

Monetary Policy Surprises, Credit Costs, and VARs (Gertler–Karadi,
2015)

vs.

Fed Chair Speeches and Expanded HFI (Swanson–Jayawickrema, 2024)

Prepared for: Applied Time Series Econometrics

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Based on: Gertler & Karadi (2015, AEJ Macro) and Swanson & Jayawickrema (2024, working paper). Baseline-focused.

Roadmap

- 1 Gertler & Karadi (2015): Baseline
- 2 Swanson & Jayawickrema (2024): Baseline
- 3 Comparison & Synthesis
- 4 References

Research Question (GK 2015)

- How do exogenous **monetary policy surprises transmit** to *credit costs* and **macro activity** when financial frictions matter?
- Do modest short-rate surprises map into large movements in (i) term premia and (ii) credit spreads? What role does *forward guidance* play?

Econometric Methodology (Overview)

Hybrid HFI-VAR with External Instruments

- Estimate monthly VAR with economic & financial variables;
- identify the policy shock via *external instruments* (a.k.a. proxy SVAR / SVAR-IV; Stock–Watson; Mertens–Ravn).
- Instruments: 30-minute surprises in fed funds & Eurodollar futures on FOMC days (Kuttner 2001; Gurkaynak, Sack, and Swanson 2005). Include Forward Guidance (*path*) surprises via longer-horizon futures.
- **Policy indicator in VAR:** 1-year Treasury yield (baseline) to embed current target surprises *and* forward guidance in the identified shock.¹

¹Authors distinguish between the policy indicator and the policy instrument. The latter is the current period short term interest rate (specifically the federal funds rate). In the standard money shock VAR the policy indicator and policy instrument are one in the same, since the structural policy shock corresponds to an exogenous innovation in the current short rate. However, because authors wish to include shocks to forward guidance in the measure of the policy innovation, they instead take as the policy indicator a government bond rate with a maturity longer than the current period funds rate.

Econometric Details (GK 2015)

Structural VAR (SVAR):

$$A Y_t = \sum_{j=1}^p C_j Y_{t-j} + \varepsilon_t, \quad Y_t \in \mathbb{R}^n$$

Reduced form:

$$Y_t = \sum_{j=1}^p B_j Y_{t-j} + u_t, \quad u_t = S \varepsilon_t, \quad \text{Var}(u_t) = \Sigma.$$

External-instrument identification of the policy shock $\varepsilon_t^{(p)}$:

- Let $u_t^{(p)}$ be the reduced-form residual of the policy-indicator equation (p); project it onto the HFI instrument set Z_t (announcement-window futures surprises).
- 2SLS on other VAR equations using $\hat{u}_t^{(p)}$ recovers the impact vector s (the column of S tied to the policy shock).

HFI Surprises: Definitions (Baseline)

- For an announcement at time t , use a narrow window (e.g., 30 minutes). For a futures contract with settlement price f_{t+j} (maturity j):

$$\Delta f_{t+j} \equiv f_{t+j}^{\text{post}} - f_{t+j}^{\text{pre}}.$$

- Stack $\{\Delta f_{t+j}\}_j$ across horizons and extract two factors: (i) *target* (current policy if $j=0$) and (ii) *forward-guidance (path)* shocks by projecting multi-horizon moves onto current vs. path loadings.
- In GK's **baseline**, the VAR's policy indicator is the 1-year Treasury; Z_t is built from these FOMC-window futures surprises.

Proxy SVAR / SVAR-IV: Identification Steps (Precise)

Goal: identify the policy shock's impact vector s in a VAR using a high-frequency instrument.

- ① **Reduced form VAR:** $Y_t = \sum_{j=1}^p B_j Y_{t-j} + u_t$, with $\Sigma = \text{Var}(u_t)$.
- ② **Policy-indicator equation:** choose equation p (GK baseline: 1-year Treasury). Let $u_t^{(p)}$ be its residual.
- ③ **First stage (relevance):** $u_t^{(p)} = \pi Z_t + e_t$ with HFI instruments Z_t ; need $\text{Cov}(u_t^{(p)}, Z_t) \neq 0$.
- ④ The **second-stage** regression of u_t^q on \hat{u}_t^p then yields a consistent estimate of s_q/s_p :

$$u_t^q = \frac{s_q}{s_p} \hat{u}_t^p + \xi_t, \quad (1)$$

where \hat{u}_t^p is orthogonal to the error term ξ_t , given the exogeneity assumption. Scale so the policy indicator moves by the desired amount (e.g., 25 bp).

- ⑤ **IRFs:** if $Y_t = C(L)u_t$ with MA coefficients $\{\Psi_h\}$, then the IRF at horizon h is $\Psi_h s$.

Data (GK 2015)

- Sample period 1979:7 to 2012:6. **But you should take the same for the baseline, while an extended sample period, both backward till 1950 and forward till 2025 for the extension. Think how you would treat such a long sample.**
- HFI instruments: intra-day futures surprises (*FOMC windows; current and multi-horizon contracts*) to *span target + FG*. **For the baseline, take FOMC, for the extension use FED Chair and Vice Chair Speeches.** As for the surprise construction feel free to take futures if available, or in case you have access to databases. Otherwise use a free access to Yahoo Finance and use trading volume for S&P500. **If intraday data available use it, otherwise use daily like Kuttner 2001 paper.**
- VAR variables: output (log industrial production), proxy for inflation (log consumer price index), short rate, 1-year Treasury (one-year government bond rate), private yields/spreads (credit costs) - a credit spread, specifically the Gilchrist and Zakrajšek (2012) excess bond premium, etc. (monthly).
- Sample spans pre-ZLB and ZLB periods; FG particularly relevant post-2008.

Estimation & Baseline Results (GK 2015)

- **Estimation**

- use the simple VAR to show how the external instrument identification works
- compare with a standard Cholesky identification

- **Macroeffects:** Top left panel: a one standard deviation surprise monetary tightening induces a roughly 25 basis point increase in the one-year government bond rate. Significant decline in industrial production, there is a small decline in the consumer price index that is not statistically significant. Real rates move with nominal rates (price stickiness).
- **Credit costs:** The GZ excess bond premium increases on impact roughly 10 basis points, an amount which is statistically significant. The spread further remains elevated at roughly 7 basis points for roughly another half year
- **Forward guidance:** Strengthens transmission—holding the current funds-rate move fixed, FG news amplifies IRFs.

Estimation & Baseline Results (GK 2015)

Under the Cholesky scheme

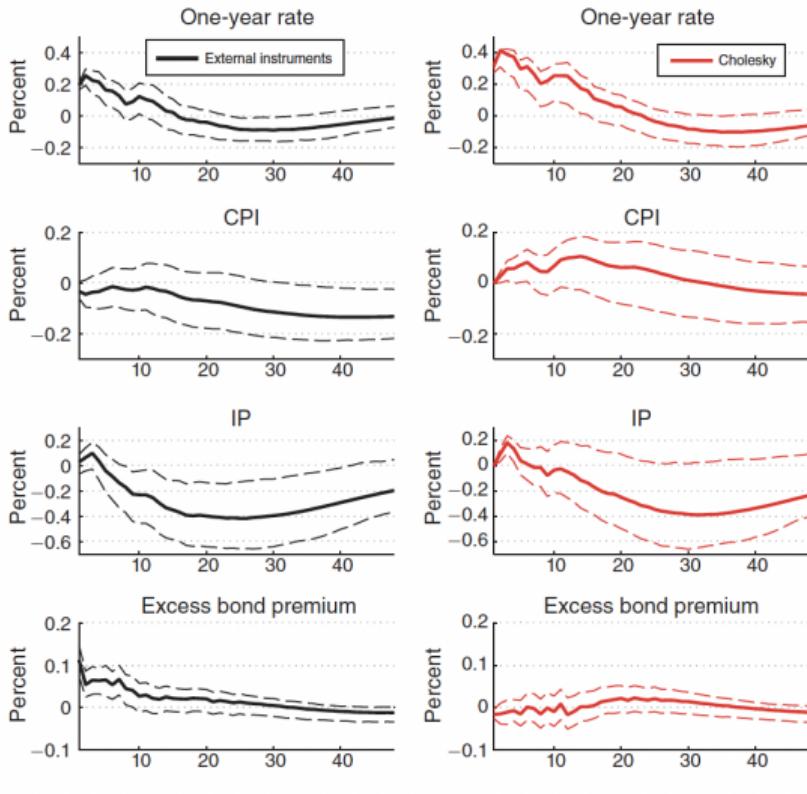
- the one-year rate is ordered second to last and the excess bond premium last
- the central bank adjustment of the one-year rate can have an immediate impact on the excess bond premium. **But** contemporaneous innovations in the excess bond premium do not affect how the central bank manipulates the one-year rate.
- **by assumption, any information in the innovation to the excess bond premium that is relevant to the central bank's decision is already contained in the innovations to industrial production and the CPI**
- as in the standard Cholesky case, the central bank can respond to news about output and prices within the period but can affect these variables only with a lag

Estimation & Baseline Results (GK 2015)

Under the Cholesky scheme

- the one-year rate increases, both industrial production and the CPI display “puzzles”
- though the point estimate of industrial productions eventually falls, the decline is not statistically significant
- the behavior of the excess bond premium illustrates the problem with the identification. In response to the surprise monetary tightening, this spread exhibits a statistically significant decline of several basis points.²
- Conversely, it is not reasonable to assume that the excess bond premium cannot respond instantly to a monetary shock.

²The decline in the spread is inconsistent with theory, which would suggest if anything just the opposite. More likely, there is a problem with the identifying restrictions. It appears the central bank is responding at least in part to the information contained in the excess bond premium. The below trend value of the premium is consistent with a strong economy, which induces the central bank to tighten. The resulting output and price puzzles are consistent with this interpretation. Accordingly, the restriction that the central bank does not respond to innovations in the excess bond premium either directly or indirectly (by responding to variables outside the VAR, which are correlated with the premium) does not appear to be reasonable.



First-stage regression:
 $F: 21.55$; Robust $F: 17.64$; $R^2: 7.76$ percent; Adjusted $R^2: 7.40$ percent

FIGURE 1. ONE-YEAR RATE SHOCK WITH EXCESS BOND PREMIUM

Research Question (S&J 2024)

- Are **Fed Chair speeches/testimony** more informative than FOMC announcements for markets and for building strong instruments?
- What is the relative importance of speeches, press conferences, and minutes for Target/FG/LSAP shocks?

Methodology (S&J 2024): Overview

- Extend the high-frequency identification (HFI) set beyond FOMC to include **Chair/Vice-Chair speeches**, press conferences, and minutes (1988–2023).
- Compute announcement-window changes for fed funds/eurodollar futures and Treasury futures over tight (e.g., 30-minute) windows.
- Decompose announcement-window moves into *Target*, *Forward Guidance (FG)*, and *LSAP* components; use these as proxy SVAR instruments.

HFI Construction: Events & Windows

- **Event set:** FOMC announcements, post-meeting press conferences, **Fed Chair speeches/testimony**, Vice Chair speeches.
- **Window:** For an event at time t , compute $\Delta p = p^{\text{post}} - p^{\text{pre}}$ over a narrow window (e.g., 30 minutes); align to the most-liquid contracts and enforce simultaneity across series.
- **Instruments:**
 - near-term fed funds/eurodollar futures (Target),
 - multi-quarter futures (FG),
 - long-dated Treasury futures/yields (LSAP / term-premium sensitivity).

Shock Decomposition: Target, FG, LSAP

- Stack contract changes into a vector ΔP_t for each event.
- Extract three components using loadings/orthogonalization:
 - ① **Target** — loads on near-term policy futures.
 - ② **FG** — loads on medium-horizon futures after removing Target.
 - ③ **LSAP** — loads on long-term Treasuries after removing Target & FG.
- Obtain orthogonal shocks z_t^T , z_t^{FG} , z_t^{LSAP} at the event level (OLS/PCA with sequential residualization).

From HFI Shocks to VAR Instruments

- Build event-level series across speeches/press conferences/minutes/FOMC; aggregate to monthly:

$$Z_m = \sum_{t \in m} Z_t \quad \text{for } Z_t \in \{z_t^T, z_t^{FG}, z_t^{LSAP}\}.$$

- Check first-stage relevance for the chosen policy-indicator residual (speech-inclusive measures typically strengthen FG/LSAP instruments).
- Apply **Proxy SVAR / SVAR-IV**: instrument the policy equation residual with Z_m , recover impact vector s , compute IRFs; normalize to 1 or 25 bp moves for comparability with GK.

Data (S&J 2024)

- 1988–2023: 360 FOMC announcements, 200+ minutes releases, ~**400+ Chair speeches**, 300+ Vice Chair speeches, 70+ press conferences.
- Intraday fed funds/eurodollar futures, Treasury futures, and equity futures for shock measurement.

Baseline Results (S&J 2024)

- **Fed Chair speeches** move Treasury yields and equities at least as much as, often more than, FOMC announcements.
- Press conferences have grown in importance over time; minutes and Vice Chair speeches matter modestly.
- Unified Target/FG/LSAP shocks strengthen instruments for VAR applications (especially FG/LSAP when speeches are included).

Research Questions: Contrast

- **GK (2015):** Transmission of policy shocks to credit costs and macro; role of term premia, spreads, and FG in VAR.
- **S&J (2024):** Where is the policy-relevant *news*? Broaden HFI to include speeches; build stronger instruments (esp. FG).

Econometric Methodology: Contrast

- **GK:** External-instrument VAR; policy indicator = 1y Treasury; instruments = FOMC-window futures surprises (target + FG).
- **S&J:** HFI construction expanded beyond FOMC; decompose into target/FG/LSAP; show speeches deliver larger, cleaner HFI shocks; apply to VARs.

Data & Estimation: Contrast

- **GK:** Monthly VAR; HFI shocks from FOMC windows; focus on credit costs IRFs.
- **S&J:** Intraday shocks from multiple communication types 1988–2023; emphasize **Chair speeches** and press conferences.

Baseline Results: Contrast

- **GK:** Tightening \Rightarrow large increases in credit costs via term premia & spreads; FG amplifies transmission.
- **S&J:** Speeches often dominate FOMC in moving yields/equities; unified FG/LSAP shocks across sources improve instrument strength.

Implications for Empirical Practice

- VARs with external instruments: consider *speech-based* HFI shocks to mitigate weak-instrument risks, especially for FG.
- When studying credit channels (à la GK), augment instruments with Chair-speech surprises to sharpen identification.

References

Gertler, M. and P. Karadi (2015). "Monetary Policy Surprises, Credit Costs, and Economic Activity." *AJ: Macroeconomics* 7(1), 44–76.

Swanson, E.T. and V. Jayawickrema (2024). "Speeches by the Fed Chair Are More Important Than FOMC Announcements: An Improved High-Frequency Measure of U.S. Monetary Policy Shocks." Working paper, Version 2.0 (March 27, 2024).