

Economics 742 Lecture 4:
Housing III: Stabilization Policy
Other Shocks I: Bartik and Monetary Shocks

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Housing and Macro

1. Introduction
 - 1.1 Why is housing and macro interesting?
 - 1.2 How did I get to housing?
 - 1.3 My JMP: House Price Momentum
2. Question 1: How big are housing wealth effects? Why do they exist? Are they big in the aggregate?
3. Question 2: What explains the 2000s housing boom and bust (and rebound)?
4. Question 3: What types of housing market stabilization policy are effective?
5. Bonus: References for interesting topics I did not cover
 - 5.1 Monetary Policy and Housing Markets
 - 5.2 Behavioral Housing Economics
 - 5.3 Housing Supply

Question 3:

What Types of Housing Market
Stabilization Policies Are Effective?

How Can Policy Limit House Price Cycles and Default?

- Big policy question, especially in a downturn.
- Start with a literature on what we can do *ex post*.
 - Given evidence on role of foreclosure, really about optimal foreclosure mitigation policy.
 - But also could do by looking at QE, etc. (won't do here, see Di Maggio, Kermani, and Palmer 2020).
 - Focus on evidence from two major government programs, HARP and HAMP.
- Given limitations and implementation frictions with *ex post* policy, will briefly touch on *ex ante* policy at the end.
- This is an area where in 2008 policy makers were flying blind and where research will make a big impact in the next crisis.

What Was Done: HARP and HAMP

- Home Affordable Refinance Program (HARP)
 - Allow homeowners with GSE loans *who are current* to refinance underwater (or above 80% LTV).
 - Initially limited take up; once remove frictions, takes off. 3 million modifications with \$3k in annual savings.
 - Agarwal et al. (2022):
 - Regions more exposed saw increase in spending, lower foreclosures, higher consumption.
 - But limited by competitive frictions: borrowers favor existing lenders creating market power which reduces benefits 10-20%.
- Home Affordable Modification Program (HAMP)
 - Modify loans for delinquent borrowers to avoid foreclosure through financial incentives and gov't cost sharing.
 - Agarwal et al. (2017):
 - Reached only 1/3 of target due to low modification rate of a few large lenders. Also crowded out some private mods.
 - Regions more exposed to have lower foreclosures, higher house prices and consumption.

Big Question: Principal Reduction or Payment Reduction?

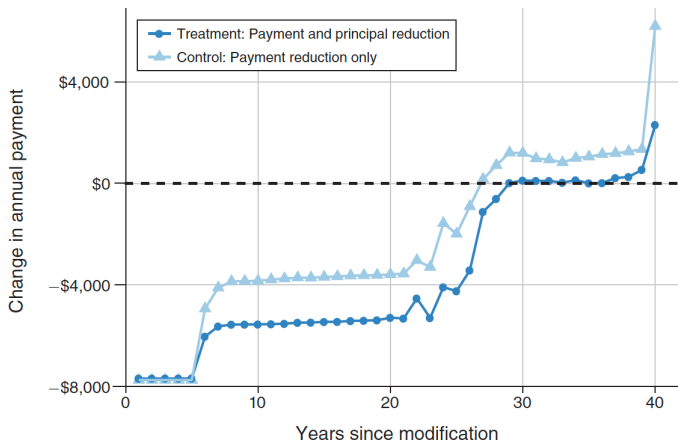
- Geithner: “The biggest debate was whether to try to reduce overall mortgage loans or just monthly payments.
- Mian and Sufi: “The fact that ... the Obama administration did not push for debt write-downs more aggressively remains the biggest policy mistake of the Great Recession.”
- Obama in 2009 “invited seven of the world’s top economists...nearly all staid Obama should introduce a much bigger plan to forgive part of the mortgage debt owed by millions of homeowners who are underwater.”
- At same time, tea party movement started by people who do not want to bail out their recklessly borrowing neighbors (e.g. Rick Santelli’s “Chicago Tea Party” speech)
 - Obama’s response: The fire department puts out the fire rather than asking if it was caused by bad behavior.

Principal or Payment: Ganong and Noel (2020)

- Difficulty in evaluating principal or payment: Most interventions do *both simultaneously* as mechanically linked.
- Ganong and Noel evaluate two natural experiments within HAMP which adjust each margin *separately*:
 1. Underwater borrowers who get the same payment reduction through principal reduction or other means (interest rate reduction and term extension).
 - RD for default probability.
 - Panel diff-in-diff for consumption for precision.
 2. Different reductions in short-term payments with same NPV of total mortgage payments due to private (more generous) vs. public (less generous) modification.
- Use data matching HAMP to credit reports and to JP Morgan Chase banking data.

Principal or Payment: Ganong and Noel (2020)

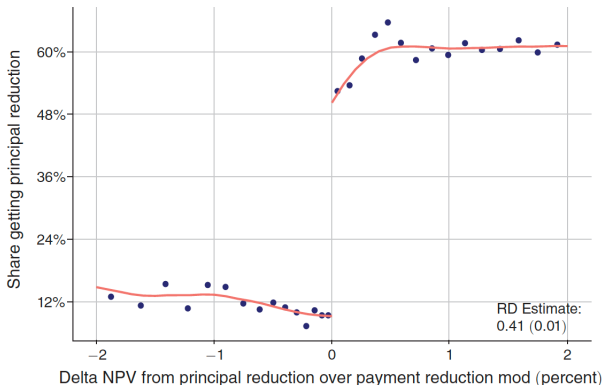
- All HAMP loans reduce payment to 31% of income for 5 years.
- Can achieve through principal reduction or other means such as interest rate reduction and term extension.



Principal or Payment: Ganong and Noel (2020)

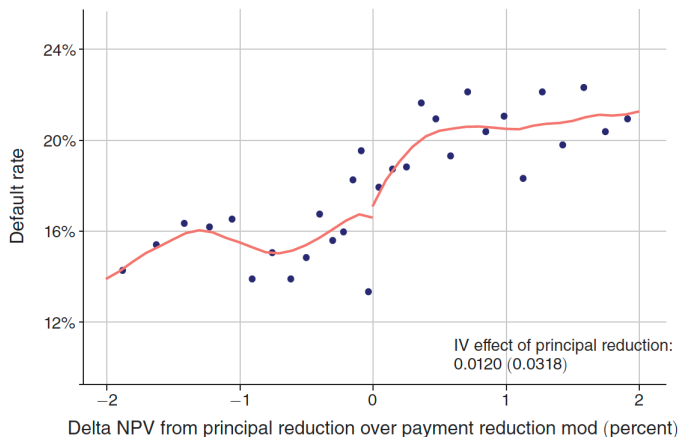
- Treasury calculates expected NPV to lenders of principal reduction (based on *ex post* wrong model).
- Ganong and Noel do a fuzzy RD on the Treasury's NPV:

Panel A. First stage: receive principal reduction



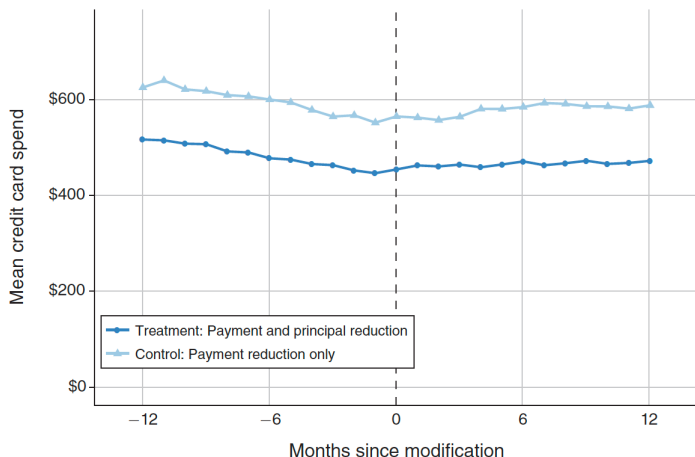
Principal or Payment: Ganong and Noel (2020)

Panel B. Reduced form: mortgage default



- Precisely no effect of principal reduction on default.

Principal or Payment: Ganong and Noel (2020)

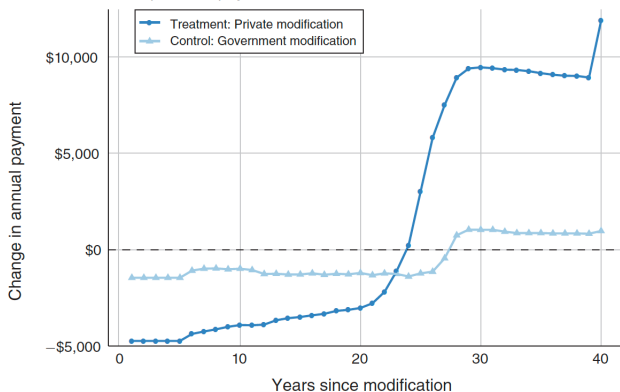


- Panel diff-in-diff shows precisely no effect of principal reduction on consumption.

Principal or Payment: Ganong and Noel (2020)

- HAMP reduced payment to income to 31%. Private modifications reduce payments by more due to payment target.
- Reduce short-run payments by more by extending maturity, but leave NPV of total payments owed unchanged.

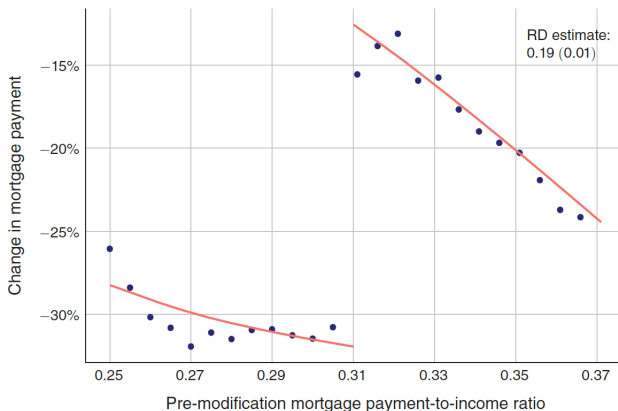
Panel A. Annual impacts on payments



Principal or Payment: Ganong and Noel (2020)

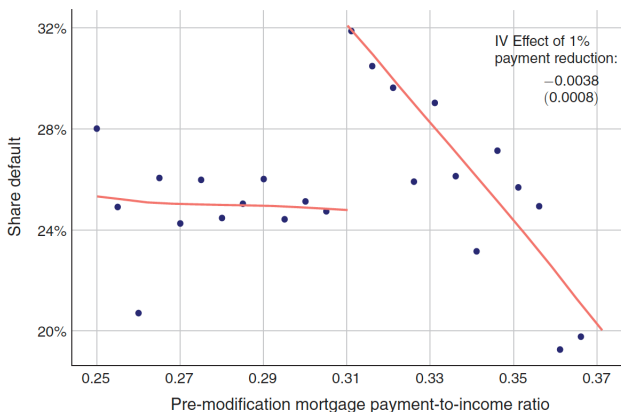
- Ganong and Noel do fuzzy RD on pre-modification PTI ratio:

Panel A. First stage: change in mortgage payment from modification



Principal or Payment: Ganong and Noel (2020)

Panel B. Reduced form: mortgage default



- 1% payment reduction reduces default in two years post-modification by 0.38 percentage points, 1.2% of the mean.

Ganong and Noel (2020) Take Aways

- Great example of interesting variation in housing micro-data; likely to have huge policy impact in the next foreclosure crisis.
- Clear economic interpretation:
 - Payment reduction relaxes constraints in the short-term.
 - Principal reduction gives wealth in states where housing market has already recovered, cannot tap in short run.
 - Constrained today → heavily discount these future states, eliminating short-run impact of principal reduction.
 - However, is likely that larger principal reduction to bring people above water may have stronger effects.
- Payment reductions through term extensions also much more cost effective, as principal reductions are expensive.
 - And very politically unpopular.

Macroprudential Policy

- Given implementation frictions, recent literature has focused on policies that can be implemented *ex ante*.
 - Some empirical analysis of policies such as Dodd-Frank ability to pay rule (DeFusco et al., 2020).
 - Some analyses of policies like changing loan-to-value requirements, payment-to-income requirements, etc. often abroad (e.g., Greenwald, 2018, Allen and Greenwald, 2022, Garriga and Hedlund, 2022, etc.).
 - Also more general models of household macroprudential policy, e.g. Korinek and Simsek (2016).
 - Related to debate about whether credit affects house prices.
- Many open questions about optimal policy, although implementation limited by Congressional gridlock.

Mortgage Design

- Other direction literature has gone: Contract design for *ex ante* stability, usually in structural life-cycle models.
- 1. Guren, Krishnamurthy, and McQuade (2021): Endogenous house prices and price-foreclosure spiral.
 - Lesson: Front-load payment reductions in recessions..
 - FRM→ARM convertible mortgage helps by switching to ARM when needed, refi back to FRM if advantageous.
- 2. Campbell, Clara, and Cocco (2021): Endogenous lender SDF.
 - Lesson: Term extension provides payment reductions in way that is attractive to risk-averse lender and minimizes up front costs to households.
- 3. Greenwald, Landvoigt, Van Nieuwerburgh (2021): Shared appreciation mortgages.
 - SAMs useful for geographic diversification and risk sharing, but aggregate SAMs hurt financial intermediary balance sheets in bad states and can be counterproductive.
- Worth revisiting in high-inflation environment.

Conclusion

- That's all I have on housing, although in appendix at the end of the slides I included brief literature outlines for three additional topics:
 1. Monetary Policy and Housing Markets
 2. Behavioral Housing Economics
 3. Housing Supply
- I hope this was interesting and am happy to talk further!

Other Sources of Micro Variation in Macro

Outline

- For the next two lectures, I want to focus on sources of micro variation in macro that I have not covered in the housing unit.
1. Share-Shift “Bartik” Shocks
 2. Monetary Shocks
 3. Firm-Level Shocks
 - 3.1 Collateral and Bank Shocks
 - 3.2 Granular IV
 - 3.3 The Role of Credit in the Great Recession
 4. Fiscal Multipliers
- Then on to aggregation of micro estimates.

Share-Shift (“Bartik”) Shocks: Idea

- Popular shock because it uses *regional* data, which is more easily available.
- National-level shocks affect some regions more than others because they have a greater share of responsive agents.
- So consider a shock that interacts:
 - Initial *share* of responsive agents.
 - With the national shock, measured as the average shock across regions using a leave-out mean to prevent endogeneity.
- Often called a “Bartik Shock” because Blanchard and Katz (1992) cite Bartik (1991) as giving intuition.
- Used both as a shock and an instrument.
 - How are these different?

Share-Shift (“Bartik”) Shocks: Examples

- “Classic” Bartik Shock to local employment is sum of local industry share \times national industry shock.
 - Intuitively, if steel nationally outside of Pittsburgh does badly, then Pittsburgh should do badly.
- Other “Industry” Share-Shift Shocks
 - Local wage shocks by worker skill (Diamond, 2016)
 - Decline of manufacturing (Charles et al., 2018)
 - Penetration of Chinese imports (Autor-Dorn-Hanson, 2013) or robots (Acemoglu and Restrepo, 2019)
 - Military spending shocks (Nakamura and Steinsson, 2014)
- Bank Share-Shift Shocks
 - Foreign bank shock (Peek and Rosengren, 2000)
 - Bank health in Great Recession \times bank locations prior to recession (Greenstone et al., 2020; Mondragon, 2020)
- MANY more.
 - Few year old econometrics papers have hundreds of cites.

Share-Shift (“Bartik”) Shocks: Formalism

- Define the Bartik shock to location j at time t as

$$\Delta \log \hat{X}_{j,t} = \sum_{ind} (\log X_{ind,-j,t} - \log X_{ind,-j,t-1}) \frac{X_{ind,j,t_{base}}}{X_{j,t_{base}}}$$

- $-j$ is all locations but j .
 - Can do over any horizon.
 - t_{base} can be $t - 1$ but can also be a longer lag.
 - Need not be in logs
- “Classic” Bartik shock uses employment for X and is interpreted as labor demand shock.

Example: Autor, Dorn, and Hanson (2013) “China Shock”

- What is the effect of import competition on labor markets?
 - Large increase in imports from China after it joined WTO.
 - Simultaneous decline in manufacturing in U.S.
 - Are these related?
- Approach: Look at local labor markets (commuting zones).
 - Shares: Industrial specialization within manufacturing.
 - Shift: Increase in Chinese imports by sub-industry due to differential Chinese comparative advantage.
- Change in Chinese import exposure per worker:

$$\Delta IPW_{uit} = \sum_j \frac{L_{ijt}}{L_{ujt}} \frac{\Delta M_{ucjt}}{L_{it}}$$

where u is U.S., c is China, i is CZ, and j industry.

- Control for manufacturing share in regressions.

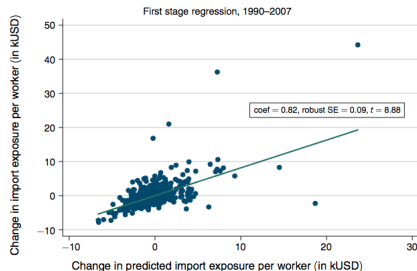
Example: Autor, Dorn, and Hanson (2013) “China Shock”

- Chinese comparative advantage with U.S. is endogenous!
 - Instrument for U.S. import growth by industry with growth in imports by other high-income markets

$$\Delta IPW_{oit} = \sum_j \frac{L_{ijt-1}}{L_{ujt-1}}$$

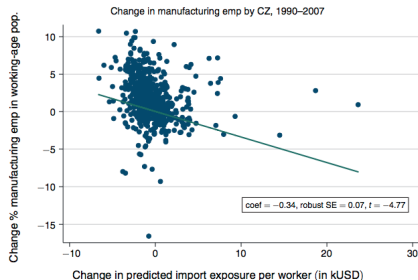
- 10 year lags to limit expectations of future trade.
- Turns out not to matter much.

Panel A. 2SLS first stage regression, full sample



Example: Autor, Dorn, and Hanson (2013) “China Shock”

Panel B. OLS reduced form regression, full sample



- Relative to 25th percentile of exposure, 75th percentile has:
 - 4.5% fall in manufacturing employees.
 - 0.8 pp larger reduction in employment/population
 - 0.8% larger decline in wages.
 - 2-3.5% Increases in unemployment, disability, and transfer programs.

Share-Shift (“Bartik”) Shocks: Basic Concerns

1. Pre-Shock Shares Correlated With Outcome

- If time lag is short and shocks are serially correlated.
- Endogeneity of shares.
 - Usually argue shares based on historical accidents.
 - Never clear to me if this is the dominant source of variation.

2. Shock is Correlated With Other Shocks

- For instance, bad banks go into worse areas, make worse loans, and then have worse national shocks.
- In “classic” Bartik, concern is corr with “labor supply shocks.”
 - Works if national growth rates are not correlated with the supply shock \Rightarrow industries are not too concentrated.
 - In reality, picks up mixture of supply and demand shocks.
 - E.g., If female labor supply expands nationally, Bartik shows it as demand shock to female-dominated industries.
- For OVB, need an omitted variable that is BOTH correlated with shares in cross section AND correlated with shocks in time series.

Three Recent Formalizations of Issues With Bartik

1. Adao, Kolesar, and Morales (2019): Inference, *shifts* random.
 - Cities have similar industrial shares; creates clustering problem.
 - Monte Carlos: Rejection rate for 5% CIs is 45-55%!
 - Novel standard errors to fix.
 2. Borusyak, Hull, Jaravel (2021): Identification, *shifts* random.
 - Orthogonality between instrument and residual is equivalent to orthogonality between shocks and shock-level residual.
 - Valid when *shocks* idiosyncratic (quasi-random assignment), many, uncorrelated, and dispersed.
 - Tests: Placebos and first stage F statistics at level of shocks.
 3. Goldsmith-Pinkham, Sorkin, and Swift (2020): Identification, *shares* random.
 - Reframe as coefficients from shock-weighted *share-level* IV.
 - Diff-in-diff exposure design with exposure based on *shares*.
 - Tests based on diff-in-diff interpretation, over ID, exog of shares. Provide weights to show what industries matter.
- Depends on setting, but my view is random shifts typically makes most sense.

Monetary Shocks

- There are generally three approaches used:
 1. **VAR** Evidence of Christiano, Eichenbaum, and Evans (2005)
 2. **Narrative Approach** of Romer and Romer (1989, 2004)
 3. **High Frequency Identification**
- I discussed the VAR approach and Cholesky decomposition assumptions at length in 704, but only briefly discussed the later two approaches.
 - I want to go into some greater detail and discuss outstanding issues in the literature today, which will be useful for HANK.
 - Good reference on reconciling (1) and (2): Coibion (2012).
- Good but skeptical summary:
Ramey (2016) Handbook of Macro Chapter
 - General Take: VAR and Local Projection across methods and time periods is unstable, doesn't know what to make of it.
 - I am more positive on usefulness of these methods.

Romer-Romer Narrative Approach

- Really two approaches: 1989 Narrative and 2004 Shock Series
- Narrative Approach (Romer-Romer 1989, Updated in 2023 AEA Presidential Address)
 - Go through transcripts and historical record, pick out Fed meetings where change in monetary policy is unrelated to state of economy (e.g., a change in the Fed's preferences).
 - Only determine 5 years after when transcripts released.
 - Just a set of dummy variables for a few meetings.
Can run IRFs on these dummies.
- Examples:
 - Contractionary: In December 1988, change view of what level of inflation is acceptable and raise rates.
 - Expansionary: January 1972 think unemployment has settled at too high a level and lower rates.
- No monetary shocks 1988-2016, only one expansionary shock.
- Typically not what people use.

Romer-Romer (2004) Shocks

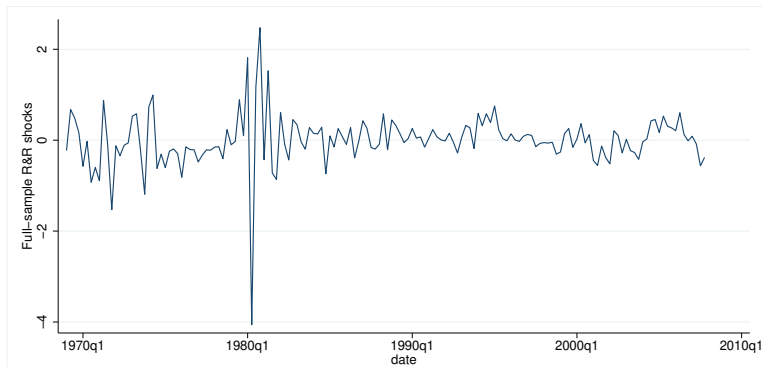
- Fed staff produces “Greenbook” forecast for each meeting. Shock is change in fed funds rate unrelated to forecast.

$$\begin{aligned}\Delta ff_m = & \alpha + \beta ffb_m + \sum_{i=-1}^2 \gamma_i \Delta \tilde{y}_{mi} + \sum_{i=-1}^2 \lambda_i (\Delta \tilde{y}_{mi} - \Delta \tilde{y}_{m-1,i}) \\ & + \sum_{i=-1}^2 \phi_i \tilde{\pi}_{mi} + \sum_{i=-1}^2 \theta_i (\tilde{\pi}_{mi} - \tilde{\pi}_{m-1,i}) + \rho \tilde{u}_{mo} + \varepsilon_m\end{aligned}$$

- Δff_m is change in intended FFR at meeting
 - ffb_m is level before meeting.
 - \tilde{y} , $\tilde{\pi}$, and \tilde{u} are forecasts of output, inflation, and unemp.
 - Use both forecasts and change in forecasts since last meeting.
- Then ε_m is the Romer-Romer shock which is typically used
 - Updated version 1969-2007 on Johannes Wieland's website is what people frequently use as “Romer-Romer shocks.”

Romer-Romer (2004) Shocks

- Advantages: Large and statistically powerful shocks.
- Most of variation from Volcker, some from pre-Volcker.
Little variation since 1988.
 - Unclear if advantage or disadvantage.
 - In a few years when 2021 and 2022 Greenbooks released we may have more shocks!

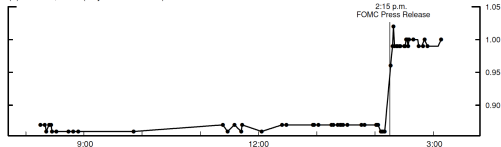


High Frequency Identification

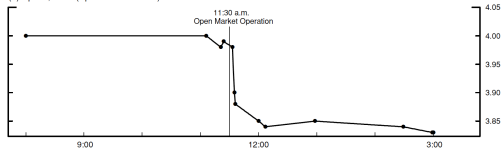
- Monetary policy news is lumpy and revealed at FOMC meetings.
 - How can we use this for identification?
 - Zoom in on tight (15-30 min) windows around Fed policy announcements. Response of Fed Funds futures in these windows reflects “surprise” component of monetary policy.
- Assumption: Unexpected changes in those windows are only due to Fed, not other factors.
- Most credible identification, but lower power because:
 - Shocks are small
 - Sample is short since late 80s and does not include Volcker.
- 2 Versions of this:
 1. Look at high frequency financial variables in same window.
 - More successful.
 2. Time aggregate the shocks and look at infrequent outcomes.
 - More skepticism warranted, but potentially more interesting.

High Frequency Identification

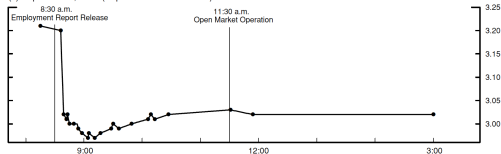
(a) June 25, 2003 (July 2003 Contract)



(b) April 9, 1992 (April 1992 Contract)



(c) September 4, 1992 (September 1992 Contract)



High Frequency Identification: High Frequency Outcomes

- Gurkaynak, Sack, and Swanson (2005)
 - Split into “target” factor (unexpected changes in current FFR) and “path” factor (“changes in future rates orthogonal to current”) using principal components.
 - Path matters more for response of long-term Treasury yields.
- Nakamura-Steinsson (2018)
 - Show monetary news leads to large and persistent changes in real rates and small changes in expected inflation.
 - Strong evidence for non-neutrality.
 - Method: Compare response of Treasuries and TIPS over yield curve to policy news shock (first principal component of change in 5 Fed Funds Futures; similar to GSS “path”).
 - But survey estimates of expected output growth *rise* in response to news shock that raises term structure of real rates!
 - Explanation: **“Fed Information Effect.”** Fed not only revealing future policy but also macroeconomic information.

High Frequency Identification: Low Frequency Outcomes

- Angrist, Jorda, and Kuersteiner (2017), Ramey (2016): High frequency shocks with non-parametric methods (e.g. local projection) are **under-powered**.
- Gertler and Karadi (2015): **External Instruments VAR**
 - Intuition: Use VAR structure to make high frequency approach much more powerful.
 - Time-aggregated high frequency shocks used as instruments using Stock and Watson “external instrument VAR” or “proxy SVAR” method. Iterate VAR to get IRF.
 - Find statistically significant non-neutrality.
- See also Gorodnichenko and Weber (2016), Wong (2021), Ottonello and Winberry (2020), etc.
 - Even if shocks small and imprecise for aggregates, differential responses by groups can elucidate MP transmission.
- **Have to think carefully about standard errors.**
 - Especially in a panel.

High Frequency Identification: Most Recent Literature

- **Predictability of High Frequency Shocks**
 - Cieslak (2018) and Bauer and Swanson (2023) show shocks corr with macro data announcements that precede FOMC.
 - Bauer and Swanson (2022, Macro Annual) orthogonalize on financial data to create more exogenous series.
- **Revisiting the Information Effect:**
 - Acosta (2023): Splits monetary and information shocks by looking at how FFR and GDP expectations respond.
 - Bauer-Swanson (2023) argue Fed information effect is really a Fed response to news.
 - If control for news, output response flips sign.
 - Survey forecasters and say revise in response to news not Fed.
- **Speeches:** Bauer and Swanson (2022) incorporate press conferences, speeches, and testimony by Fed Chair.
 - They argue more important than FOMC announcements and increases statistical power.
- Bauer and Swanson (2022) good reference for best practices.

High Frequency Identification: LP vs. SVAR

- Plagborg-Moller and Wolf (2021)
 - **LP and VAR(∞) estimate the same IRFs in population.**
 - Implications:
 1. LP and VAR are two different dimension reduction techniques for finite samples.
 2. Structural estimation with an IV can be carried out by ordering instrument first in a recursive VARs.
- Li, Plagborg-Moller, and Wolf (2023)
 - **Bias-variance tradeoff** between LP (lower bias) and VAR (lower variance at intermediate and long horizons).
 - Unless overwhelmingly concerned with bias, LP is not optimal.
 - Mean squared error prefers VARs. Shrinkage via Bayesian VAR or penalized LP is attractive.
 - Intuition: Reduce bias a lot by taking advantage of “smoothing” of IRFs.
- Best summary of external instruments SVAR method: Watson discussion of Bauer and Swanson (2022).

The Next Frontier? Text For Monetary Shocks

- Finally, recently several interesting papers using text as data to study monetary policy.
 - Tarek is world expert on text as data!
- Two recent interesting papers:
 1. Aruoba and Drechsel (2023): New shock series in spirit of Romer-Romer, but use full text of Fed briefing materials rather than only numerical forecasts.
 - Argue fewer and smaller but better identified monetary shocks.
 - Stronger results than typical R-R shocks in a Bayesian VAR.
Really like this!
 2. Cieslak, Hansen, McMahon, and Xiao (2023): Use text to create a measure of policy maker uncertainty.
 - Increase in uncertainty leads to more hawkish stance orthogonal to fundamentals.
 - Potentially a useful measure?

Bonus Material: Literature Guides For Related Topics

Today I Could Not Cover Everything

- Lots of other interesting topics in housing and macro.
- Wanted to provide a brief literature guide to three:

Monetary Policy and Housing Markets

- Empirical
 - Di Maggio et al. (2017, AER): Rate resets and consumption
 - Beraja et al. (2019, QJE): Regional heterogeneity and QE
- Transmission through housing markets
 - Wong (2021, WP): Refinancing and Transmission of MP to Consumption by Age
 - Greenwald (2018, WP): Mortgages and MP transmission with PTI constraints
- Limited ammunition when people have low mortgage rates
 - Berger et al. (2021, AER)
 - Eichenbaum-Rebelo-Wong (2022, AER)

Behavioral Housing Economics

- Loss aversion:
 - Genesove and Mayer (2001, QJE): The original
 - Andersen et al (2022, AER): Structural behavioral estimation with amazing data to disentangle things. Highly recommend
- Failure to Refinance
 - Andersen et al. (2020, AER)
- Expectations
 - Kuchler-Piazzesi-Stroebe (2022, Handbook) Survey
 - Armona-Fuster-Zafar (2019, Restud) Clever informational experiment to show how people update
 - Kuchler-Zafar (2019, JF) Personal experience and expectations
 - Kindermann et al. (2021, WP): Expectational differences for renters vs. owners

Housing Supply

- Bedrock and canonical topic
- Saiz (2010) discussed above.
- Ed Glaeser is the expert here
 - Glaeser-Gyourko (2018, JEP) is outstanding literature guide, as is Gyourko and Molloy (2015).
 - Glaeser-Gyourko (2005) is a favorite.
- Baum-Snow and Han (2024): Excellent recent paper estimating housing supply elasticities at county and tract level.
 - Lower than Saiz due to more recent period.