

The Fed Information Effect: Firm-level Evidence and Theory

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Fed information effect

- FOMC announcements can change private agents' beliefs regarding future economic conditions

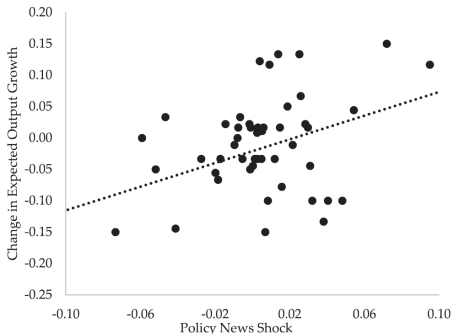


Figure: Nakamura and Steinsson (2018), Figure II

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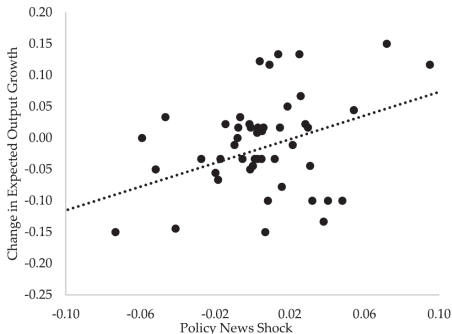


Figure: Nakamura and Steinsson (2018), Figure II

- No! Bauer and Swanson (AER, 2023): previous evidence not robust to controlling for macro news released prior to FOMC announcements

Contributions

- To detect effect of Fed announcements:
 - ↳ New approach: cross-sectional instead of aggregate
 - ↳ New data: Institutional Brokers' Estimate System (IBES)

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- To detect effect of Fed announcements:
 - ↳ New approach: cross-sectional instead of aggregate
 - ↳ New data: Institutional Brokers' Estimate System (IBES)

- Propose heterogeneous firm New Keynesian model
 - ↳ Incorporates our cross-sectional findings
 - ↳ Response of asset prices
 - ↳ Response of firm-level investment
 - ↳ Response of inflation to interest rate policy + Fed announcements

Outline

- New Cross-sectional Evidence
- Model
- Evidence for model's predictions

Measuring monetary shocks

- Sample period: 1990-2019
- High-frequency interest rates and stock market response around FOMC announcement
- Use Jarocinski and Karadi (2020) decomposition:
 - ↪ Central Bank Information (“CBI”) shock
 - ↪ Conventional monetary policy (“MP”) shock

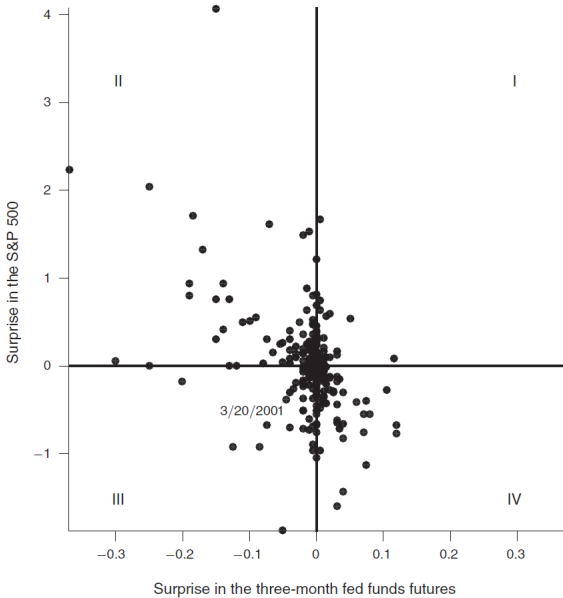
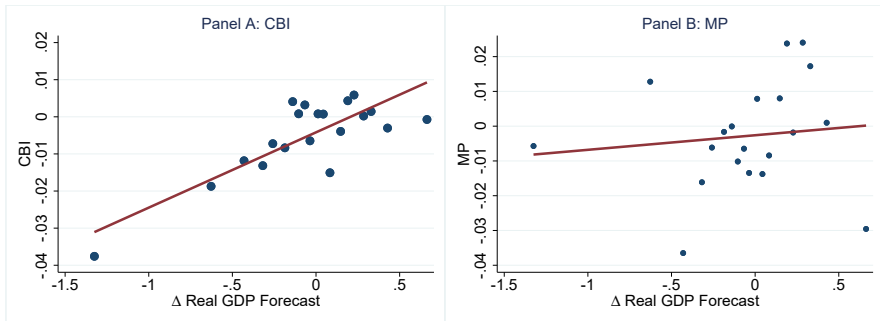
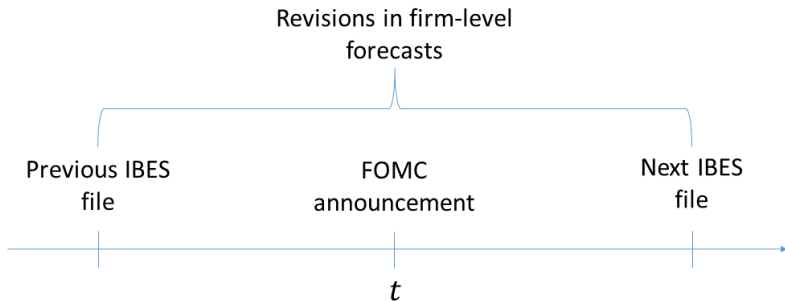


Figure: Jarocinski and Karadi (2020), Figure 1

Figure: Tealbook revisions in real GDP forecasts and monetary policy shocks.



Revisions in firm-level analyst forecasts



- $\text{UpRev}X_{i,t}$ = net upward revision in one-year ahead forecast of outcome X
- $X \in \{\text{earnings per share, sales}\}$

$$\text{UpRevX}_{i,t} = \widehat{\delta}_{CBI}(\beta_i \times CBI_t) + \widehat{\delta}_{MP}(\beta_i \times MP_t) + \boldsymbol{\gamma}' \mathbf{X}_{i,t-1} + \eta_i + \theta_{s,t} + \epsilon_{i,t}.$$

- β_i : CAPM beta, measures cyclicity of firm i
- Control for news from Bauer and Swanson (2022) data set
- Firm-level controls $\mathbf{X}_{i,t-1}$
- Firm FEs η_i
- Sector-by-time FEs $\theta_{s,t}$

	UpRevEPS		UpRevSales	
	(1)	(2)	(3)	(4)
$CBI \times \beta$	0.317***	0.217**	0.442***	0.377***
	(0.098)	(0.084)	(0.095)	(0.111)
$MP \times \beta$	0.023	0.017	0.066	0.066
	(0.042)	(0.042)	(0.046)	(0.052)
Observations	430,038	430,038	305,501	305,501
R^2	0.079	0.079	0.092	0.092
Firm-level Controls	✓	✓	✓	✓
Bauer-Swanson News $\times \beta$		✓		✓
Firm FE	✓	✓	✓	✓
Sector \times Time FE	✓	✓	✓	✓

Model

■ Structure:

- ↪ Wholesalers: produces input goods, heterogeneous cyclicalities
- ↪ Retailers: set prices
- ↪ Households: supplies labor & owns firms
- ↪ Monetary authority: sets monetary policy & communicates knowledge of future aggregate productivity

Wholesalers

- Output:

$$y_i(t) = e^{\beta_i z(t)} K_i(t)^\alpha N_i(t)^{1-\alpha}$$

- Heterogeneous productivity betas:

$$\beta_i \sim \Gamma$$

Cross-sectional distribution Γ fitted from data

■ Capital accumulation:

$$dK_i(t) = [l_i(t) - \delta]K_i(t)dt$$

subject to adjustment costs $[l_i(t) + \frac{\kappa}{2}l_i(t)^2] K_i(t)$

■ Optimal investment:

$$l_i(t; \beta) = \kappa^{-1} [v(t; \beta_i) - 1]$$

Retailers and households

- Retailers: sets prices \Rightarrow NKPC

$$\left[r(t) - \frac{Y'(t)}{Y(t)} \right] \pi(t) = \pi'(t) + \frac{\epsilon}{\theta} [p_w(t) - p_w^*]$$

- Households:

\hookrightarrow Labor supply:

$$w(t)C(t)^{-\gamma} = \varphi$$

\hookrightarrow Consumption Euler equation:

$$\frac{C'(t)}{C(t)} = \frac{r(t) - \rho}{\gamma}$$

Monetary authority

- Taylor rule:

$$i(t) = \rho + \phi_{\pi}\pi(t) + \varepsilon^m(t)$$

- Fisher equation:

$$i(t) = r(t) + \pi(t)$$

- Pure monetary shock ("MP shock")

$$\varepsilon^m(t) = \Delta_m e^{-\psi_m t}$$

Fed information shock

- Fed learns + communicates shock to future aggregate productivity:

$$\varepsilon^{CBI}(t) = \Delta_{CBI} \times \left(t/\bar{t}\right)^{\psi_{CBI}\bar{t}} e^{-\psi_{CBI}(t-\bar{t})}$$

Then all agents respond accordingly

Figure: Size and shape of CBI shocks.

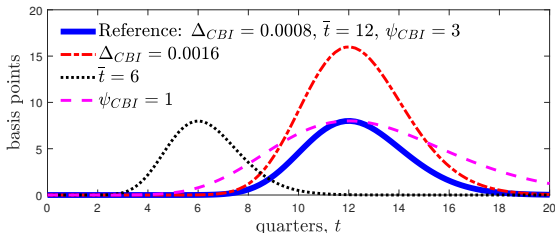
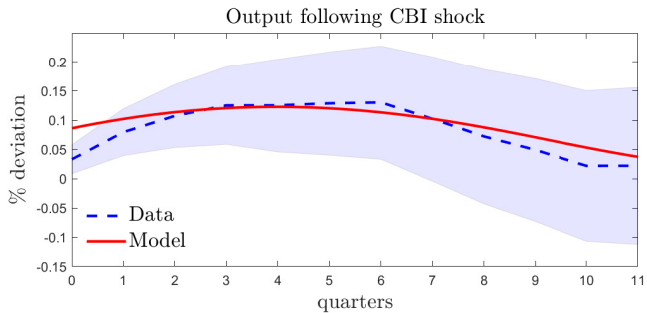
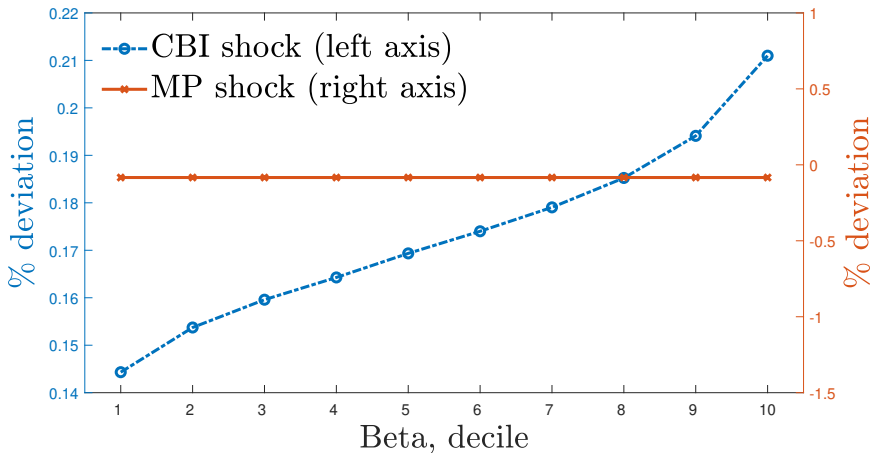


Figure: Calibration of CBI shock.

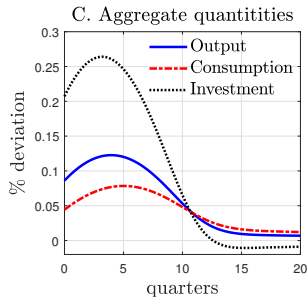
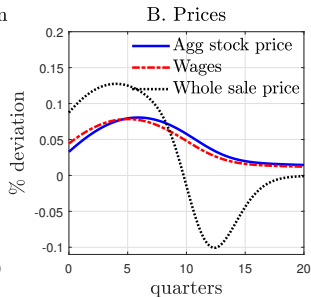
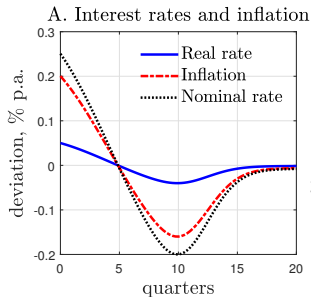


Validation

Sales

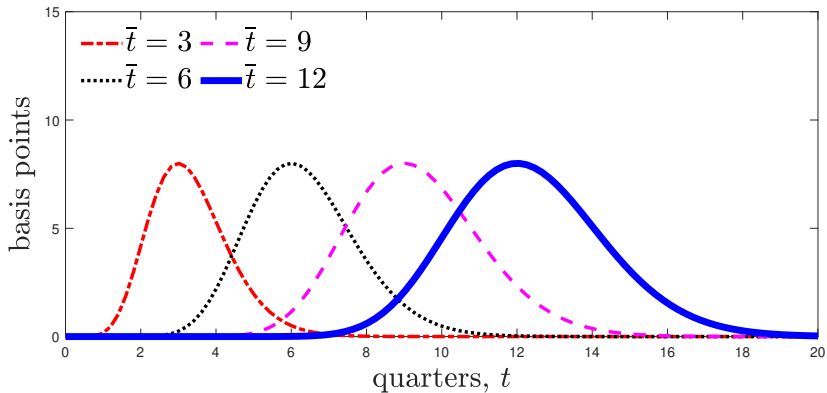


Aggregate responses to an expansionary CBI shock

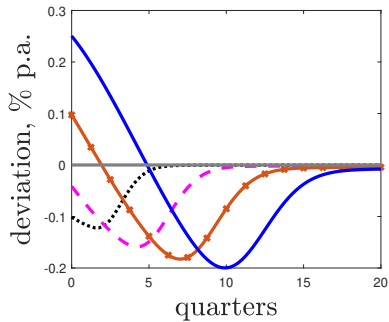


When do you get a CBI shock?

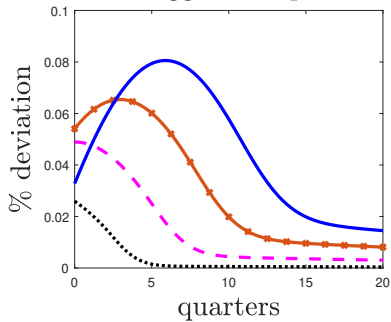
When do you get a CBI shock?



A. Nominal rate

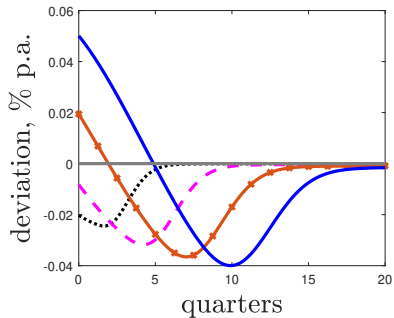


B. Agg. stock price

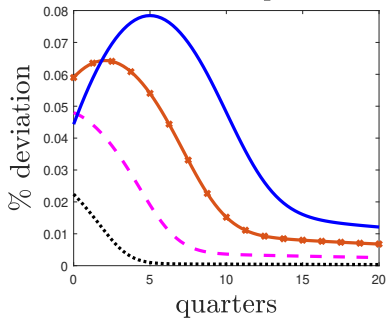


..... $\bar{t} = 3$ - - - $\bar{t} = 6$ - - - $\bar{t} = 9$ - - - $\bar{t} = 12$

A. Real rate



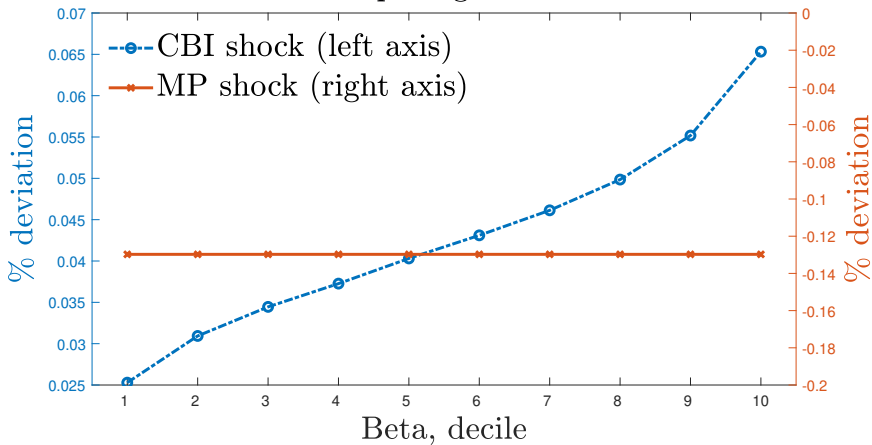
B. Consumption



..... $\bar{t} = 3$ - - - $\bar{t} = 6$ - - - $\bar{t} = 9$ - - - $\bar{t} = 12$

Prediction 1: firm-level investment

Capital growth



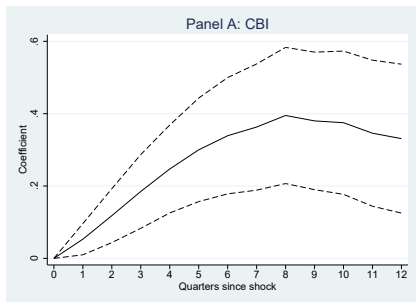
Evidence: firm-level investment

$$\Delta \log k_{i,t-1 \rightarrow t-1+h} = \delta_{CBI,h} (\beta_i \times CBI_t) + \delta_{MP,h} (\beta_i \times MP_t) + \gamma'_h \mathbf{X}_{i,t-1} + \eta_i + \theta_{s,t} + \epsilon_{i,t}$$

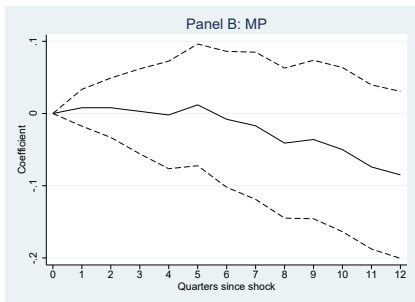
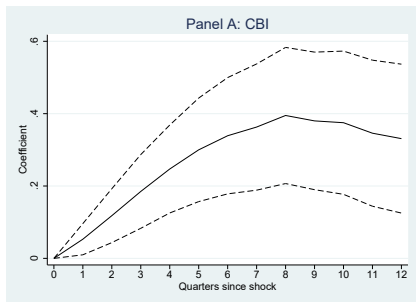
- $\Delta \log k_{i,t-1 \rightarrow t-1+h}$: cumulative investment response of firm i , h quarters following FOMC announcement

	(1)	(2)
CBI $\times \beta$	0.543***	0.395***
	(0.103)	(0.096)
MP $\times \beta$	0.031	-0.041
	(0.063)	(0.053)
Observations	331,364	331,364
R^2	0.350	0.351
Bauer-Swanson News $\times \beta$		✓
Firm-level Controls	✓	✓
Firm FE	✓	✓
Sector \times Time FE	✓	✓

Dynamic investment response to Fed info

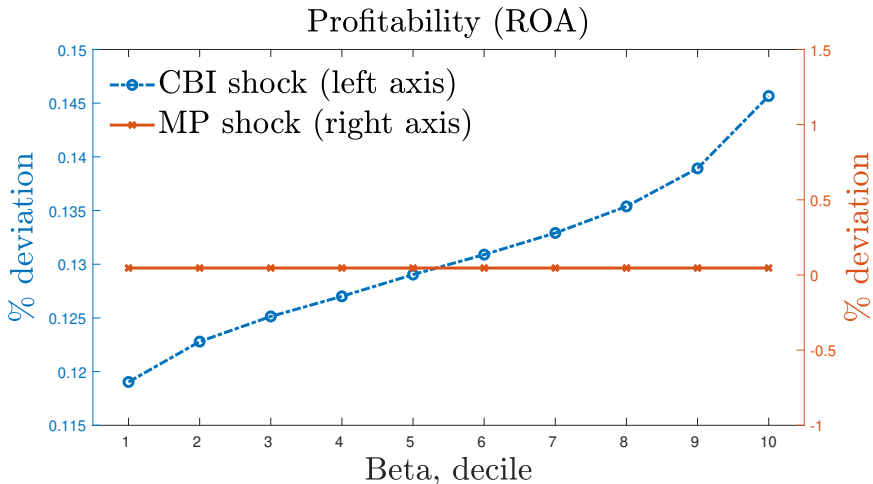


Dynamic investment response to Fed info



Prediction 2: profitability channel

Prediction 2: profitability channel



Evidence: profitability channel

$$\text{Profit}_{i,t-4+4n \rightarrow t-1+4n} = \widehat{\delta}_{CBI}(\beta_i \times CBI_t) + \widehat{\delta}_{MP}(\beta_i \times MP_t) + \boldsymbol{\gamma}' \mathbf{X}_{i,t-1} + \eta_i + \theta_{s,t} + \epsilon_{i,t}$$

- $\text{Profit}_{i,t-4+4n \rightarrow t-1+4n}$ is realized annual ROA in n th year following FOMC announcement at quarter t

	<i>n</i> = 1 year		<i>n</i> = 2 year		<i>n</i> = 3 year	
	(1)	(2)	(3)	(4)	(5)	(6)
CBI $\times \beta$	0.021 (0.032)	-0.009 (0.031)	0.094*** (0.033)	0.065* (0.036)	0.081** (0.036)	0.107** (0.041)
MP $\times \beta$	0.024 (0.020)	-0.003 (0.020)	-0.041** (0.018)	-0.055*** (0.020)	-0.003 (0.021)	-0.004 (0.022)
Observations	341,604	341,604	307,663	307,663	283,926	283,926
R^2	0.775	0.775	0.703	0.703	0.699	0.699
Firm-level Controls	✓	✓	✓	✓	✓	✓
Bauer-Swanson News $\times \beta$		✓		✓		✓
Firm FE	✓	✓	✓	✓	✓	✓
Sector \times Time FE	✓	✓	✓	✓	✓	✓

Monetary policy with Fed info effect

- Model: positive Fed information of future productivity \Rightarrow muted response of inflation to rate hikes
- Fed Chair Powell, August 25, 2023 Jackson Hole speech:

[a]dditional evidence of persistently above-trend growth could put further progress on inflation at risk and could warrant further tightening of monetary policy

- Consider combined Fed information + pure monetary shock:

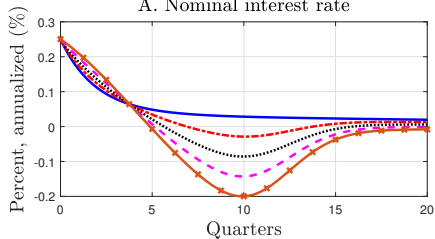
$$w_{CBI} \times \varepsilon^{CBI}(t)$$

and

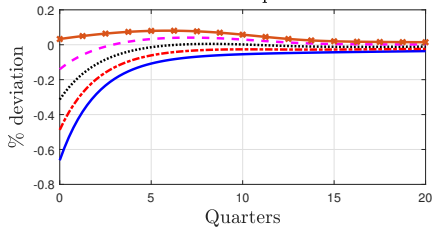
$$(1 - w_{CBI}) \times \varepsilon^m(t),$$

$w_{CBI} \in [0, 1]$ is strength of information effect

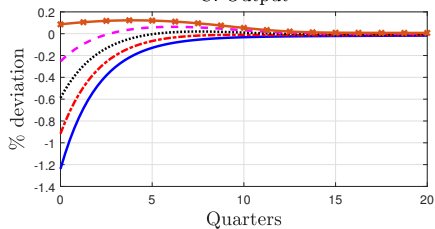
A. Nominal interest rate



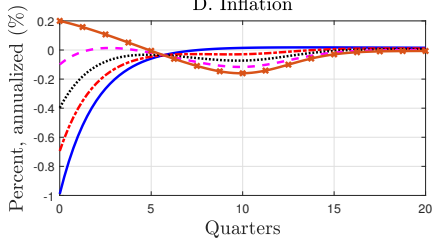
B. Stock price



C. Output



D. Inflation



— $w_{CBI} = 0$ - - - $w_{CBI} = 0.25$ $w_{CBI} = 0.5$ - · - · $w_{CBI} = 0.75$ — $w_{CBI} = 1$

Contributions

- New approach and new data to identify Fed info effect
- More cyclical firms respond more strongly to Fed info
 - ↳ Revisions in analyst forecasts
 - ↳ Investment response
 - ↳ Profitability channel
- Heterogeneous firm New Keynesian model
 - ↳ Incorporates our cross-sectional findings
 - ↳ Microfoundation CBI shock
 - ↳ Muted inflation response in presence of Fed info effect