gamma}_m$, if significant

Tests at 1%; at 5% in the 28 narrative event months.
All 16 events keep their narrative sign.



93 of 771 months (14 with reliance shuffled); 16 of 28 narrative events

The Monthly Rule, Step by Step

$$r_{j,m} = \alpha_m + \gamma_m \lambda_{j,s} + \varphi_m^{\text{MKT}} \beta_{j,s}^{\text{MKT}} + \varphi_m^{\text{C-AERO}} \beta_{j,s}^{\text{C-AERO}} + \varphi_m^{\text{DUR}} \beta_{j,s}^{\text{DUR}} + \varepsilon_{j,m}$$

Contractors trading every session of month m; betas from year $s-1$; firms beyond 5 robust s.d. dropped

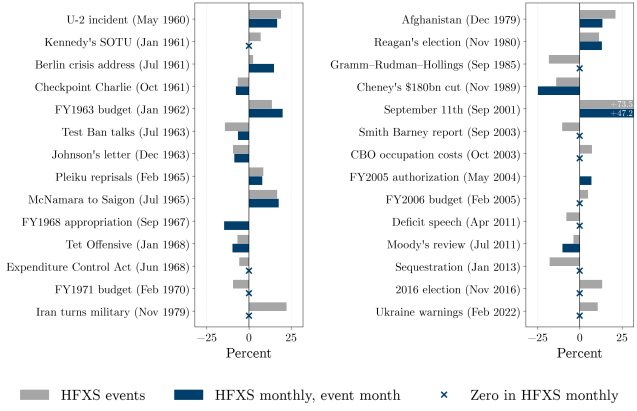
1. $\hat{\gamma}_m$ insignificant $\Longrightarrow 0$
2. $\hat{\alpha}_m$ insignificant $\Longrightarrow \hat{\gamma}_m$
3. $\hat{\alpha}_m$ significant: $\hat{\alpha}_m + \hat{\gamma}_m$ significant $\Longrightarrow \hat{\alpha}_m + \hat{\gamma}_m$, otherwise 0

Every test at 1%; at 5% in the 28 narrative event months

- **Sum**: the Corollary's defense news; 8 of the 93 months
- **Why 1%**: at 5% in every month, 158 of 771 months would enter
- **Open**: the monthly slope loads on size, +0.8 per point of SMB

The 28 Narrative Events, Month by Month

Does the monthly series find our 28 narrative events in their month?



HFXS events: the 26 news events we priced and validated

HFXS monthly: the monthly rule, in every month

RZ's narrative shocks are a separate series. Zeros: ten insignificant slopes (five just under 5%), two insignificant sums (Iran, deficit speech).

Responses: each outcome $x \in \{g^{def}, g^{nd}, y\}$ at horizon $h = 0, \ldots, 20$ quarters on the shock z_t

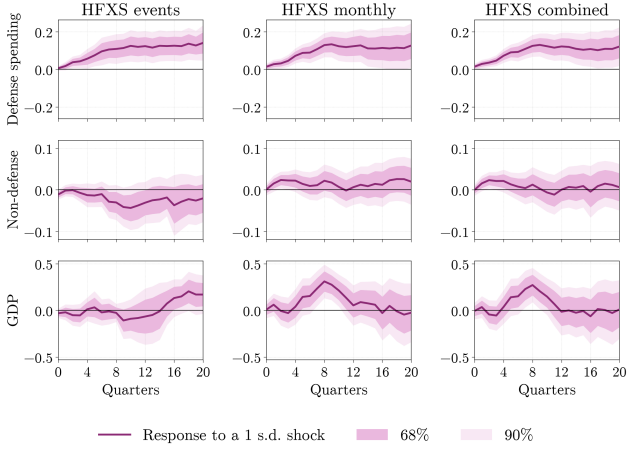
$$x_{t+h} = \beta_h z_t + \text{four lags of } (x,\ i,\ z) + u_{t+h}$$

Multiplier: cumulative GDP on cumulative defense spending, with z_t as the instrument, $H = 0, \ldots, 28$

$$\sum_{h \le H} y_{t+h} = \mathcal{M}_H \sum_{h \le H} g^{def}_{t+h} + \text{four lags of } (y,\ g^{def},\ g^{nd},\ i,\ z) + \varepsilon_{t,H}$$

- z_t: the monthly HFXS series summed by quarter, in s.d. units; i: the 3-month T-bill rate
- Units: % of potential GDP (Gordon and Krenn, 2010); local projections (Jordà, 2005; Ramey and Zubairy, 2018)
- Samples: IRFs 1961Q3–2024Q3; multiplier on one fixed sample, 1961Q3–2017Q3
- Robust standard errors; first-stage F: the effective F (Montiel Olea and Pflueger, 2013)

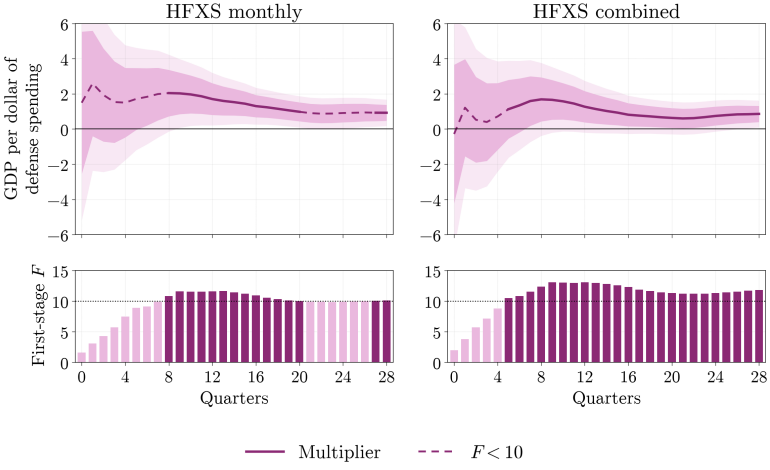
Responses to the Three HFXS Series



- **HFXS events**: the 26 news events we priced and validated, one value each
- **HFXS monthly**: the monthly rule, in every month 1960–2024
- **HFXS combined**: HFXS events in their quarters, HFXS monthly in every other quarter

All three come from our cross-section of contractor returns; RZ's narrative shocks are a separate series.

HFXS combined: our 26 priced events in their quarters, HFXS monthly in every other quarter



HFXS combined: 1.7 at two years, 0.86 after seven (90%: 0.10–1.62); first-stage $F \geq 10$ from the fifth quarter

First-Stage F: HFXS, Ramey–Zubairy, Fisher–Peters

		First-stage F, quarter H					Multiplier	
Instrument	Sample	4	8	12	20	28	2 yrs	7 yrs
(1) Common sample, 1961Q3–2015Q4								
HFXS monthly series	common	7.4	10.9	11.7	10.0	10.0	2.10	0.94
Ramey–Zubairy news	common	8.5	9.2	11.3	15.3	16.5	0.31	0.43
Fisher–Peters top-3 return	common	4.7	9.9	11.0	9.9	8.4	0.78	0.23
(2) Each on its own longest sample								
HFXS monthly series	1961Q3–2017Q3	7.5	10.8	11.6	10.0	10.1	2.04	0.92
Ramey–Zubairy news	1961Q1–2015Q4	10.1	11.1	13.3	15.9	18.9	0.49	0.40
Fisher–Peters top-3 return	1961Q1–2017Q3	4.9	10.4	11.5	10.0	8.6	0.91	0.24
(3) Common sample, four lags of another series added to the controls x								
Ramey–Zubairy news	+ HFXS factor	6.4	6.5	8.1	10.5	10.4	0.15	0.32
Fisher–Peters top-3 return	+ HFXS factor	3.1	7.6	8.6	6.2	3.7	1.05	−0.38
HFXS monthly series	+ RZ news	6.9	10.5	11.3	9.4	9.1	2.37	1.00
HFXS monthly series	+ F&P return	7.1	11.5	12.4	9.9	9.4	2.27	0.99

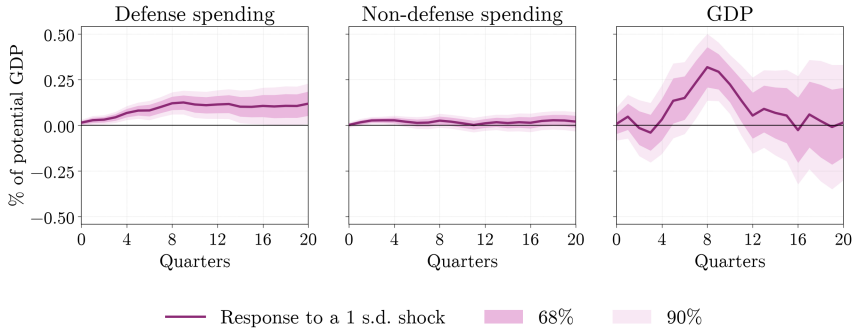
The multiplier slide's LP-IV; only z changes (first stage and $\mathbf{x}$). F: robust first-stage t^2, the effective F. Ramey–Zubairy (2018, Fig. 4), 1947–2015: $F > 50$ at quarters 4–17; Korea (1950Q3–Q4) carries 94% of that sample's news variance

Similar F on the same sample; part of theirs is news markets priced earlier

A Stricter Bar: 1% in Every Month

Back

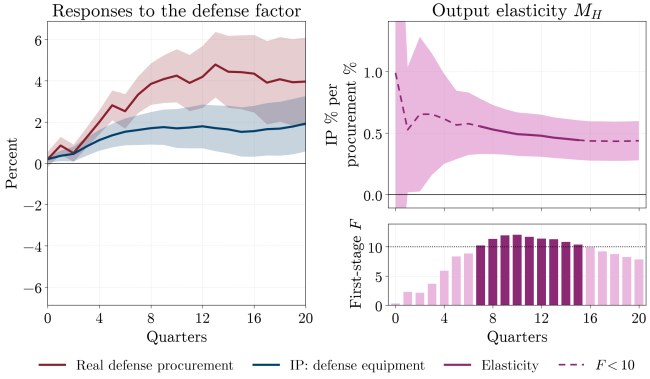
The same rule with the 1% bar also in the 28 narrative months



- **88** of 771 months, 13 with reliance shuffled; **11** of 28 narrative events, same sign
- Two years on: defense spending **+0.12%** of potential GDP, GDP **+0.32%**
- Multiplier **1.0** after seven years (90%: 0.22–1.85); first-stage *F* of 9–11

What does a 1% rise in procurement do to the output of defense equipment?

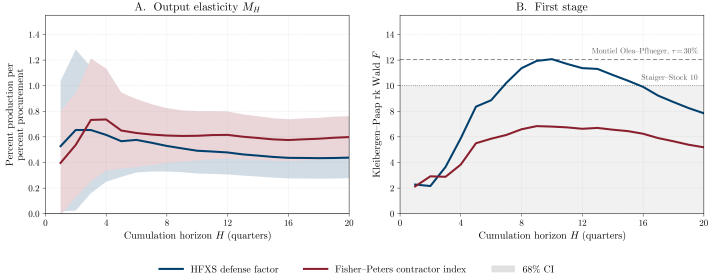
$$\sum_{h=0}^{H} y_{t+h}^{def} = \mathcal{M}_H \sum_{h=0}^{H} g_{t+h}^{def} + \Phi_H(L)\, \mathbf{x}_{t-1} + \varepsilon_{t,H}$$



y^{def}: IP, defense & space equipment; g^{def}: real procurement, instrumented by the defense factor; 1961q3–2017q4

Fisher–Peters (2010): defense news as the excess return of the **top-3 contractors**

Same production regression, two instruments: their index and our factor



- **A. Same response**: procurement alike, output elasticities close
- **B. Sharper first stage**: nearly twice the first-stage F of the top-3 index
- **Why**: the top-3 return also moves with sector-wide news; the cross-section nets it out

Same answer, stronger instrument

Rebuilding the Fisher–Peters (2010) Index

Back

- Ever-top-3 munitions contractors, FY1958–2007, Boeing excluded: **eight lineages**

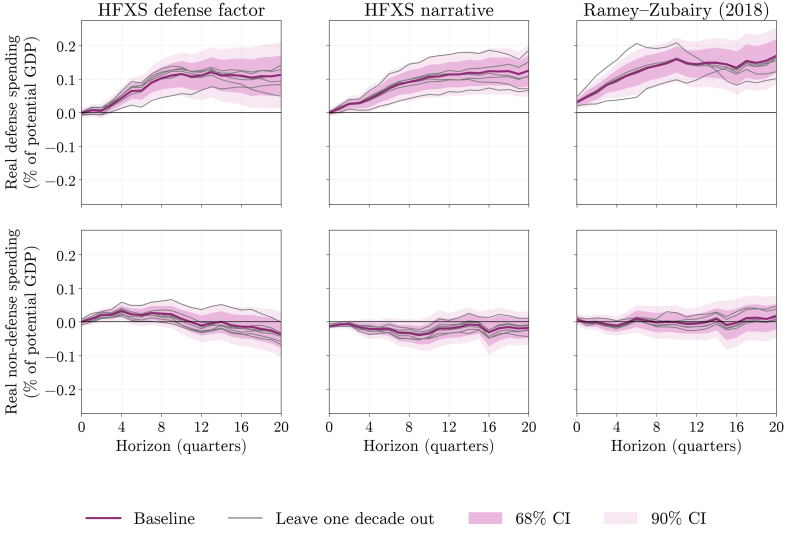
  General Dynamics, Grumman, Lockheed, Martin, McDonnell, Northrop, Raytheon, United Aircraft

- CRSP total returns; market values at the start of each quarter; excess over the market
- Replicates their footnote-6 regression of the top-3 return on the market:

	1947Q1–2007Q4		1957Q3–2007Q4	
	constant	slope	constant	slope
Fisher and Peters (2010)	0.012 (0.006)	0.98 (0.09)	0.009 (0.006)	0.95 (0.09)
Our rebuild	**0.0127** (0.0063)	**0.981** (0.088)	**0.0097** (0.0065)	**0.954** (0.091)

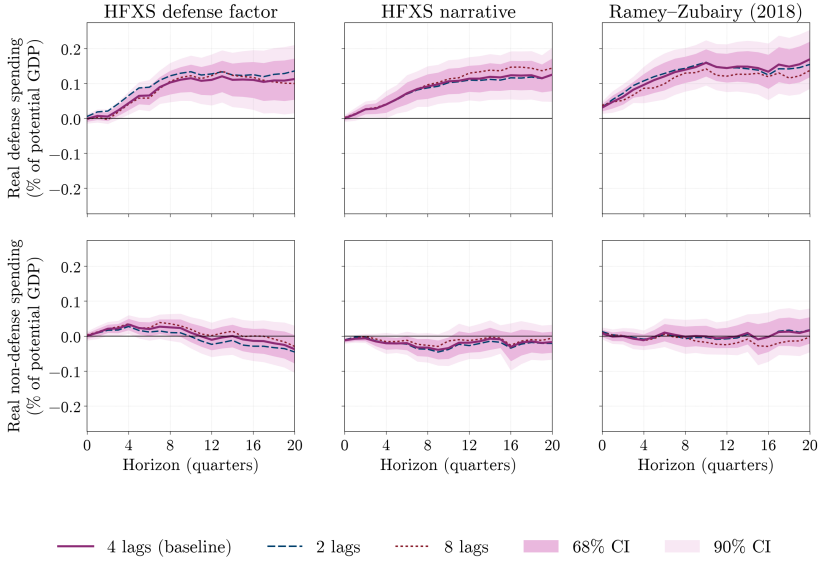
Accumulated index at 2007Q4: 6.00 (their text: “more than five times” the market)

IRF Robustness: Dropping One Decade at a Time

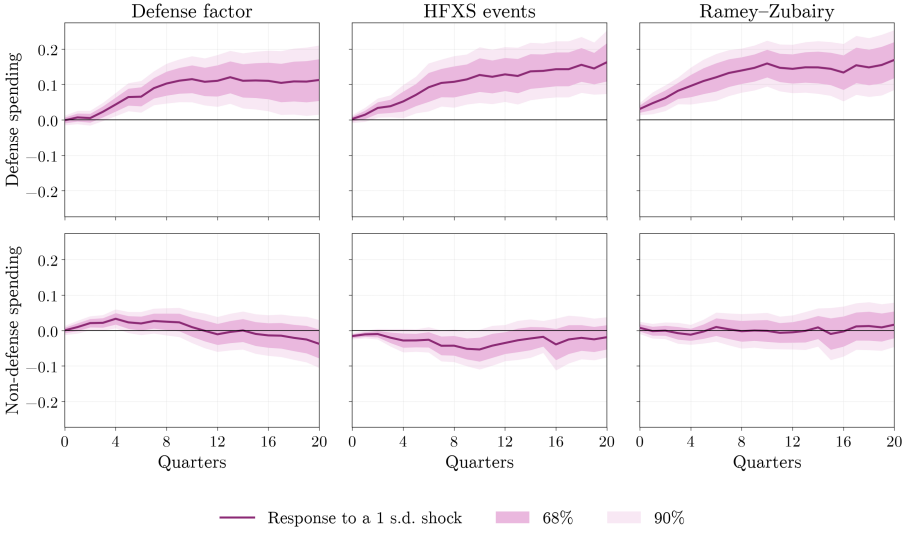


The 1960s build-ups (1962–63, 1965–69) weigh most, above all for the factor and the HFXS narrative series (shown before the rule)

IRF Robustness: Lag Length



HFXS narrative column: the series before the rule



Factor with {MKT, C-AERO} loadings only: defense peak 0.12 pp at $h = 13$ ($t = 2.7$); HFXS events column: the two-factor rule, election at Nov 8

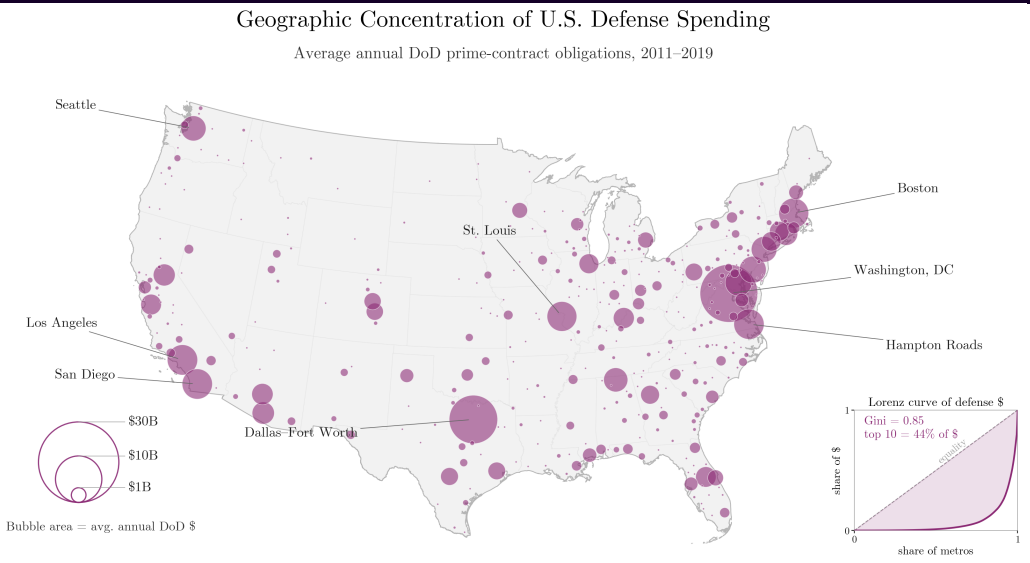
Additional Application: Regional Multipliers

An Additional Application: Regional XS-Multipliers

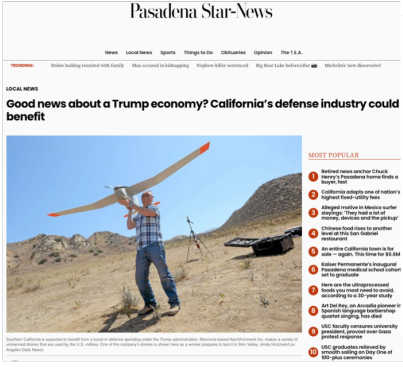
- An earlier version of the paper used the HFXS shocks as the **shift** of a shift-share instrument across US metro areas
- The shocks in these slides come from **12 event windows, 2001–2023**: weekly Fama–French excess returns, event-by-event regressions
- They predate the daily factor, the SDF framework and the intercept rule

The regional design starts in the 2000s, when the contract and metro-GDP data begin

Defense Spending Across MSAs



Military News Shocks are (Regionally) Salient!



Pasadena Star-News

News Local News Sports Things to Do Obituaries Opinion The T.E.A.

TRENDING: Stolen bulldog reunited with family Man accused in kidnapping Nephew-killer sentenced Big Bear Lake beforeafter Michelin's 'new discoveries'

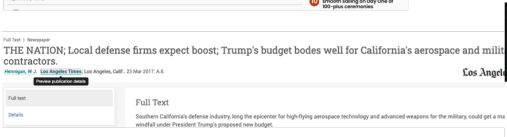
LOCAL NEWS

Good news about a Trump economy? California's defense industry could benefit

Southern California is expected to benefit from a boost in defense spending under the Trump administration. Monrovia-based AeroVironment Inc. makes a variety of unmanned drones that are used by the U.S. military. One of the company's drones is shown here as a worker prepares to test it in Simi Valley. (Andy Holzman/Los Angeles Daily News)

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3. Alleged mastiff in Mexico surfer slayings: They had a lot of money, devices and the pickup'
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THE NATION; Local defense firms expect boost; Trump's budget bodes well for California's aerospace and milli contractors.

Herrigan, W J. Los Angeles Times; Los Angeles, Calif. 23 Mar 2017: A.6.

Preview pdf/Earlier details

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Details

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Southern California's defense industry, long the epicenter for high-flying aerospace technology and advanced weapons for the military, could get a ma windfall under President Trump's proposed new budget.

Los Angeles Times

BUSINESS

Southern California aerospace and defense contractors expecting boost from Trump budget



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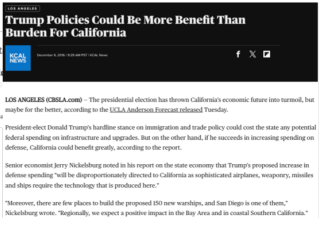
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LOS ANGELES

Trump Policies Could Be More Benefit Than Burden For California

KCAL NEWS

December 6, 2016 / 5:29 AM PST / KCAL News

LOS ANGELES (CBSLA.com) – The presidential election has thrown California's economic future into turmoil, but maybe for the better, according to the UCLA Anderson Forecast released Tuesday.

President-elect Donald Trump's hardline stance on immigration and trade policy could cost the state any potential federal spending on infrastructure and upgrades. But on the other hand, if he succeeds in increasing spending on defense, California could benefit greatly, according to the report.

Senior economist Jerry Nickelsburg noted in his report on the state economy that Trump's proposed increase in defense spending "will be disproportionately directed to California as sophisticated airplanes, weaponry, missiles and ships require the technology that is produced here."

"Moreover, there are few places to build the proposed 150 new warships, and San Diego is one of them," Nickelsburg wrote. "Regionally, we expect a positive impact in the Bay Area and in coastal Southern California."

Military News Shocks are (Regionally) Salient!

The Atlanta Journal-Constitution

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NEWS

Trump defense plan ignites hope in Georgia



A photographer takes pictures of Lockheed Martin F-35 Lighting II during a media day of Seoul International Aerospace and Defense Exhibition (ADEX) 2013 in Goyang, South Korea, Monday, Oct. 28, 2013. About 360 defense firms from 28 countries participate in the biennial international aerospace and defense exhibition from Oct. 29 to...

More

By Craig Schneider and Tamar Hallerman

March 7, 2017

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Raytheon to add nearly 2,000 high-paying jobs in Tucson

David Wichner , Joe Ferguson Nov 16, 2016 Updated May 10, 2018

BUSINESS

Trump looks good for defense business; New faces at the Pentagon; Want to buy an Army Humvee?



BY MARCUS WEISGERBER
GLOBAL BUSINESS EDITOR

NOVEMBER 10, 2016

Last year, Byron Callan was among the first to seriously examine what a President Trump would mean for Wall Street and the investment community.

The Capital Alpha analyst opened his Dec. 13, 2015, note like this: "We don't expect Donald Trump will be the next President. However we have some thoughts regarding defense if we are wrong." The gist: we don't know much about Trump's defense plan other than some broad themes.

A year later, we still don't know the specifics, but it appears that defense spending could be one of this election's biggest winners. Companies had been expecting a boost no matter who won; the question was how much. Now with a Republican heading to the White House in January and the GOP keeping control of both chambers of Congress, the consensus appears "higher than expected," even though Trump has not yet laid out detailed detailed defense plans.

$$\frac{Y_{\ell,t+h} - Y_{\ell,t-1}}{Y_{\ell,t-1}} = \underbrace{\beta_h}_{\text{XS-Multiplier}} \cdot \frac{G_{\ell,t+h} - G_{\ell,t-1}}{Y_{\ell,t-1}} + \alpha_\ell^h + \lambda_t^h + \varepsilon_{\ell,t+h}$$

- $Y_{\ell,t}$ real GDP, $G_{\ell,t}$ real DoD Contracts, α_ℓ^h & λ_t^h location & time FE; (N = 377; T = 24)

! **Endogeneity**: Reverse Causality, Anticipation (Auerbach et al., 2020)

→ shift-share (**Bartik**) instrument:

$$Z_{\ell,t+h}^{\text{Bartik}} = \frac{s_\ell \left(G_{t+h} - G_{t-1}\right)}{Y_{\ell,t-1}}$$

- s_ℓ (*Share*): DoD share of MSA ℓ
- G_t (*Shift*): National DoD contracts

→ we replace the shift:

$$Z_{\ell,t+h}^{\text{HFXS}} = \frac{s_\ell \, \mathbb{E}_t(G_{t+1})}{Y_{\ell,t-1}}$$

- s_ℓ (*Share*): DoD share of MSA ℓ
- $\mathbb{E}_t(G_{t+1})$ (*Shift*): HFXS news shock

2-year XS Multiplier of ≈ 1

Horizon	IV: HFXS Military News Shocks			IV: Standard Bartik		
	Coefficient	*pvalue*	*Effective F*	*Coefficient*	*pvalue*	*Effective F*
Impact	2.647	0.252	1.462	0.095	0.030	17.088
	(2.307)			(0.044)		
Year 1	1.352	0.000	14.939	0.539	0.000	95.193
	(0.369)			(0.125)		
Year 2	0.953	0.000	30.558	0.484	0.001	46.408
	(0.271)			(0.148)		
Year 3	0.614	0.070	6.257	0.639	0.013	15.239
	(0.338)			(0.256)		

Notes: 377 MSAs, 2001-23. GDP price deflator from BEA, base year 2017. Robust SE in parentheses, clustered at MSA level. Montiel Olea and Pflueger (2013) effective F is calculated with `weakivtest`.

$\longrightarrow$ The earlier HFXS shocks raise metro GDP: **a 2-year XS multiplier ≈ 1**

Robustness - Sample: 2002-2023 (Without 9/11) - 377 MSAs								
Horizon	*IV: HFXS Military News Shocks*			*IV: Standard Bartik*			*OLS*	
	Coefficient	*pvalue*	*Effective F*	*Coefficient*	*pvalue*	*Effective F*	*Coefficient*	*pvalue*
Impact	-0.112	0.594	9.428	0.124	0.008	17.575	0.009	0.622
	(0.209)			(0.047)			(0.018)	
Year 1	0.609	0.044	17.868	0.494	0.000	100.184	0.052	0.042
	(0.301)			(0.120)			(0.025)	
Year 2	0.571	0.033	12.293	0.437	0.002	42.991	0.078	0.090
	(0.268)			(0.142)			(0.046)	
Year 3	0.620	0.147	6.656	0.638	0.019	10.163	0.123	0.074
	(0.427)			(0.271)			(0.069)	

Notes: 377 MSAs, 2001-23. GDP price deflator from BEA, base year 2017. Robust standard errors in parentheses, clustered at MSA level. Montiel Olea and Pflueger (2013) effective F is calculated with `weakivtest`, coincides with Kleibergen and Paap (2006) statistic for single instrument