Minimum Wages and the Rigid-Wage Channel of Monetary Policy

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Introduction

- Nominal wages are thought to be rigid, especially downward, generating non-neutrality of monetary policy
- We investigate empirically whether the effect of monetary policy differs with the degree of wage rigidity in a state
- But wage rigidity has been difficult to measure, especially when monetary policy shocks were large and well-identified
- We view the extent of wage rigidity in a state as a latent variable which can be proxied by the shares of institutionally/legislatively rigid groups like
    1. Minimum wage workers
    2. Unionized workers
    3. Government workers
- These groups are measurable even prior to the Volcker era

Theory

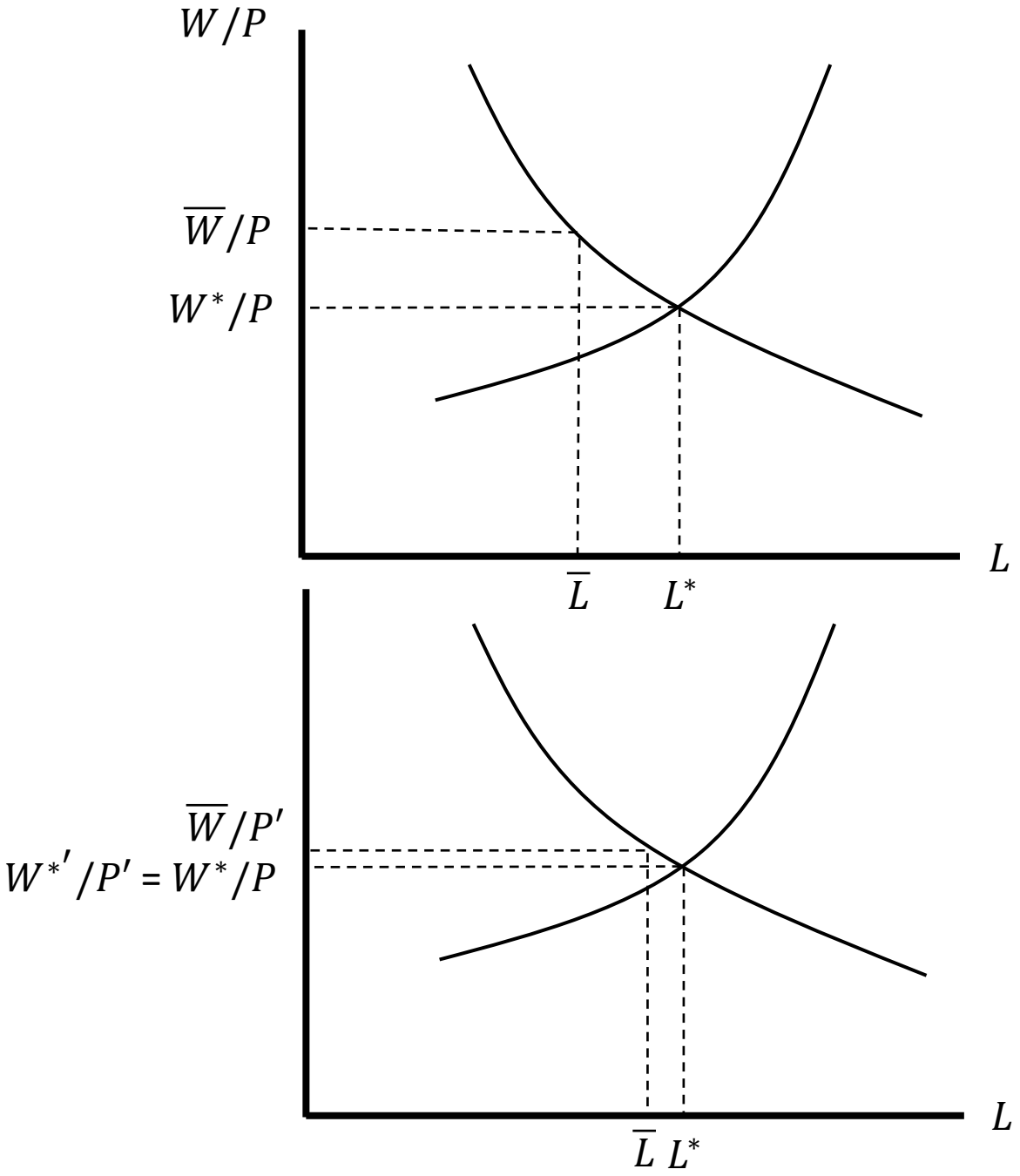
- Recall the real profit maximization problem of a competitive firm:

$$\max_{X,L} F(X,L) - \frac{1}{P}\omega \cdot X - \frac{1}{P}\overline{w}L$$

- L is labor subject to a wage floor, and X is all other inputs
  - L could include, e.g., minimum wage workers or unionized workers whose wage contracts are not inflation-indexed
- If expansionary monetary policy increases ω along with P,
- Then inflation would lead to
  - A substitution effect towards factor L, as the real wage floor has fallen while other input prices have remained constant;
  - A scale effect, as inflation has reduced a real input price and induces firms to use more of all inputs.

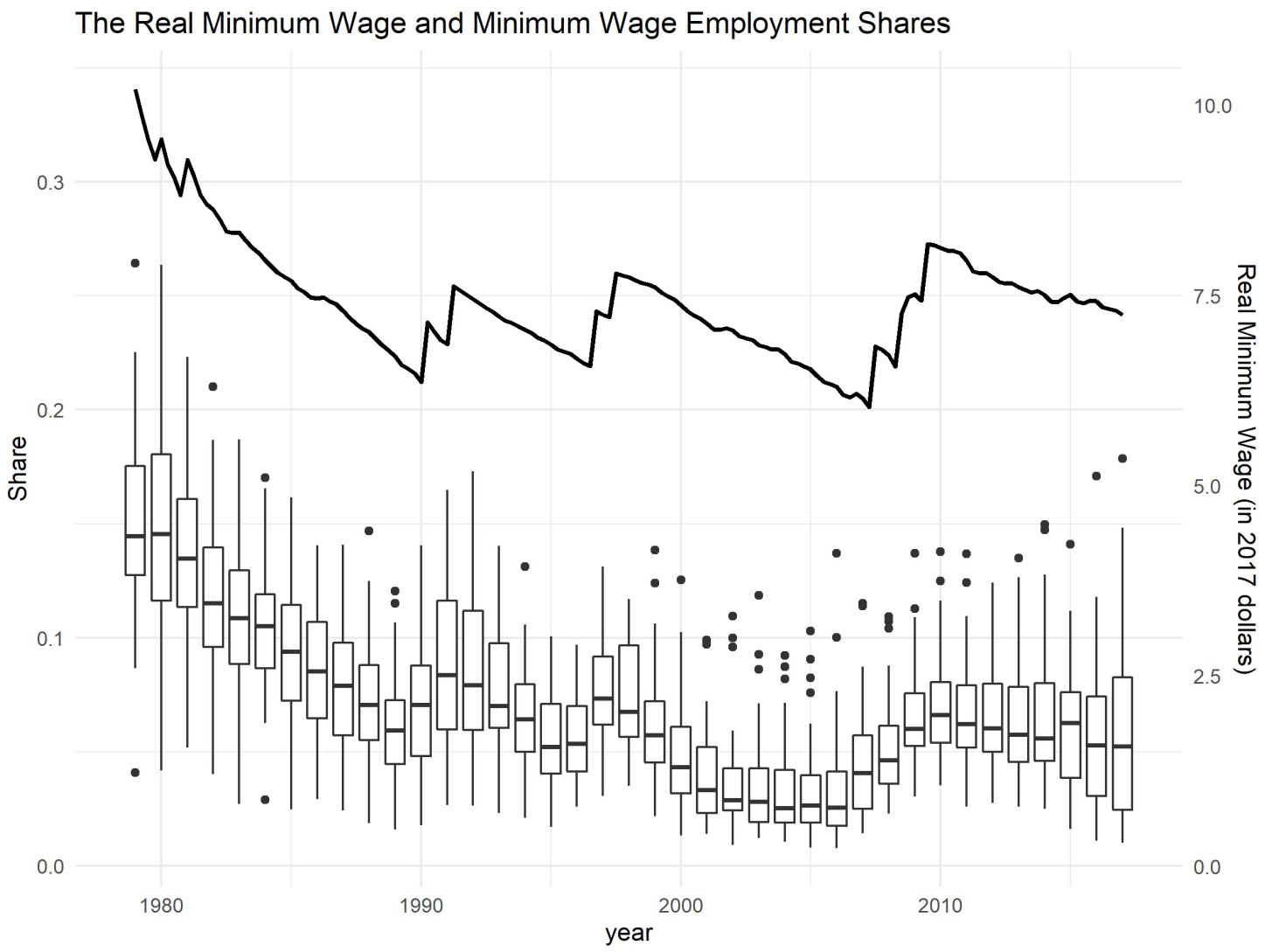
Graphical Intuition

- Inflation causes prices, *P*, flexible wages, and other input prices, to increase
- The nominal wage floor, $\overline{W}$, remains fixed. Therefore the real wage floor declines.
- The extent of the distortion in the labor market is reduced.
  - New hiring can occur – particularly of workers subject to a wage floor



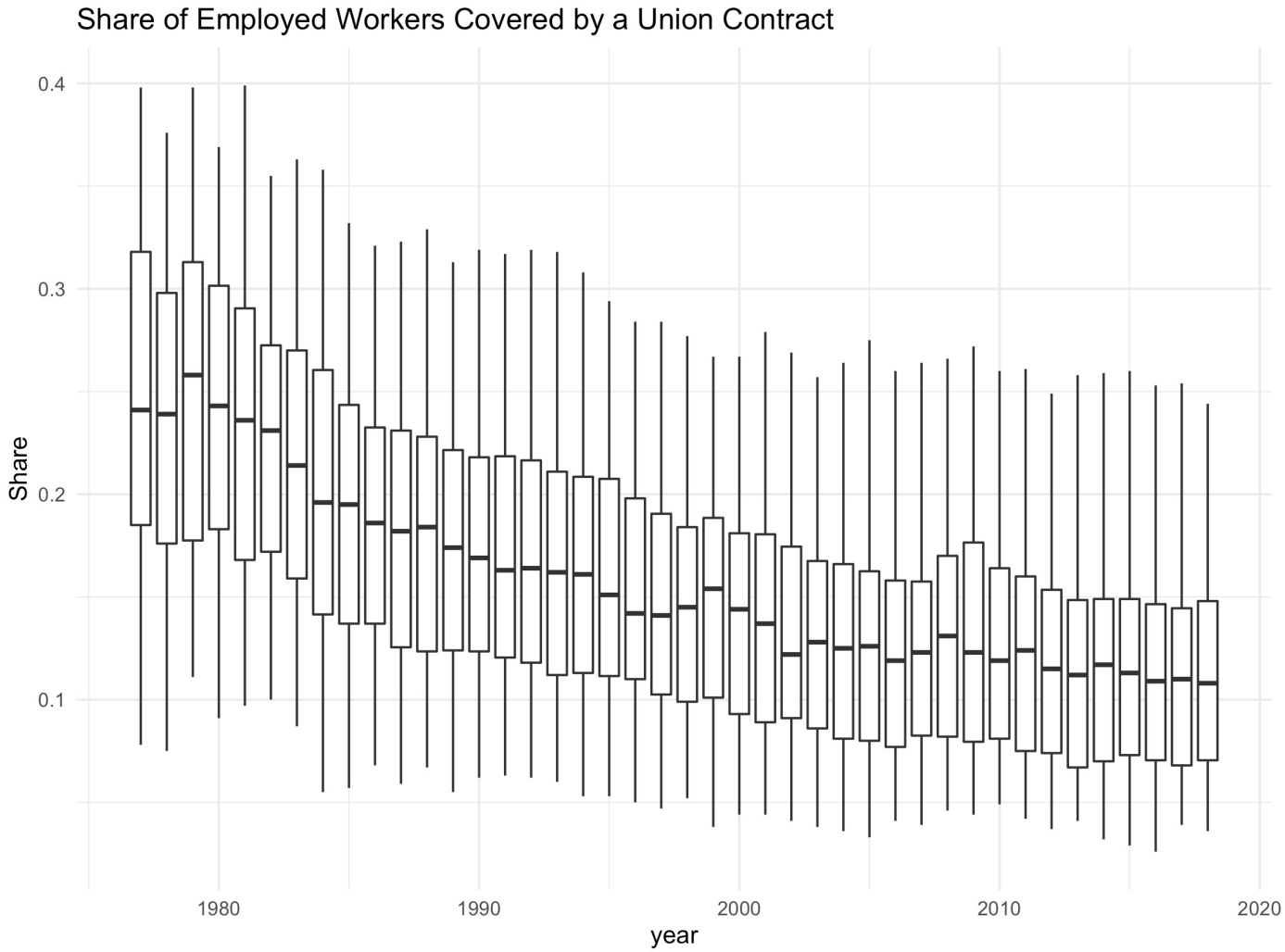
Proxy for Wage Rigidity: Minimum Wage Share

- Minimum wage worker: Any hourly wage worker making between 90%-110% of the minimum wage in the state of residence (computed in the CPS ORG).
- Boxplot shows heterogeneity across states in their minimum wage employment shares.
- We focus on this proxy today



Proxy for Wage Rigidity: Union Share

- Union worker: Any worker covered by a union contract (taken from Hirsch, Macpherson, and Vroman 2001)
- Correlation of 0.23 with the minimum wage employment share (across states and time)



Proxy for Wage Rigidity: Government Share

- Government worker: Any wage/salaried worker classified as working for the government (computed in the basic monthly CPS)
- Misses some military in group quarters/barracks
- Correlation of .09 with MW share, .10 with union share

Baseline Regressions

- Data cover 1975 – 2008.
- Standard (monthly) monetary policy regression:

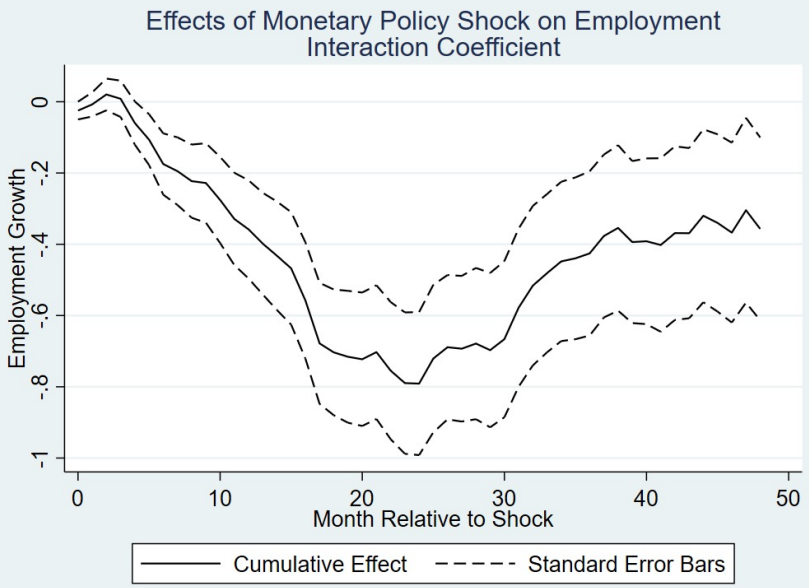
$$\Delta L_t = \sum_{j=1}^{48} \beta_j^L \Delta L_{t-j} + \sum_{j=0}^{48} \beta_j^{FFR} \Delta FFR_{t-j} + \epsilon_t$$

- ΔL: change in log national monthly employment (from the QCEW).
- ΔFFR: exogenous component of the change in the federal funds rate developed in Romer and Romer (2004).
- Minimally alter this regression to test for state heterogeneity mediated by the rigid wage *cost* share (use ## to denote a full interaction):

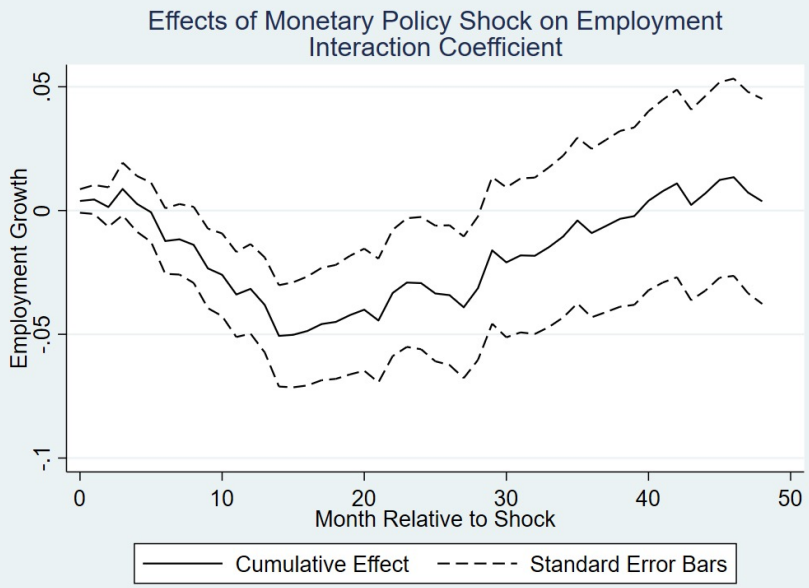
$$\Delta L_{s,t} = \sum_{j=1}^{48} \beta_j^L \Delta L_{s,t-j} + \sum_{j=0}^{48} \beta_j^{FFR} \cdot (ShareRigid_{s,t} \#\# \Delta FFR_{t-j}) + \epsilon_{s,t}$$

Baseline Interaction Effect

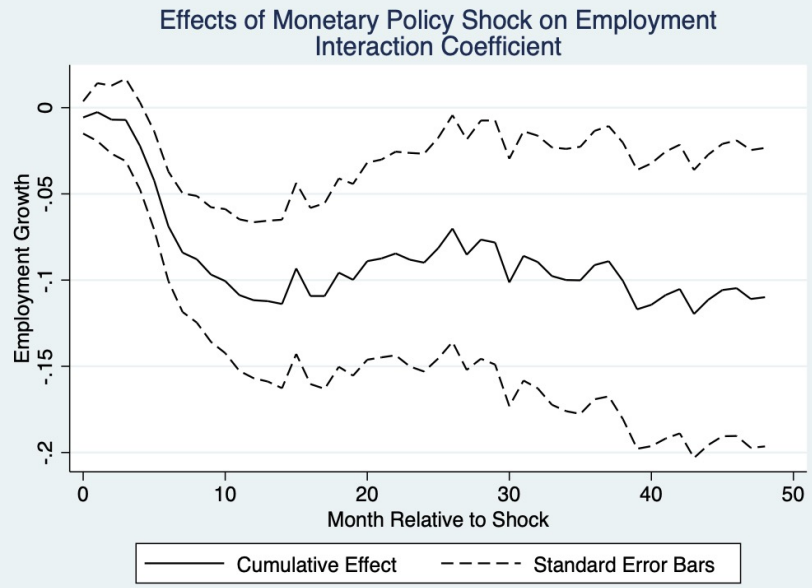
Minimum Wage Proxy



Union Proxy



Government Proxy



- Interpretation: in response to a 1pp unexpected increase in the FFR, a state at the 90th pct of wage rigidity, relative to a state at the 10th pct, experiences
  - 1.6 pp less employment growth (MW proxy)
  - 0.6 pp less employment growth (union proxy)
  - 0.5 pp less employment growth (government proxy)

Outline for Remainder of Talk

- How robust are these results?
  - We focus on the minimum wage proxy today
  - For time reasons, and because it is our strongest result
- In light of robustness, what magnitudes do we believe? How much of monetary policy's total effect does the rigid wage channel of monetary policy explain?
- Are our results using the minimum wage proxy driven in part by changes in minimum wage employment?

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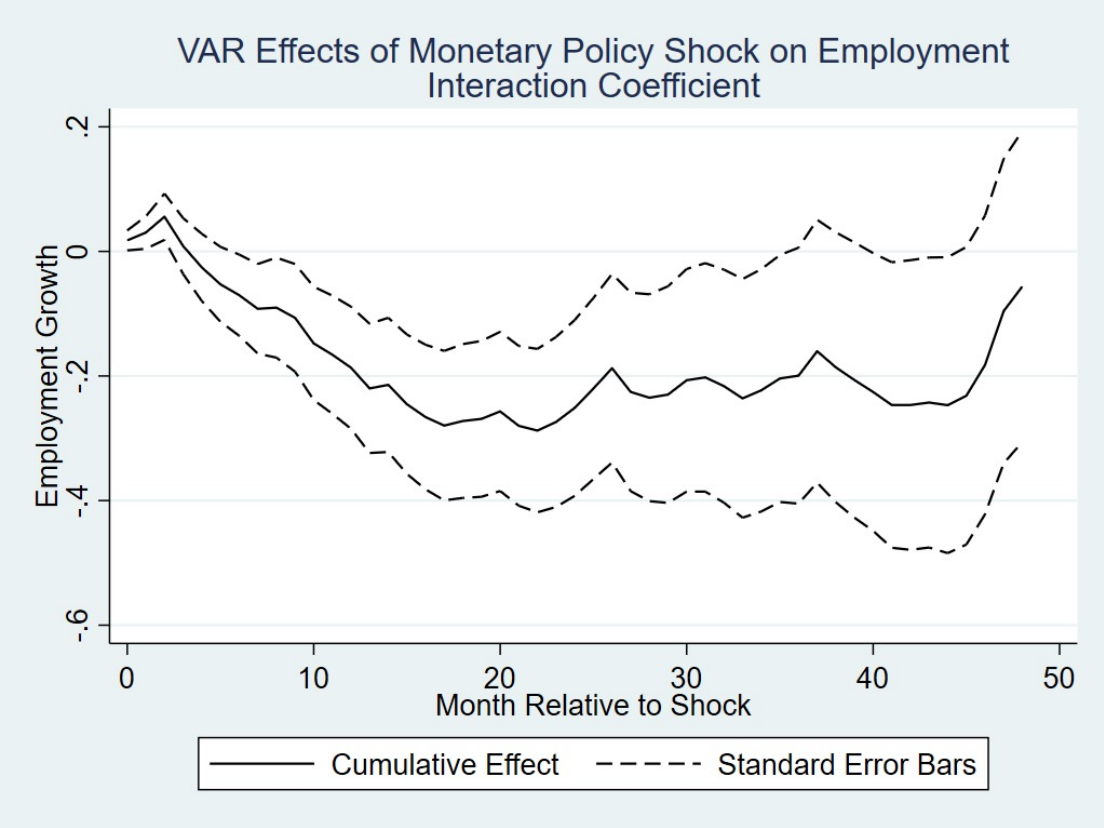
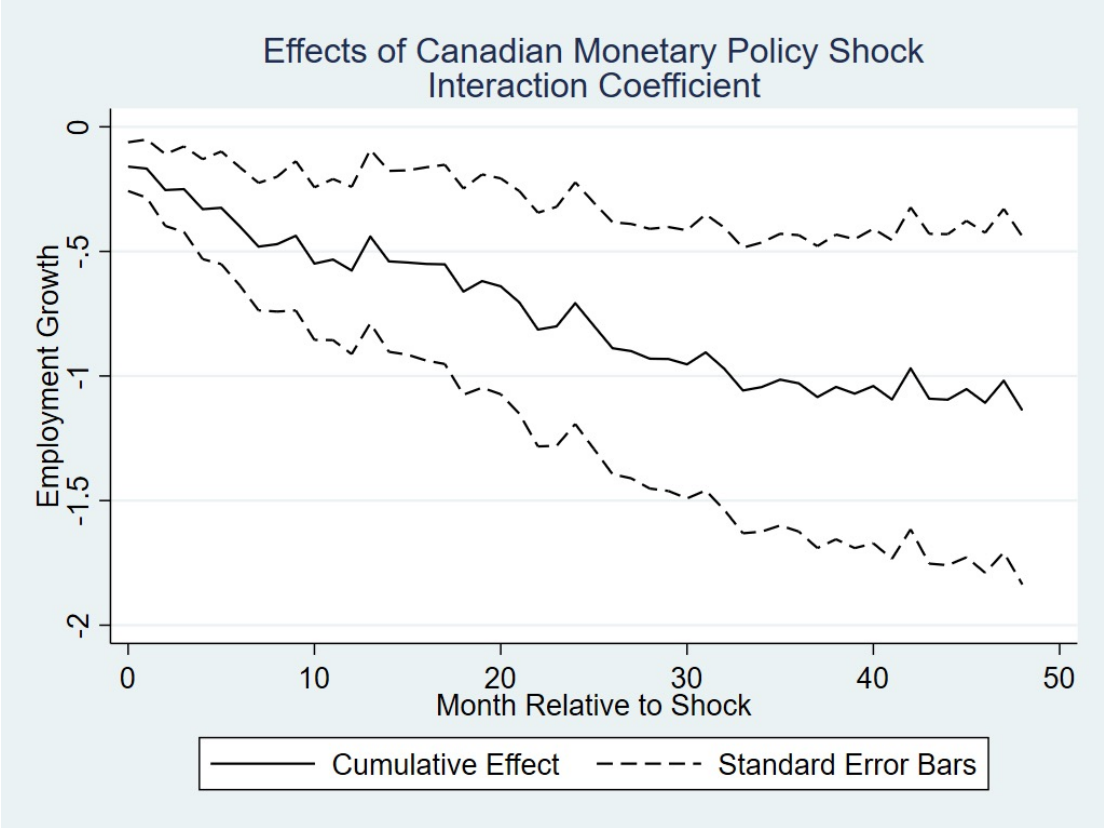
Initial Robustness





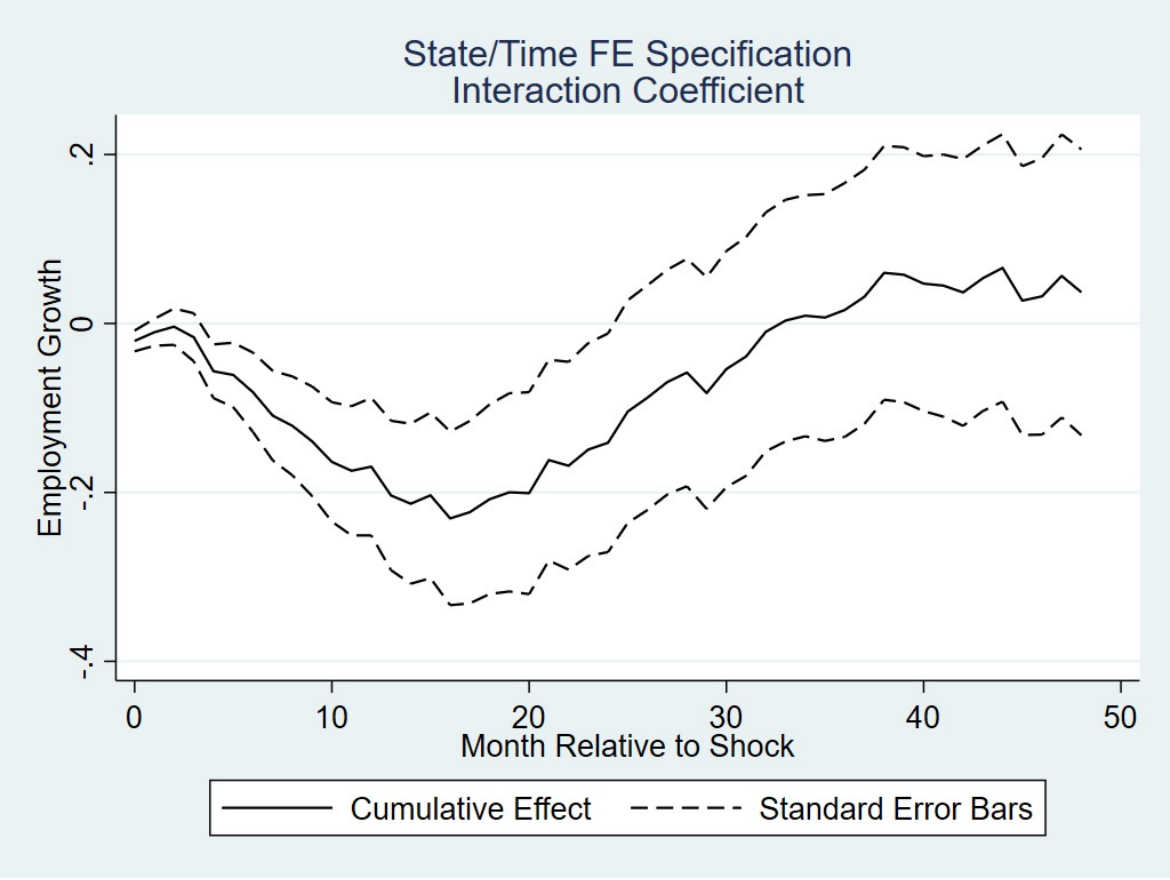
- Effect remains significant if we use VAR shocks (Coibion, 2012) instead of the narrative Romer and Romer (2004) shocks.
- Effect remains significant if we run the same exercise on Canadian data using shocks constructed analogously to Romer and Romer (2004) by Champagne and Sekkel (2018)

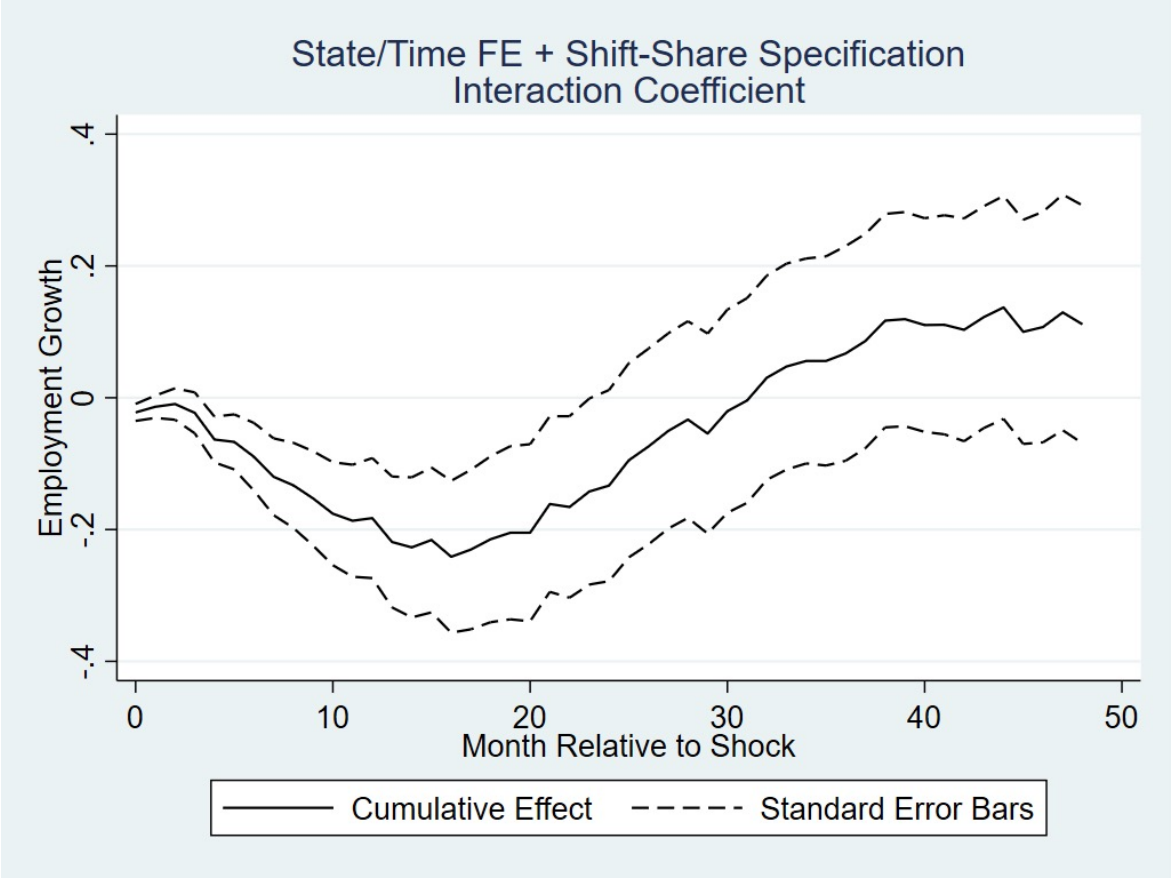
Industry Confounds

- States with a high share of rigid wage workers may have different industries than other states, and these may be the industries more exposed to monetary policy.
  - Result is robust to state and time fixed effects.
    - Controls for persistent industry differences by state and national time trends
  - Result is robust to a Bartik control, constructed as follows:
    - In each time period t, compute employment growth in each national industry j: $Shift_{j,t}$
    - For each state and time period, weight national industry employment growth by the employment share in that industry *last* period: $Share_{s,j,t-1}$
    - The control is $\Delta S_{s,t} = \sum_j Shift_{j,t} Share_{s,j,t-1}$
  - Result is robust to instrumenting a state's minimum wage share with legislated minimum wage increases (at the state or federal level)

Industry Confounds

- Results remain highly significant, but magnitudes have fallen to be very close to those predicted by the full model (not shown today)

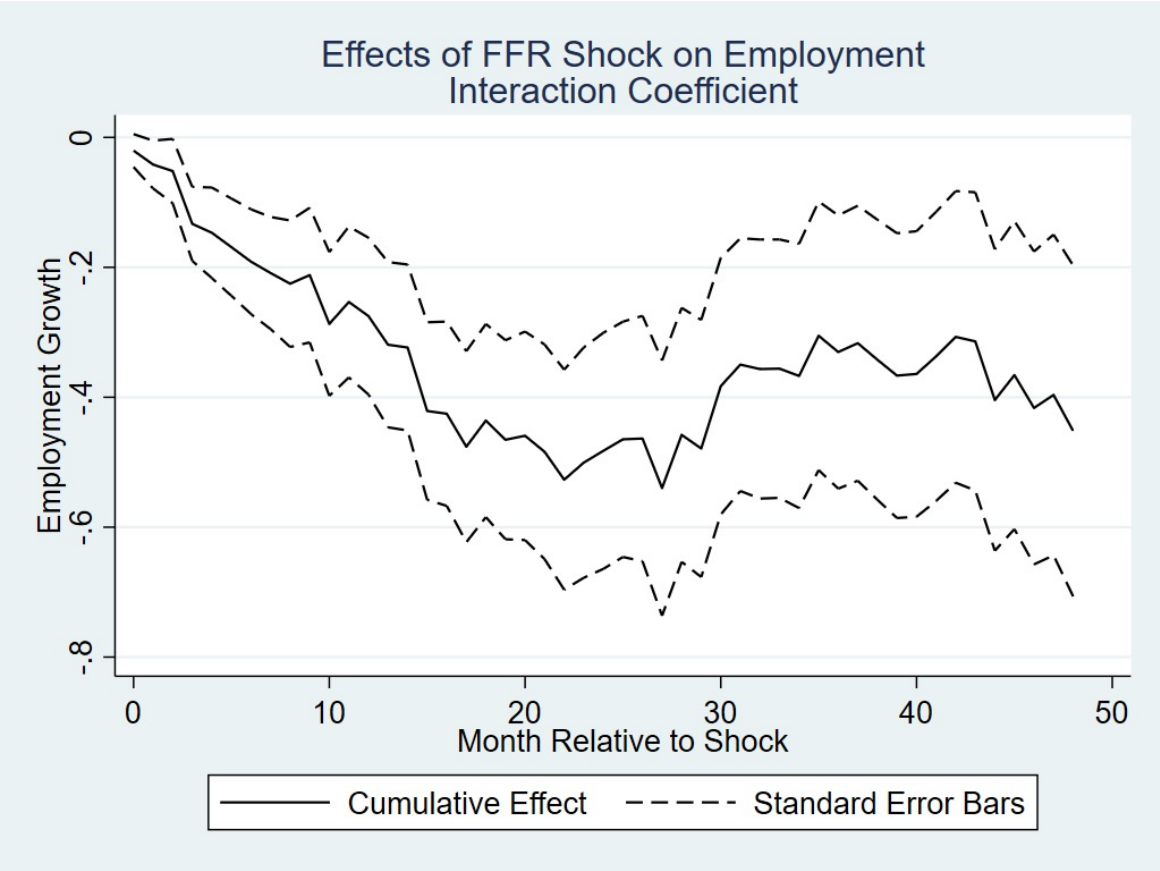




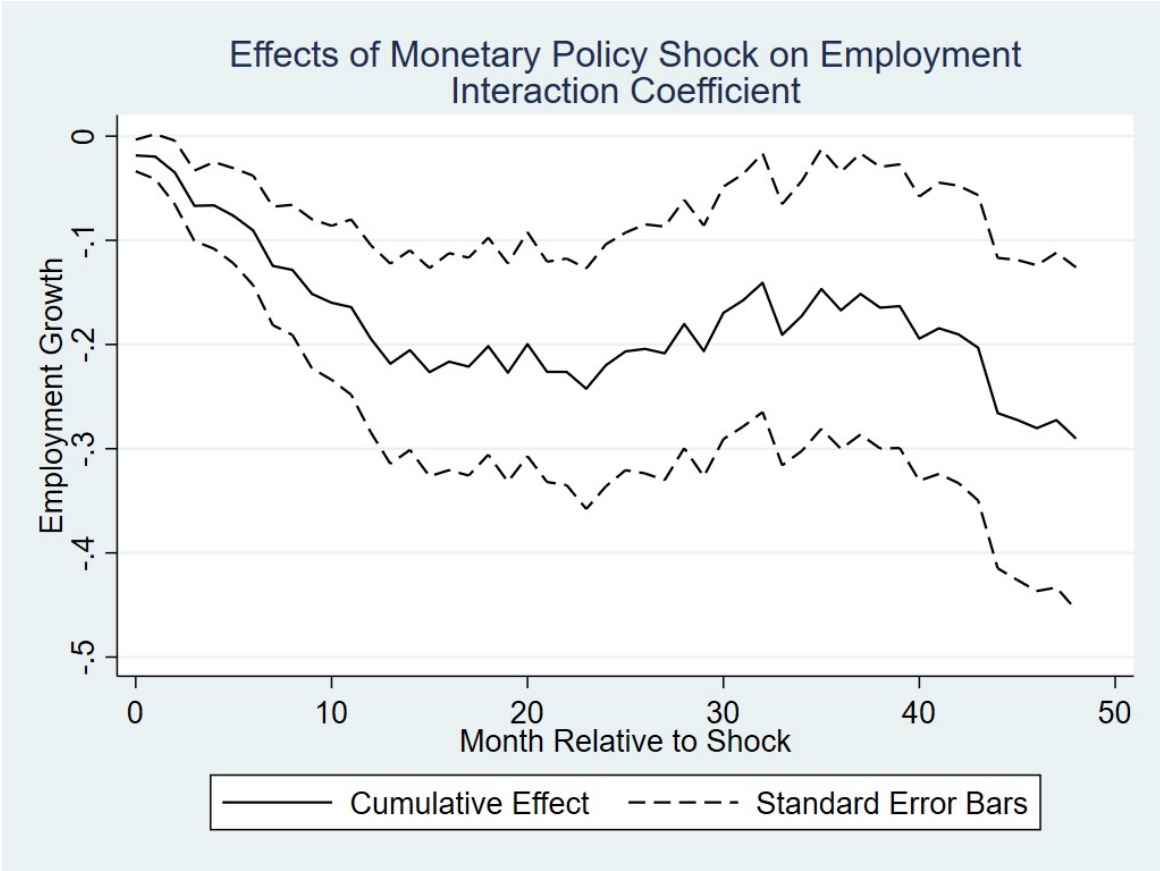
Other Controls

- Not driven by crude measures of banking use: deposits per capita.
- Not driven by share of liquid deposits in banks (checking deposits / total deposits by state).
  - Motivated by Drechsler, Savov, and Schnabl (2017)
- Not driven by personal income per capita.
  - Motivated by potential MPC issues highlighted in Mian, Rao and Sufi (2013)
  - More on this soon with tradable/non-tradable analysis

Results Using the FFR Directly



Baseline Specification with FFR Treatment

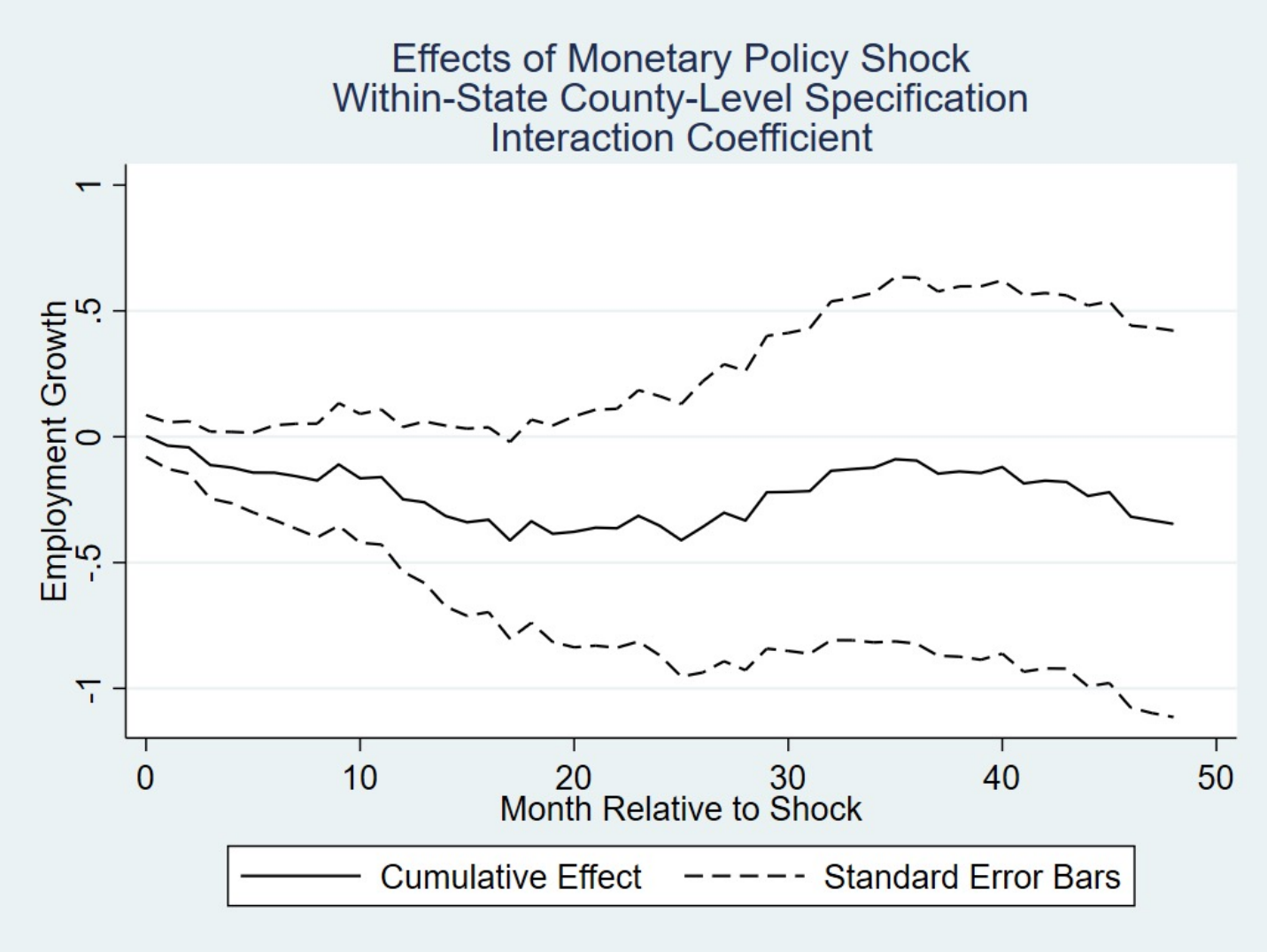


Shift-Share + State/Time FE Specification with FFR Treatment

State Confounds

- One might think that the states with a high share of minimum wage workers are the same states over time.
  - Three responses:
    - The states with a high share of minimum wage workers are changing over our sample.
    - Just showed baseline results are robust to state and time fixed effects.
    - No result if, instead of minimum wage share, we interact with a dummy for being in the South.
- We perform the same analysis at the county level and include state by time fixed effects.
  - Idea here is to compare low and high minimum wage share counties within state-time to control for time-varying, state-level confounds.

Focusing on Cross-Sectional Variation

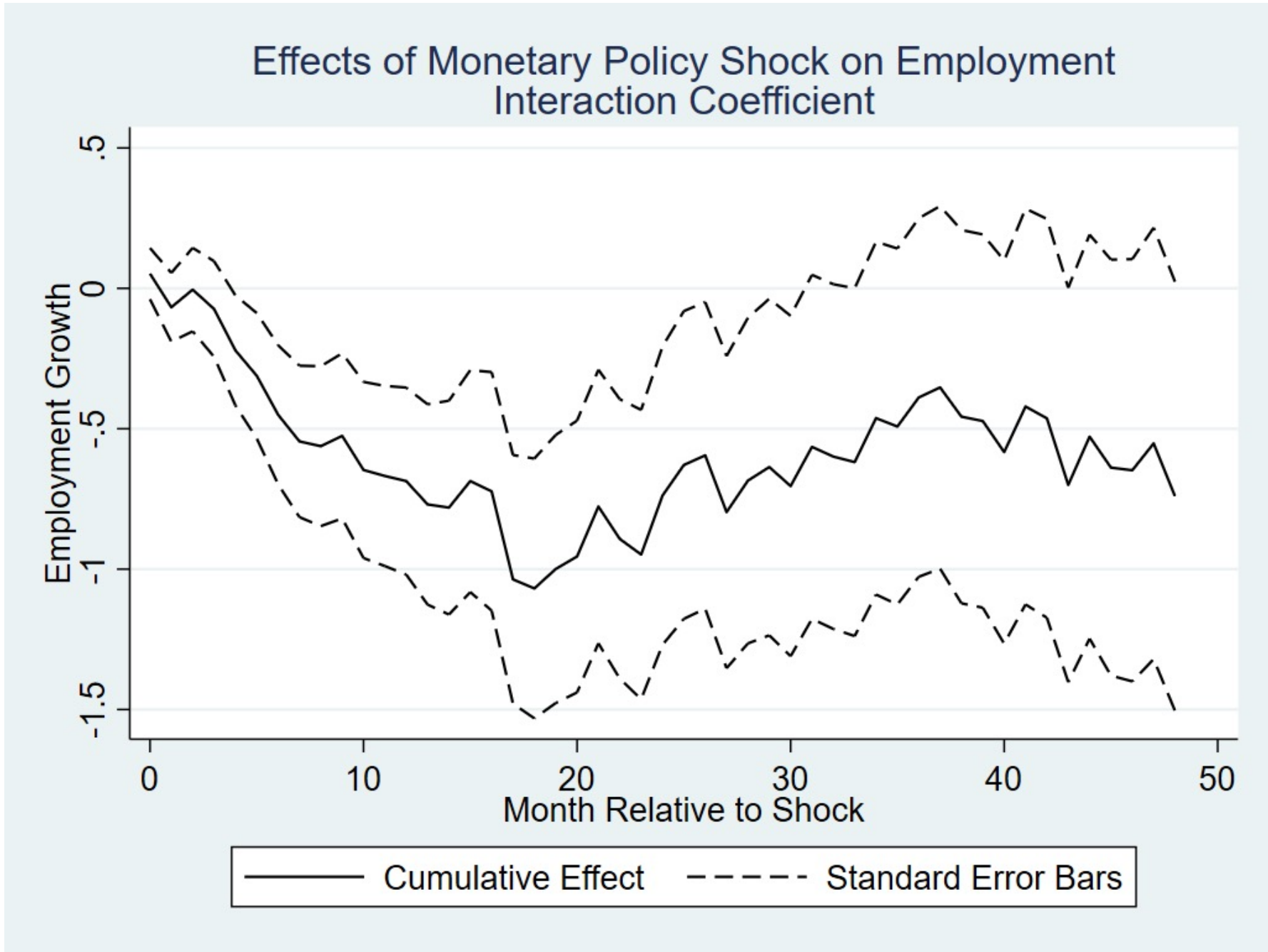


Focusing on Time-Series Variation

- Conversely, we can shut down the cross-sectional variation and focus entirely on time-series variation by interacting the shock series with state FEs:

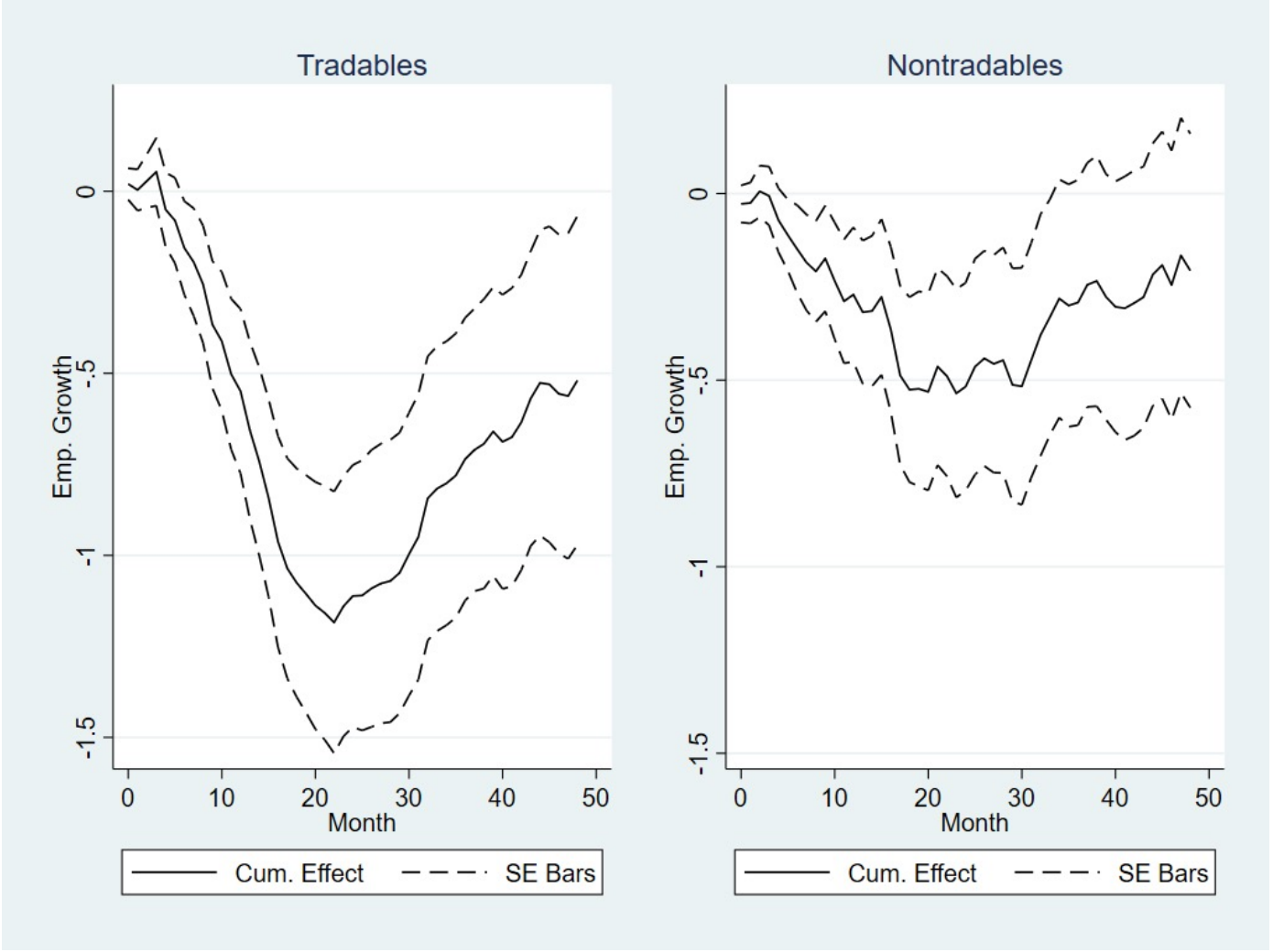
$$\Delta L_{s,t} = \sum_{j=0}^{48} \beta_j^{FFR} \cdot (ShareMin_{s,t} \#\# \Delta FFR_{t-j}) + \sum_{j=1}^{48} \beta_j^{L} \Delta L_{s,t-j} + \sum_{j=0}^{48} \gamma_j \cdot (\mathbf{1}\{State = s\} \#\# \Delta FFR_{t-j}) + \epsilon_{s,t}$$

- Exploits the variation that each state had different minimum wage shares are different moments in time


Effects of Monetary Policy Shock on Employment
Interaction Coefficient
Employment Growth
.5
0
-.5
-1
-1.5
0
10
20
30
40
50
Month Relative to Shock
Cumulative Effect
Standard Error Bars

Tradable/Non-Tradable Analysis

- Our model suggests a larger effect for tradables.
- If our empirical results are actually driven by differences in the MPC across places, we would expect the opposite (since non-tradables must be produced locally).
- Results we find are more consistent with our model.



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Implications for Monetary Policy Efficacy

- The peak effect of a 1 pp monetary policy shock during the 1975-1990 period is a 2.8 pp reduction in employment.
- Our empirical specifications have an average interaction effect of approx. -0.5.
  - Average minimum-wage cost share over this period: 2.28%
- Implies that, over the 75-90 period, the minimum wage proxy is responsible for 41% of monetary policy's total effect.

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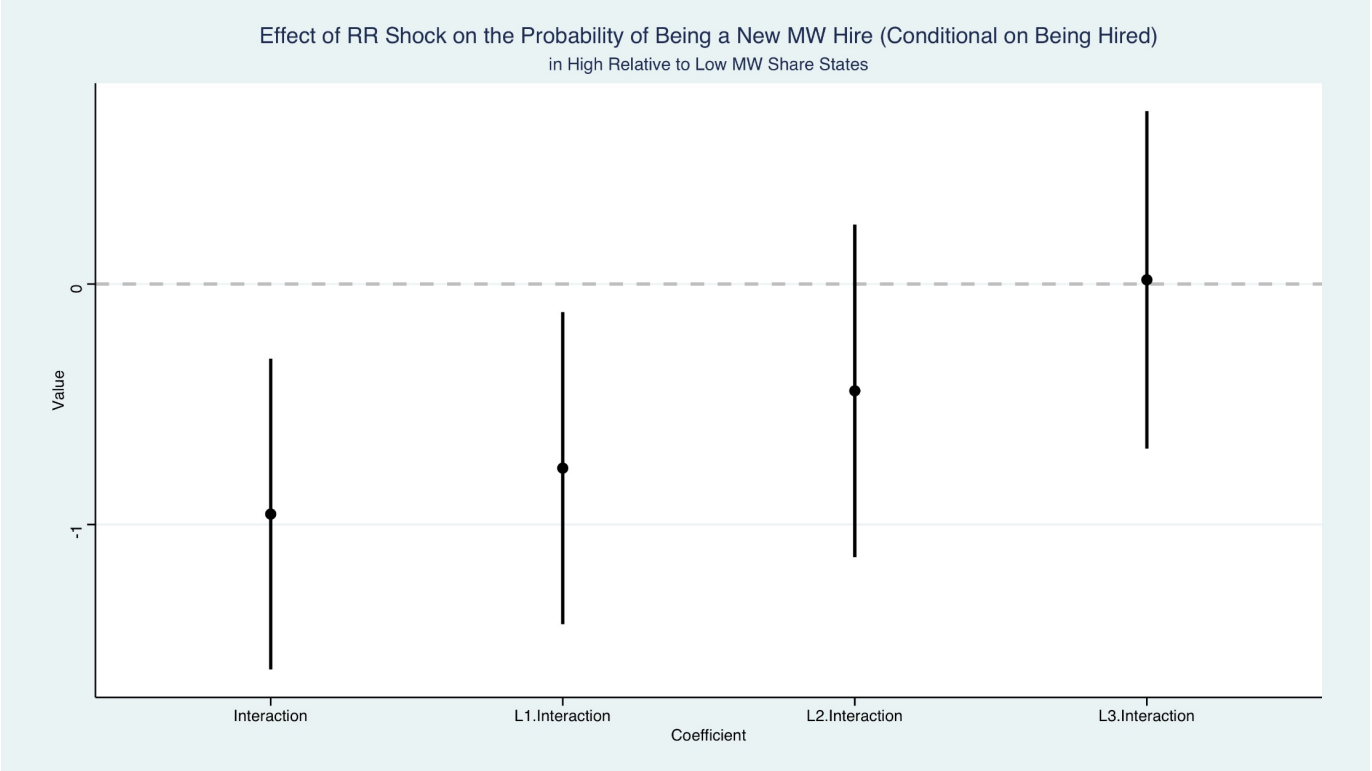
Testing the Mechanism: CPS Data

- The CPS is partially longitudinal in nature.
  - Households are present in the CPS for 4 months in a row, out of the CPS for 8 months, and then back in the CPS for another 4 months.
  - In the 4th month, individuals are asked a variety of questions about their employment and wage status – including hourly wage.
  - 12 months later, they are asked the same questions again.
- We can leverage this data to determine whether, indeed, expansionary monetary policy leads to new hires that are disproportionately minimum-wage workers.

$$\Delta L_{s,t} = ShareMin_{s,t} + \sum_{j=0}^{3} \beta_j^{FFR}(ShareMin_{s,t}\#\Delta FFR_{t-j}) + \vartheta_t + \eta_s + \epsilon_{s,t}$$

Effect of Monetary Policy on Hiring of Minimum-Wage vs. Non-Minimum-Wage Workers

- Share of new hires earning the minimum wage declines more in the high minimum wage states
- Similar but borderline insignificant effect for fires



Conclusion

- Rigid wages have long been thought to lead to non-neutrality of monetary policy
- We demonstrate that this hypothesis holds and may explain at least 41% of monetary policy's total effect
- Moreover, heterogeneity in rigid wage shares may generate substantial heterogeneity in the effect of monetary policy across states and time

Thank You!