What drives employment cycles in U.S. states & metros?

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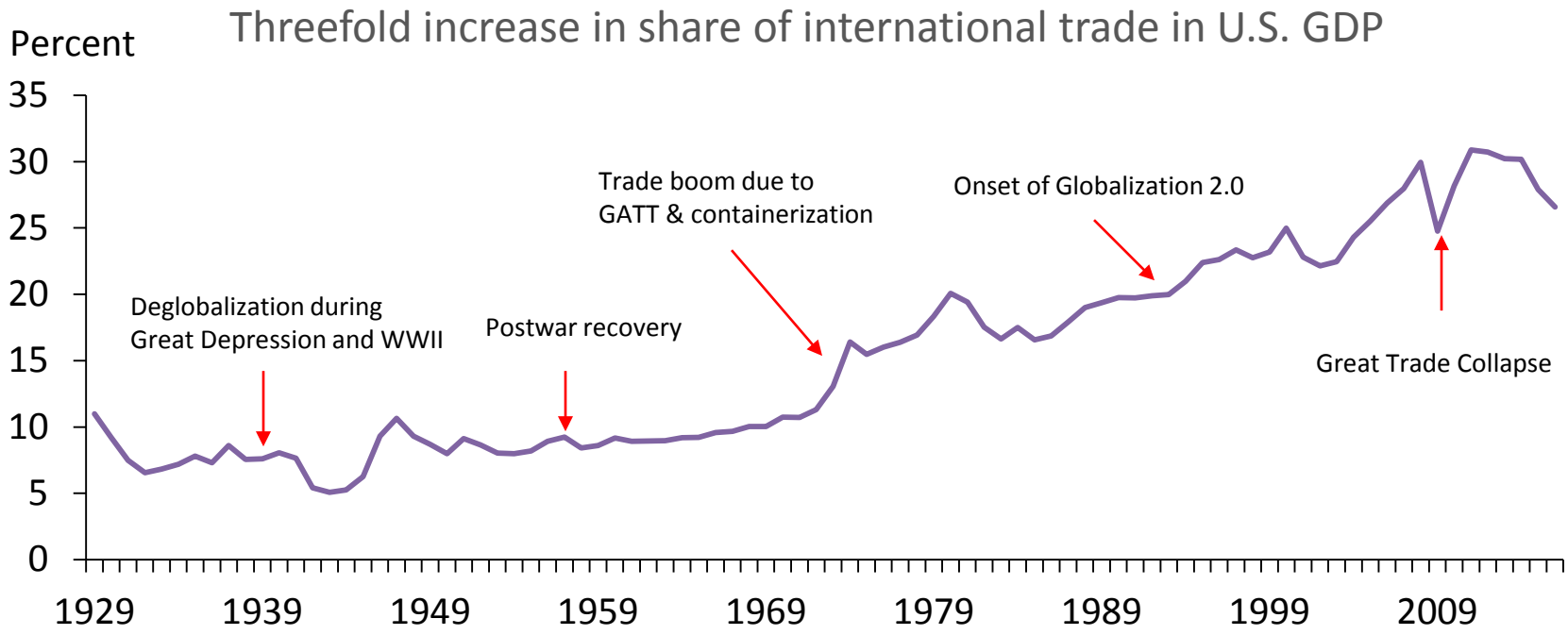
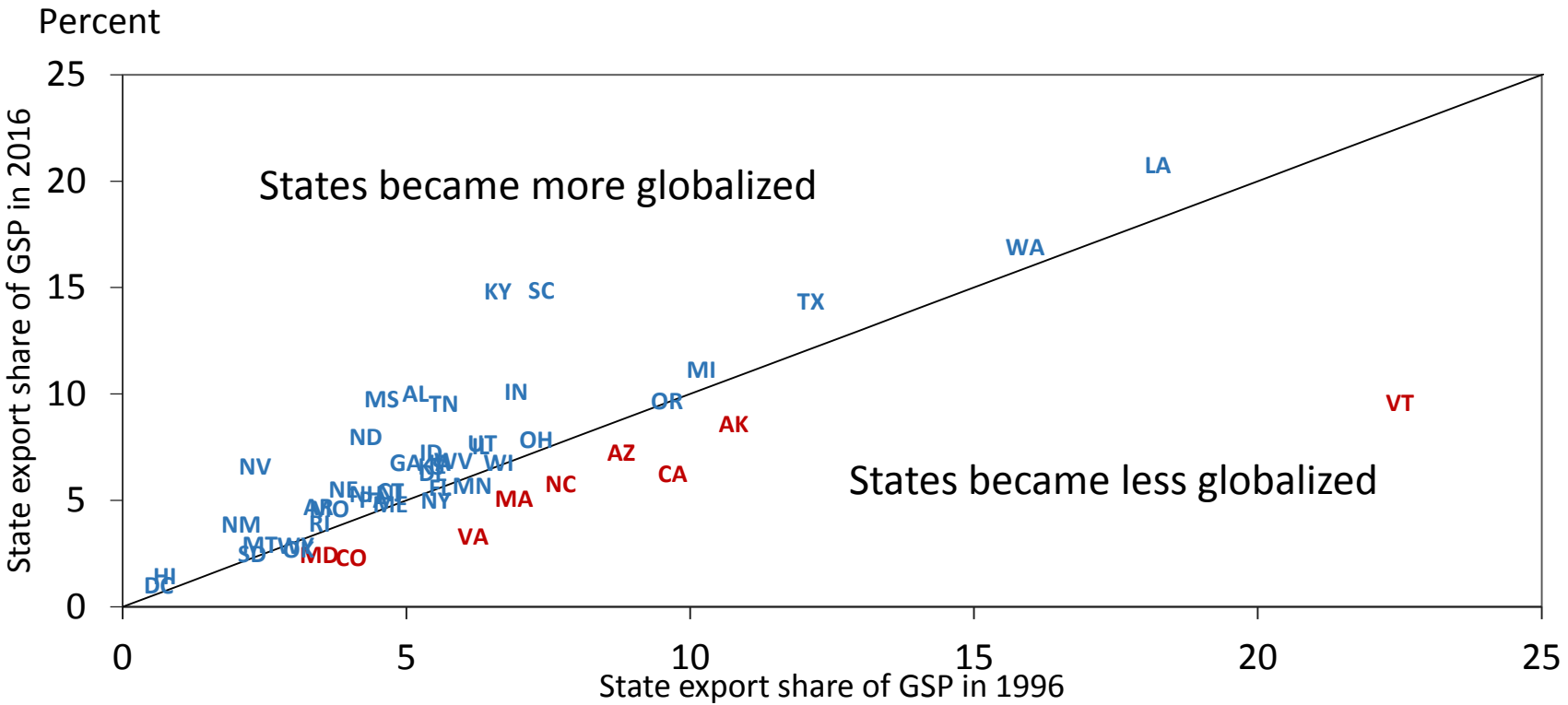
Introduction and overview

- Three facts
  - The U.S. economy has become more globalized over time
  - Not all states are equally globalized: Differences in geography; Differences in industry mix
  - Business cycles differ across states
- How much of state-level employment fluctuations can be explained by global and national macroeconomic business cycles?
- About a quarter of employment fluctuations can be explained by global business cycle alone on average (across states)
  - Big differences across individual U.S. states.
- Trace the contribution of global and national shocks over time to state employment growth
  - Focus on 3rd and 11th Federal Reserve Districts

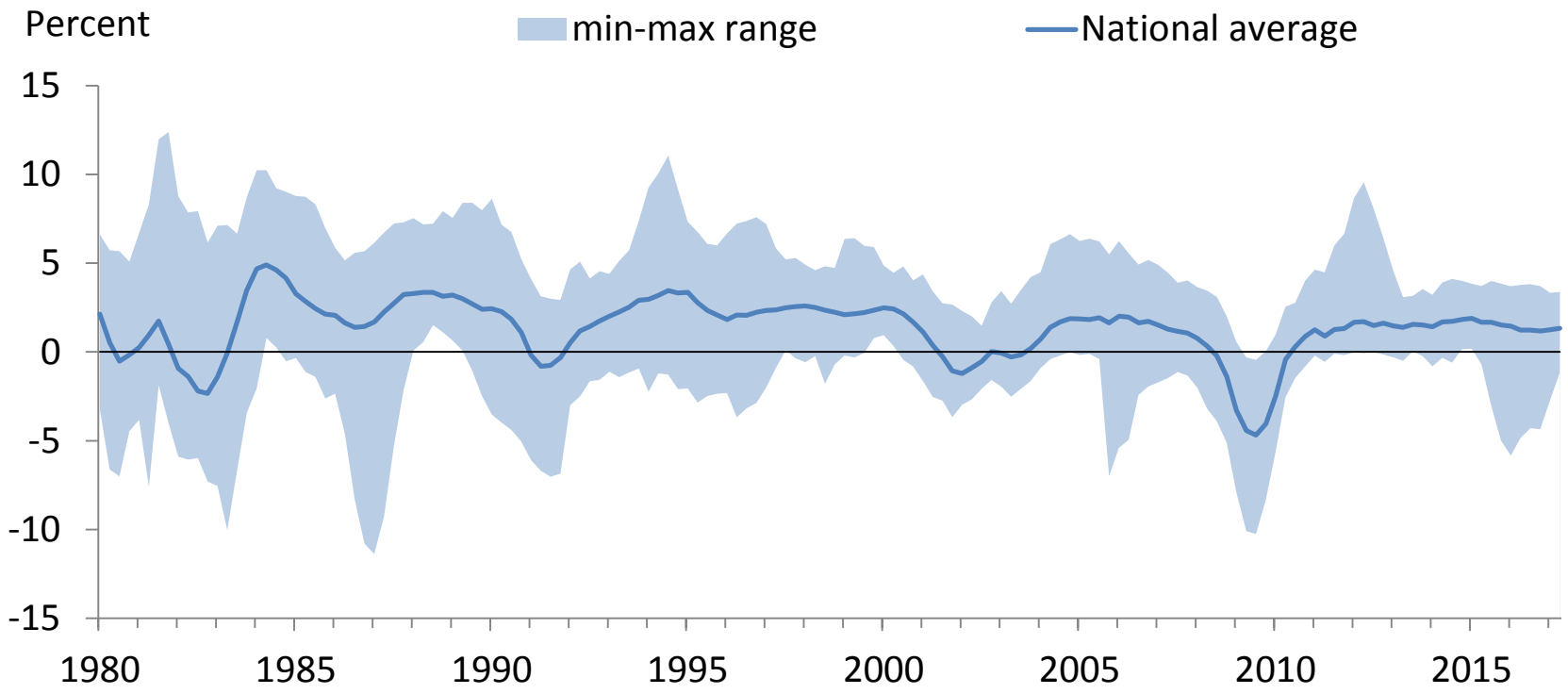
Globalization of the U.S. economy



State export shares in 2016 vs 1996



Employment growth: U.S. and all states range



Decomposing employment growth

- Assumptions underlying our approach:
  - Global foreign output aggregate is driven by global shocks
  - National (U.S.) output and employment are driven by global shocks + national shocks
  - State-level employment driven by global shocks + national shocks + residual state-specific shocks
- Attribute state-level employment fluctuations not explained by global shocks or national shocks to a residual state-specific shock
  - Does not necessarily mean that these developments must solely originate from within the state

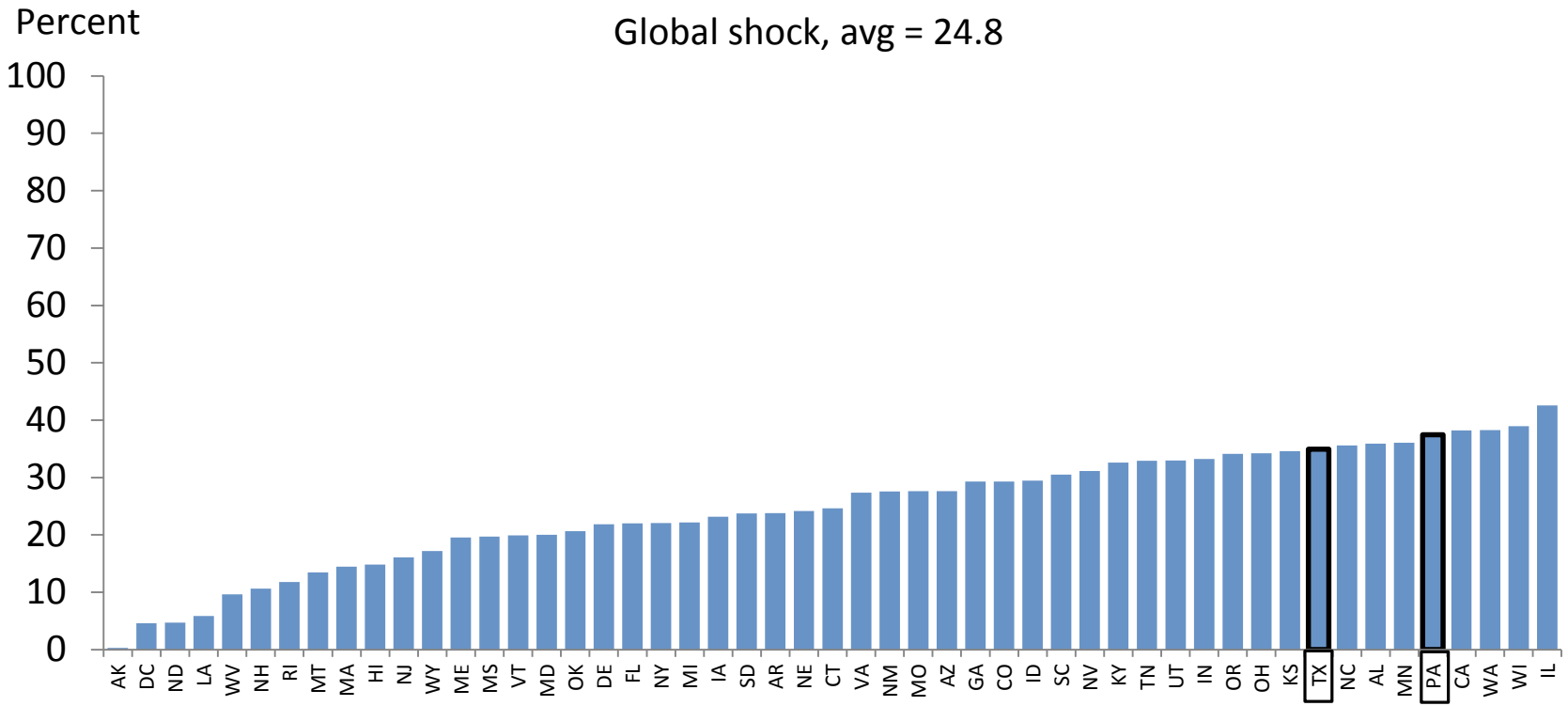
Model

- Country-specific model (all countries other than the U.S.):
  - $y_{it} = c_{yi} + \sum_{l=1}^{p} \theta_{i,l} y_{i,t-l} + a_{i,0} y_t^* + \sum_{l=1}^{p} a_{i,l} y_{t-l}^* + e_{i,t}$
  - N-1 countries
- US model (country N):
  - $z_{Nt} = c_{zi} + \sum_{l=1}^{p} \Theta_{N,l} z_{N,l} + a_{N,0} y_t^* + \sum_{l=1}^{p} a_{N,l} y_{t-l}^* + e_{N,t}$
- where $z_{Nt} = (y_{Nt}, h_t)'$, $y_t^* = N^{-1} \sum_{i=1}^{N} y_{it}$ (global growth factor proxy)
- State-specific model:
  - $h_{j,t} = c_{hj} + \sum_{l=1}^{p} \psi_{jl} h_{j,t-l} + \lambda_{j0}' z_{Nt} + \sum_{l=1}^{p} \lambda_{jl}' z_{N,t-l} + \alpha_{j0} y_t^* + \sum_{l=1}^{p} \alpha_{j,l} y_{t-l}^* + \varepsilon_{jt}$

Model (continued)

- Global output model:
  - $y_t^* = c_y + \sum_{l=1}^{p} \rho_l y_{t-l}^* + v_t$

Share of state employment variation explained by global, national and residual state-specific shocks



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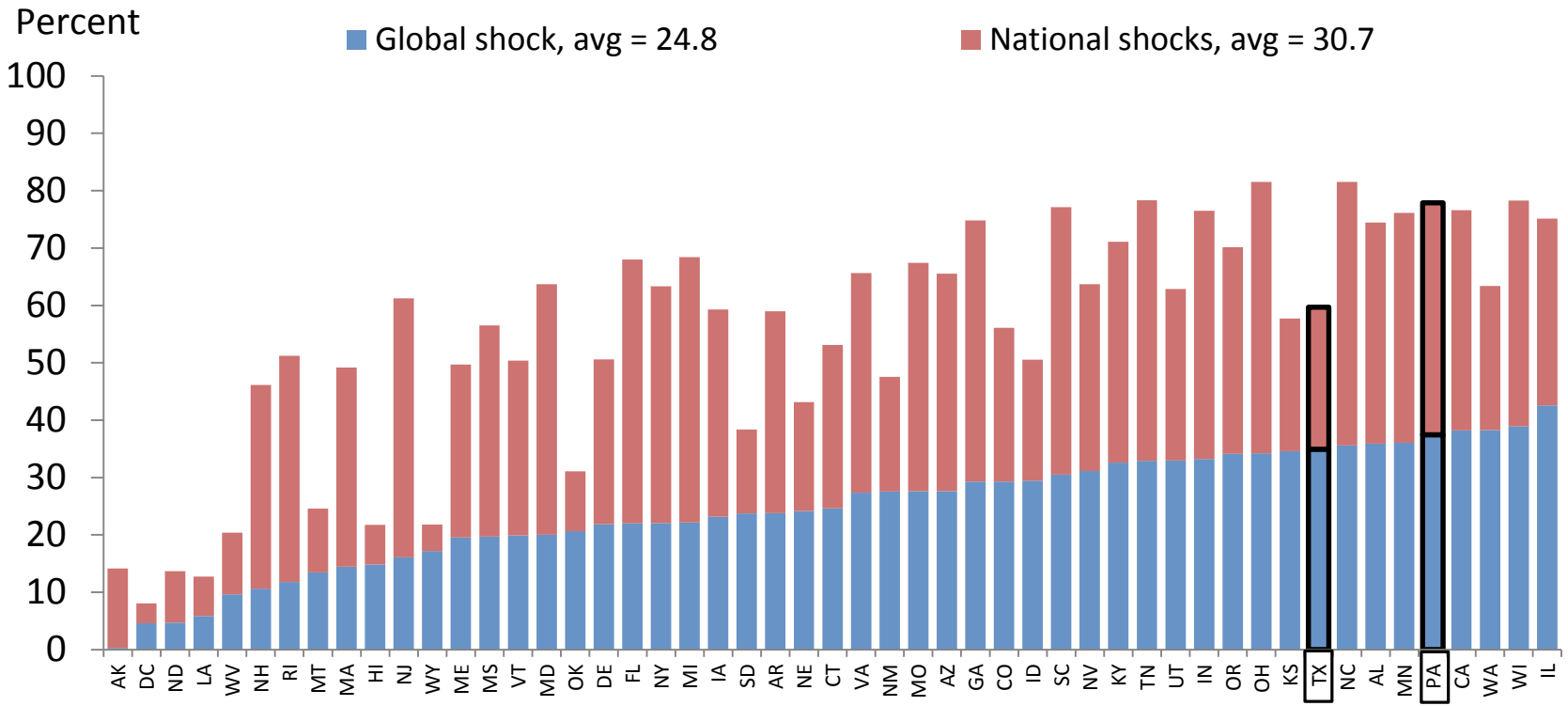

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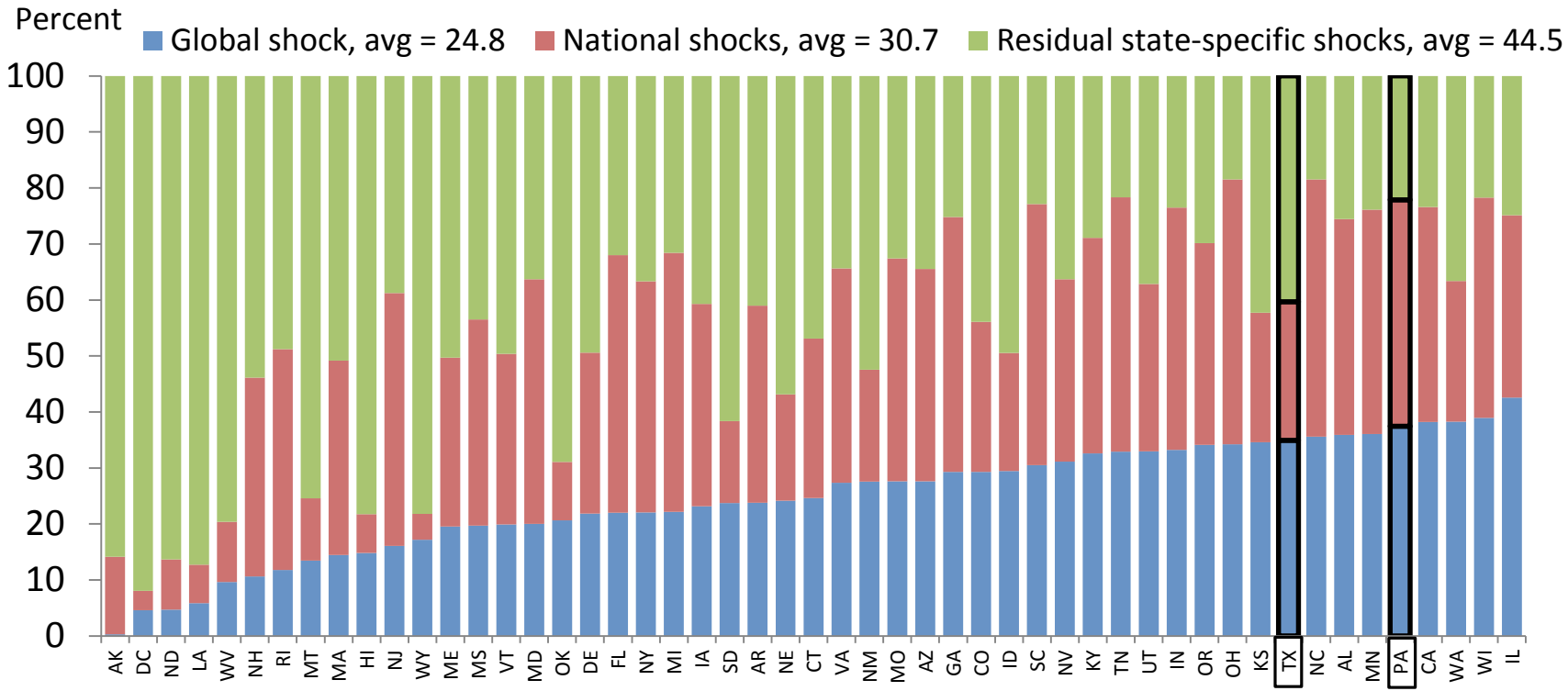
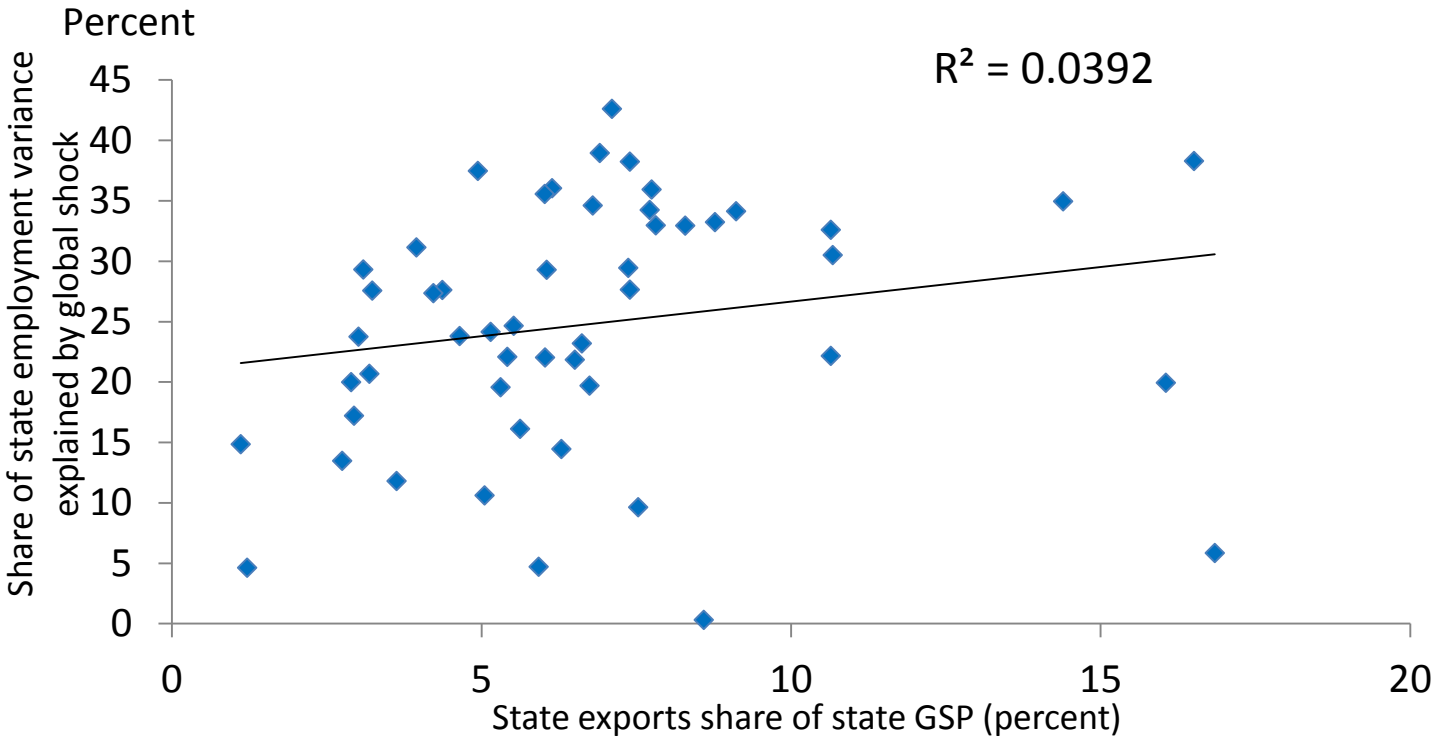


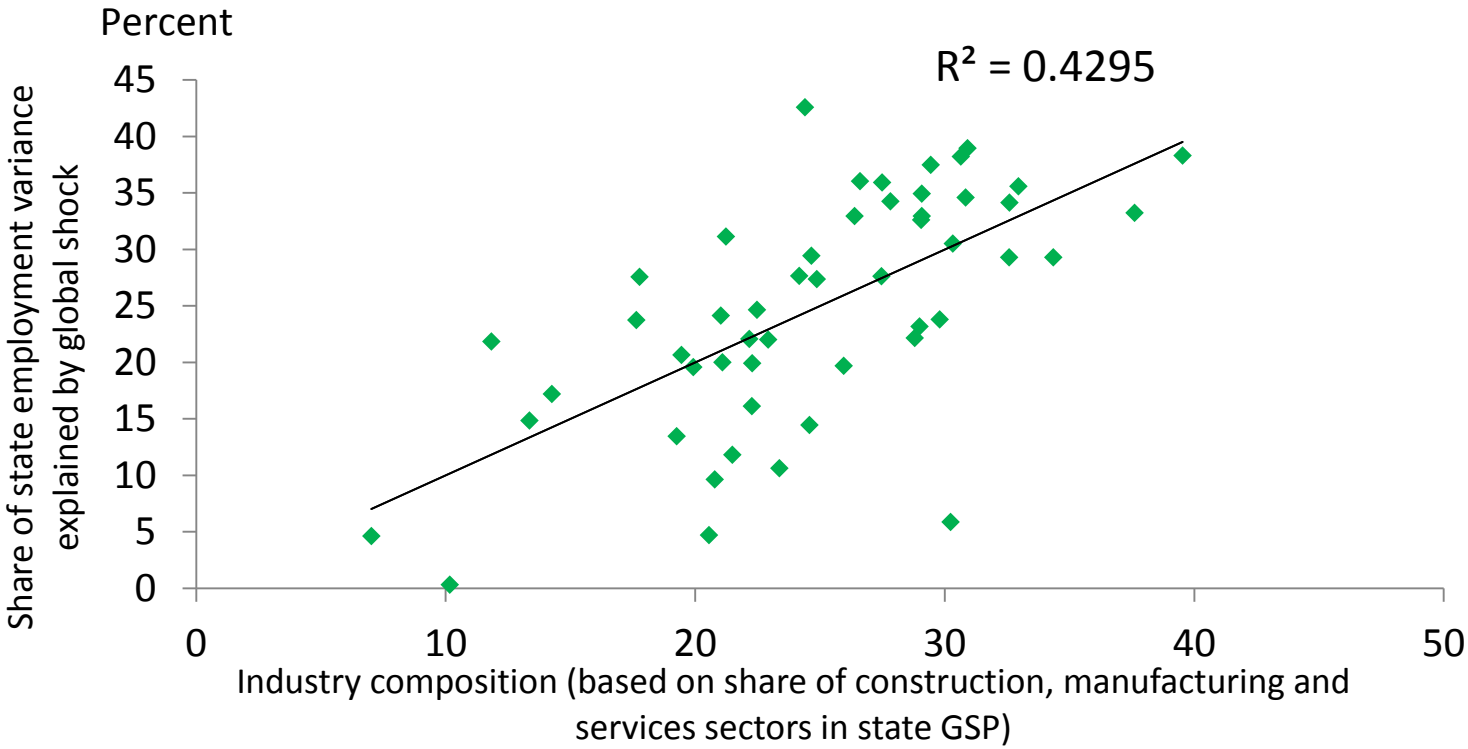
Summary

- Global business cycle *alone* explains about 25 percent of employment fluctuations, on average
  - Large differences across states
  - Range from a low of 0.3 percent in Alaska to 42.6 percent in Illinois
  - Texas: 34.9 percent; Pennsylvania: 37.5 percent
- Global and national business cycles *together* explain about 56 percent of employment fluctuations, on average
- About 44 percent of employment fluctuations (on average) cannot be accounted for by the global and national business cycles
  - Range from a low of 18.5 percent in North Carolina to 91.9 percent in DC
  - Texas: 40.3 percent; Pennsylvania: 22.1 percent

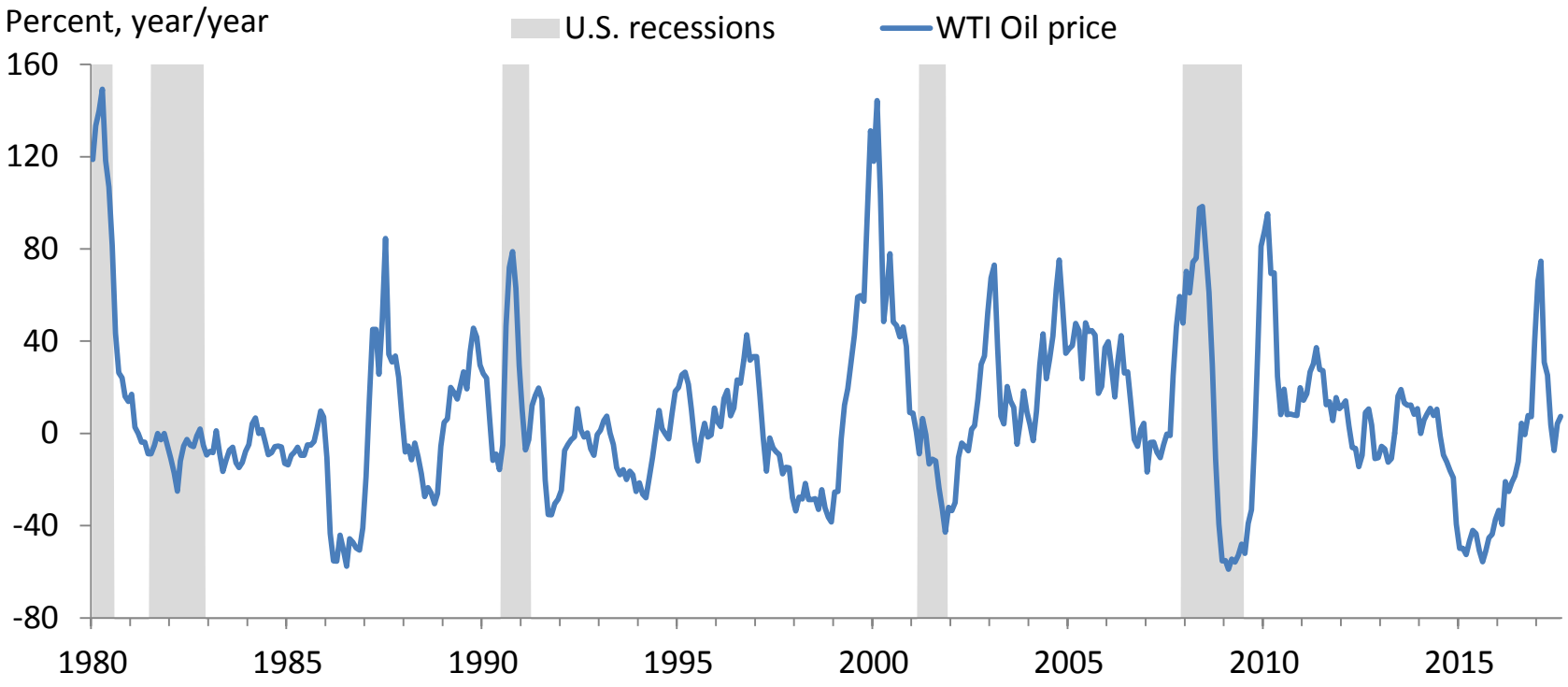
Exports alone explain little of the cross-state differences in share of state employment variance explained by the global shock



Industry composition explains some of the state differences



Oil price swings

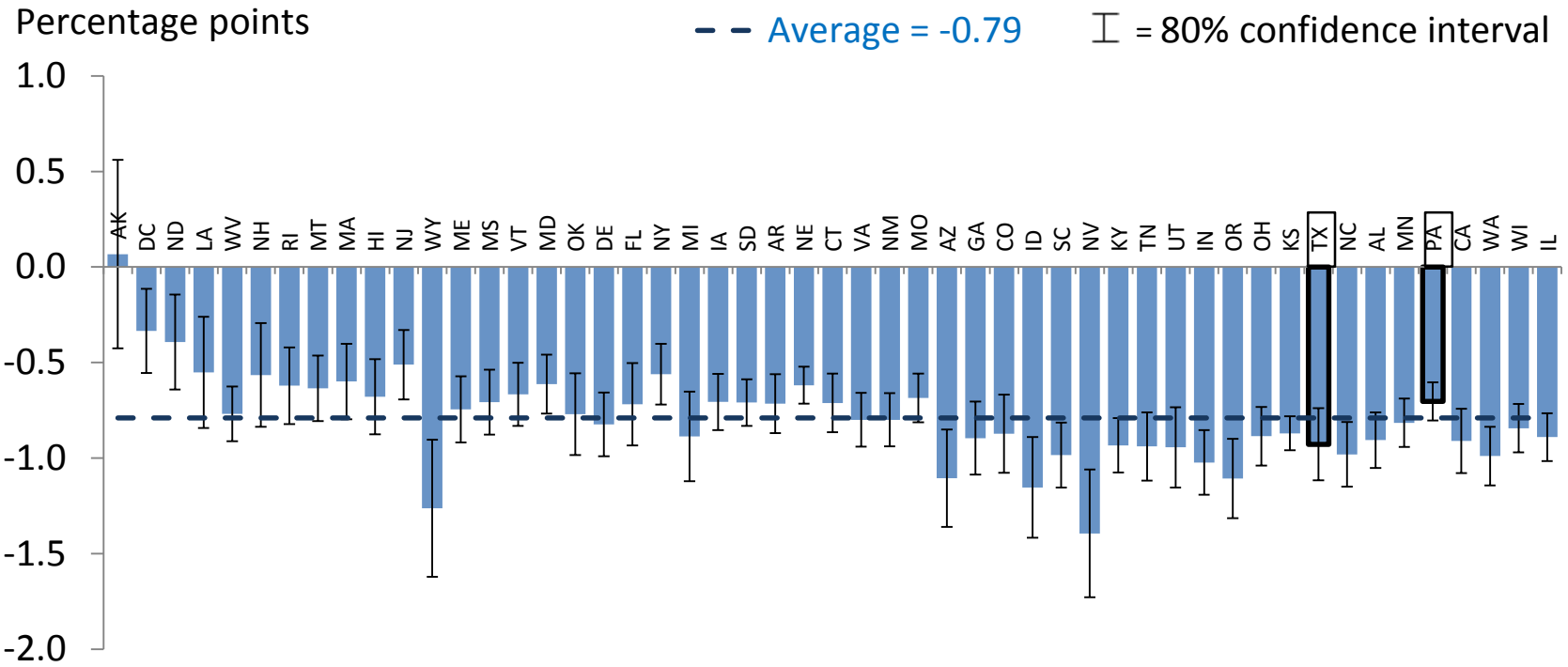


Oil prices as an explanation of state-level employment fluctuations

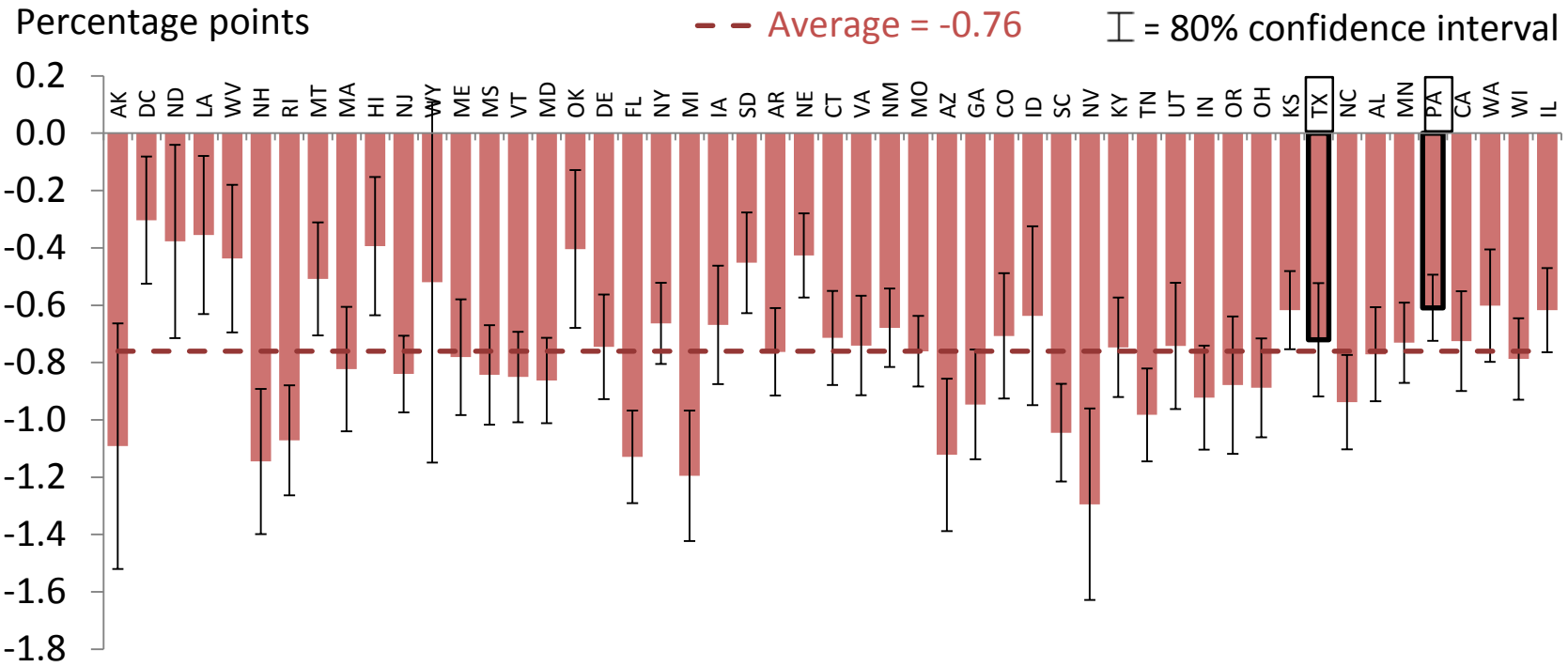
- Oil prices alone can (unconditionally) explain:
  - About 12% of fluctuations in foreign economies aggregate real output
  - About 5% of fluctuations in the U.S. output, and about 8% of fluctuations in the U.S. national employment
  - About 15% of fluctuations in the Texas employment

- Oil prices and global/national/state output and employment variables are jointly determined (interdependent), and therefore the results above are likely over-estimating the importance of oil market developments.

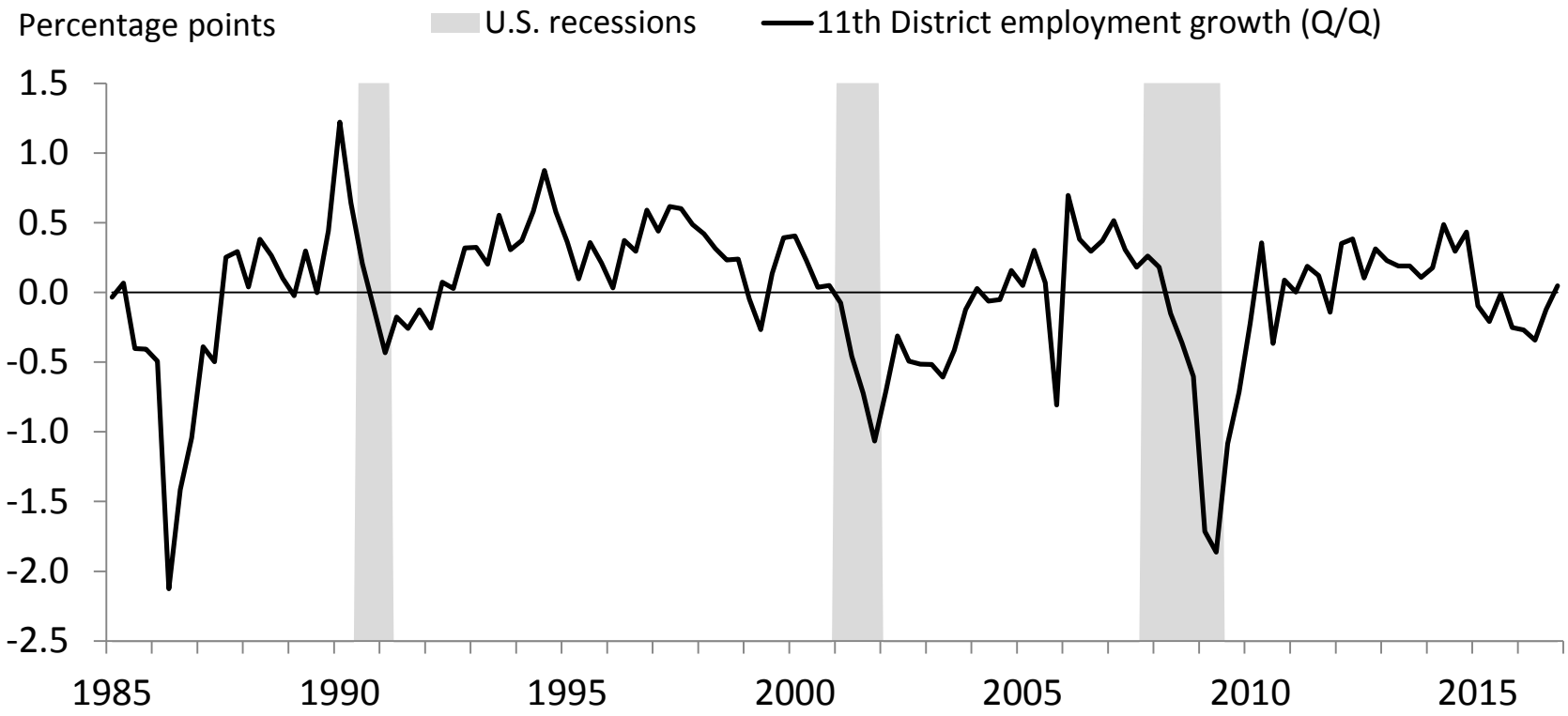
Cumulative one year effect of a 0.5% negative global foreign output shock on states' employment growth



Cumulative one year effect of a 1% negative national U.S. output shock on states' employment growth



Contributions of shocks to employment growth in the 11th District



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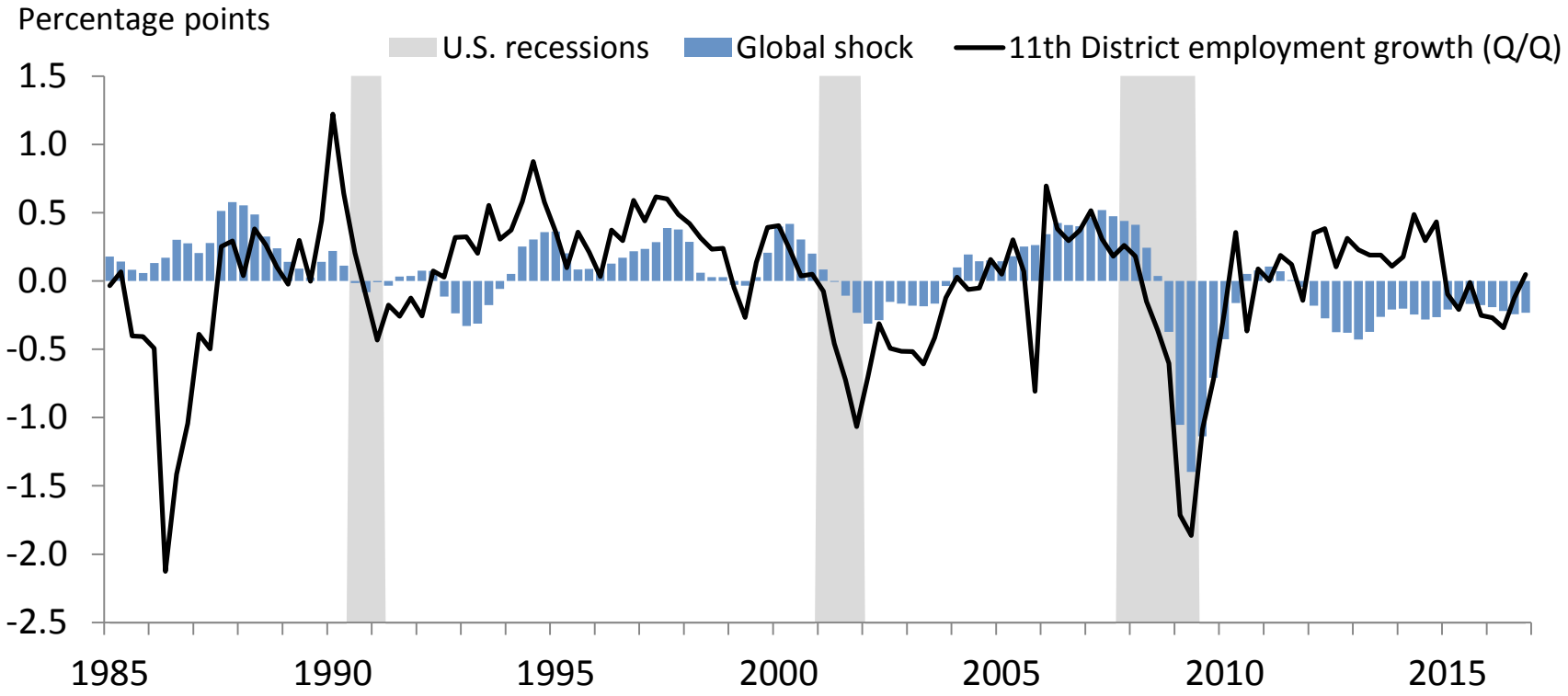

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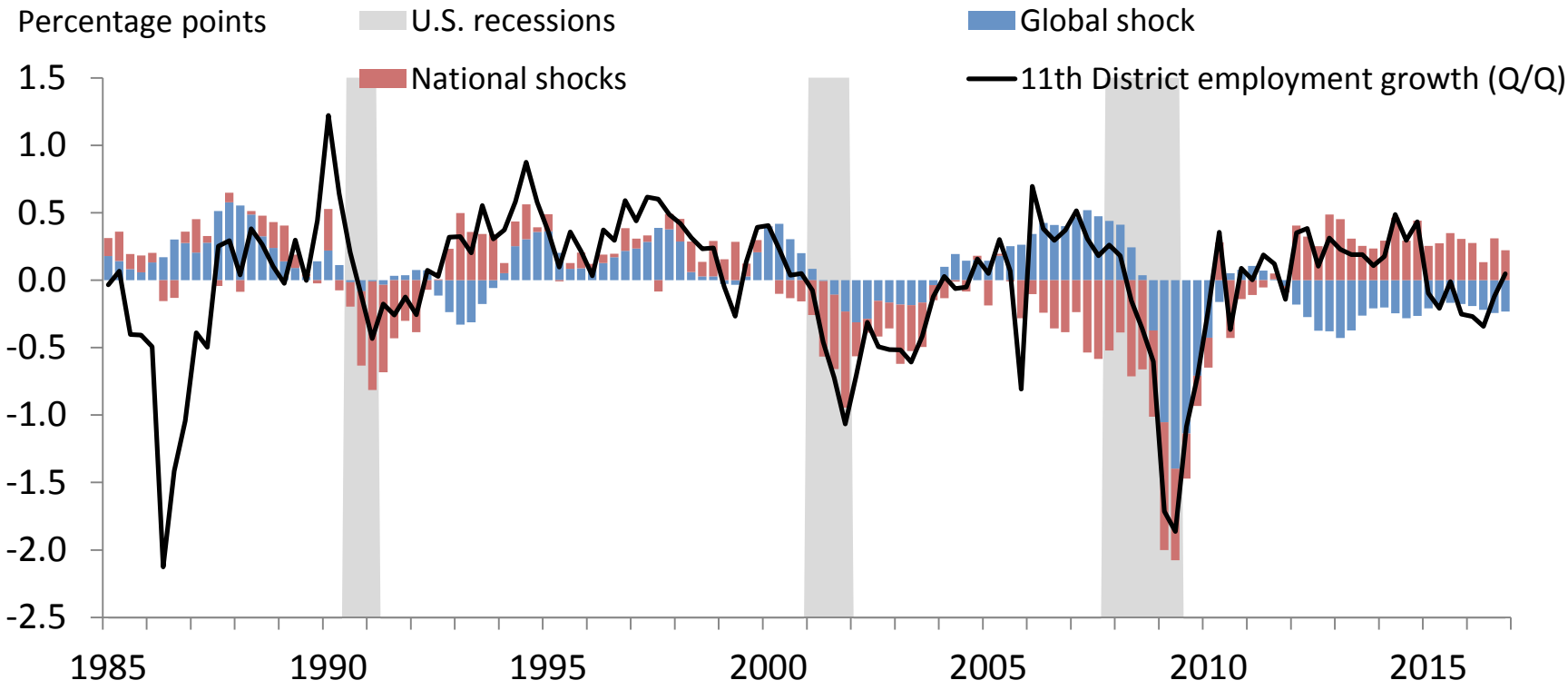

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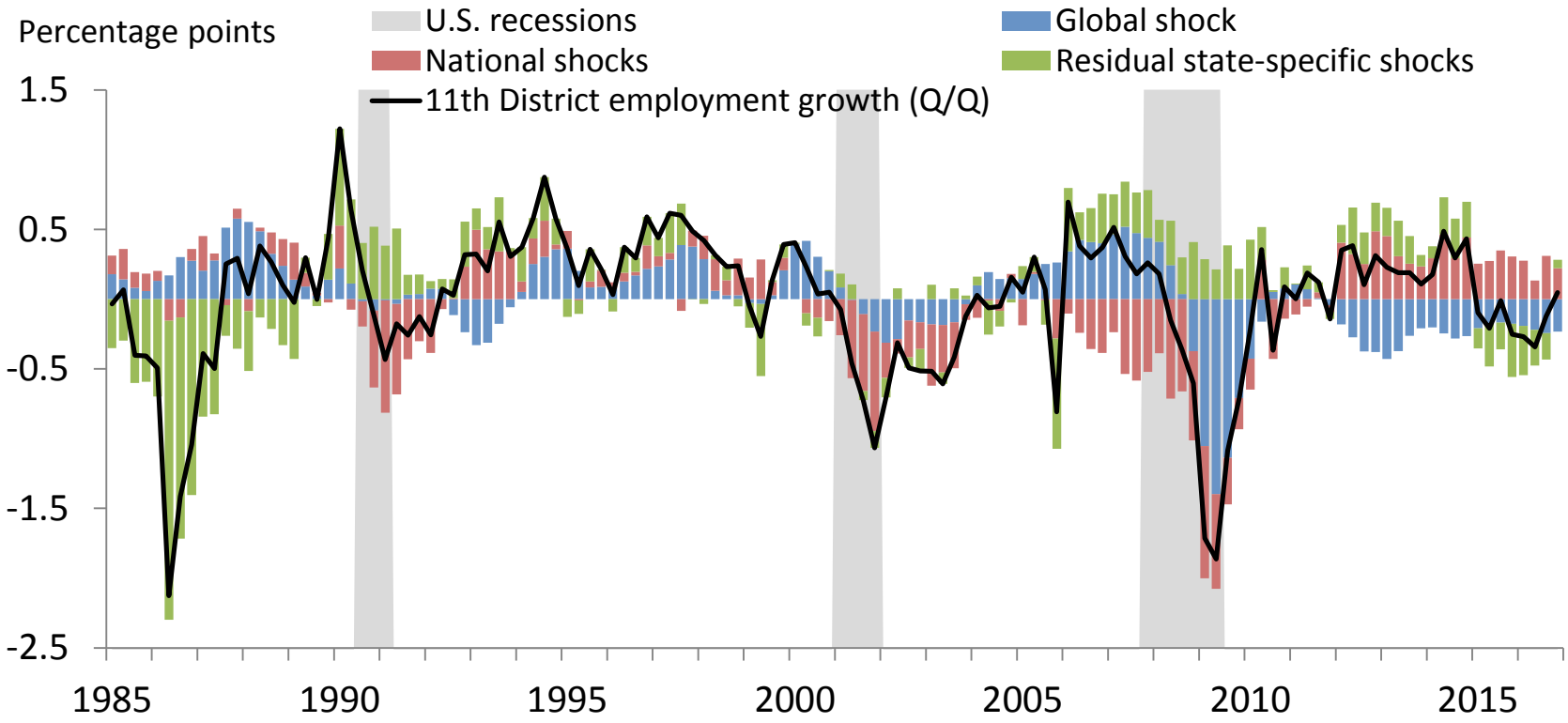
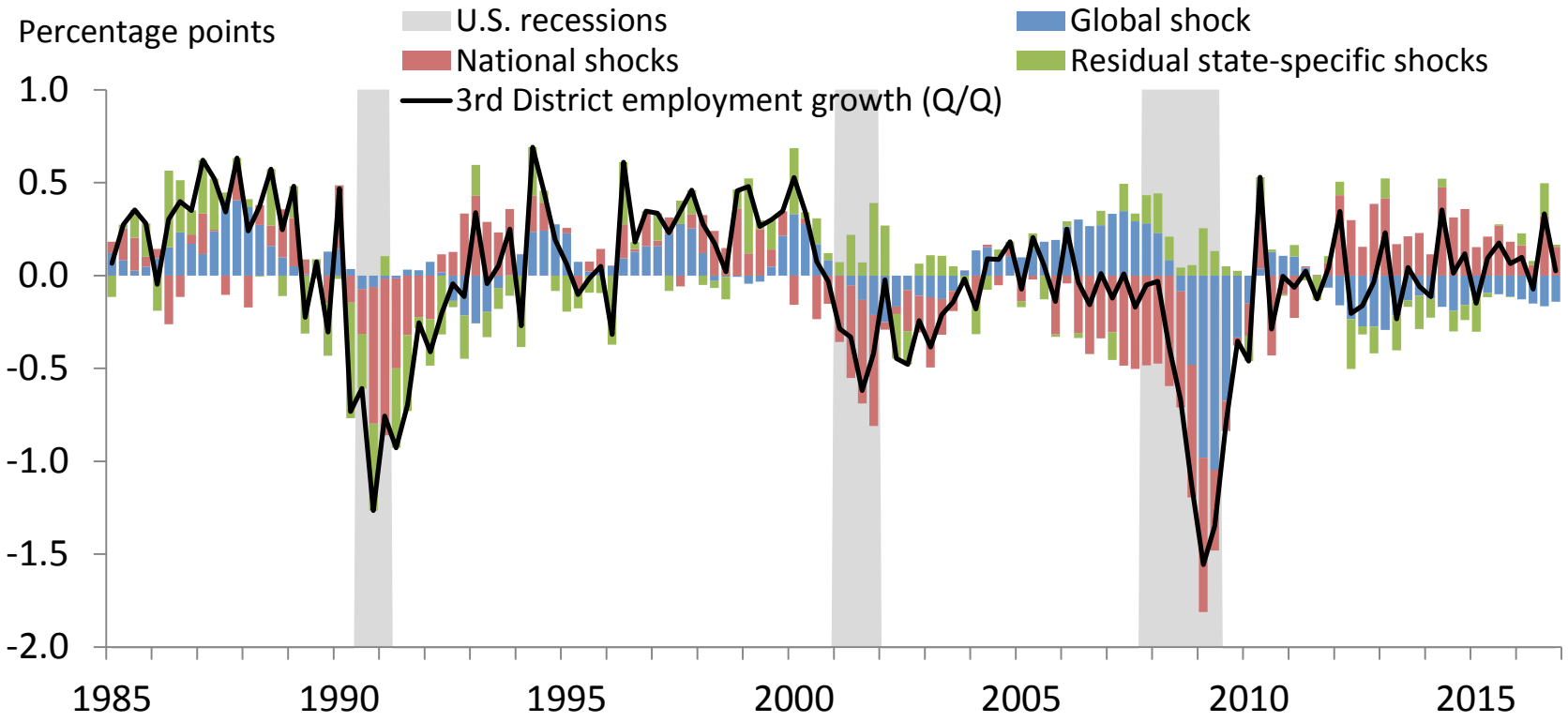
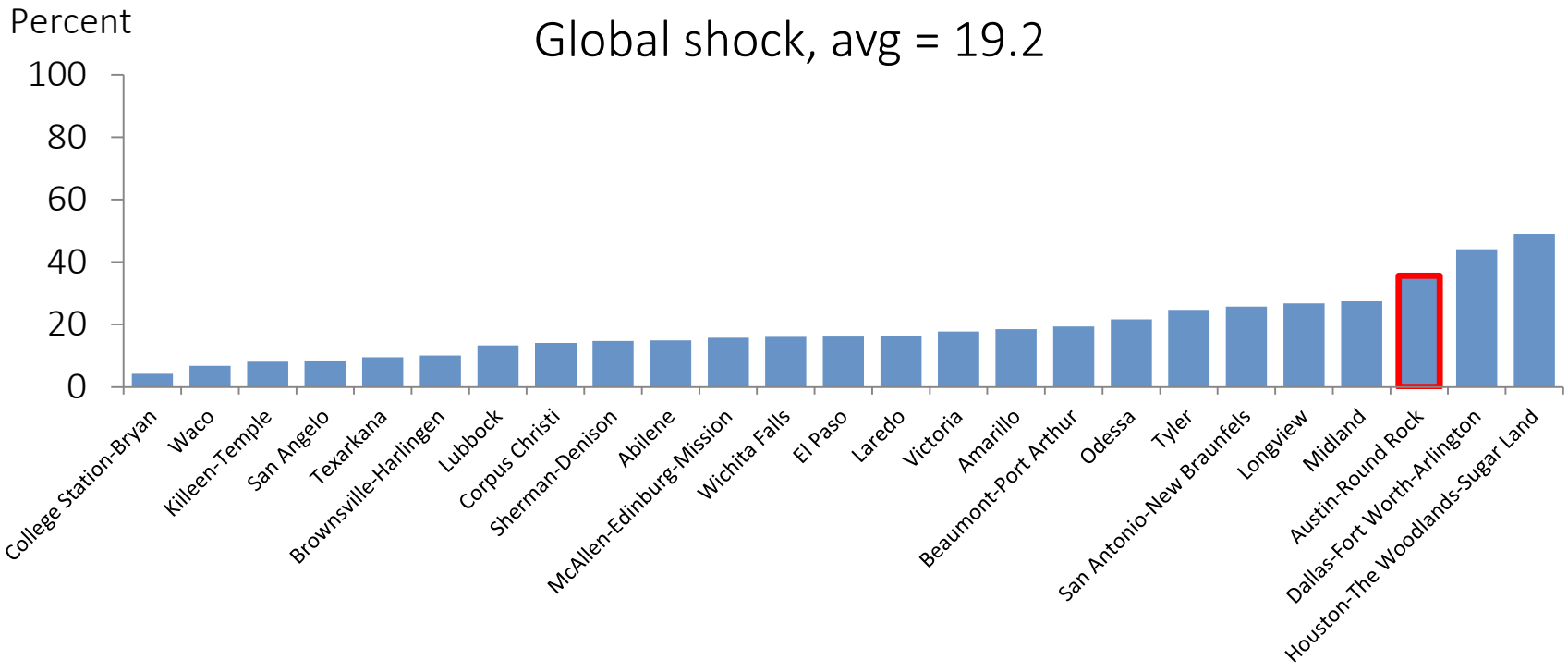


Contributions of shocks to employment growth in the 3rd District



Share of metro area employment variation explained by global, national and residual MSA-specific shocks



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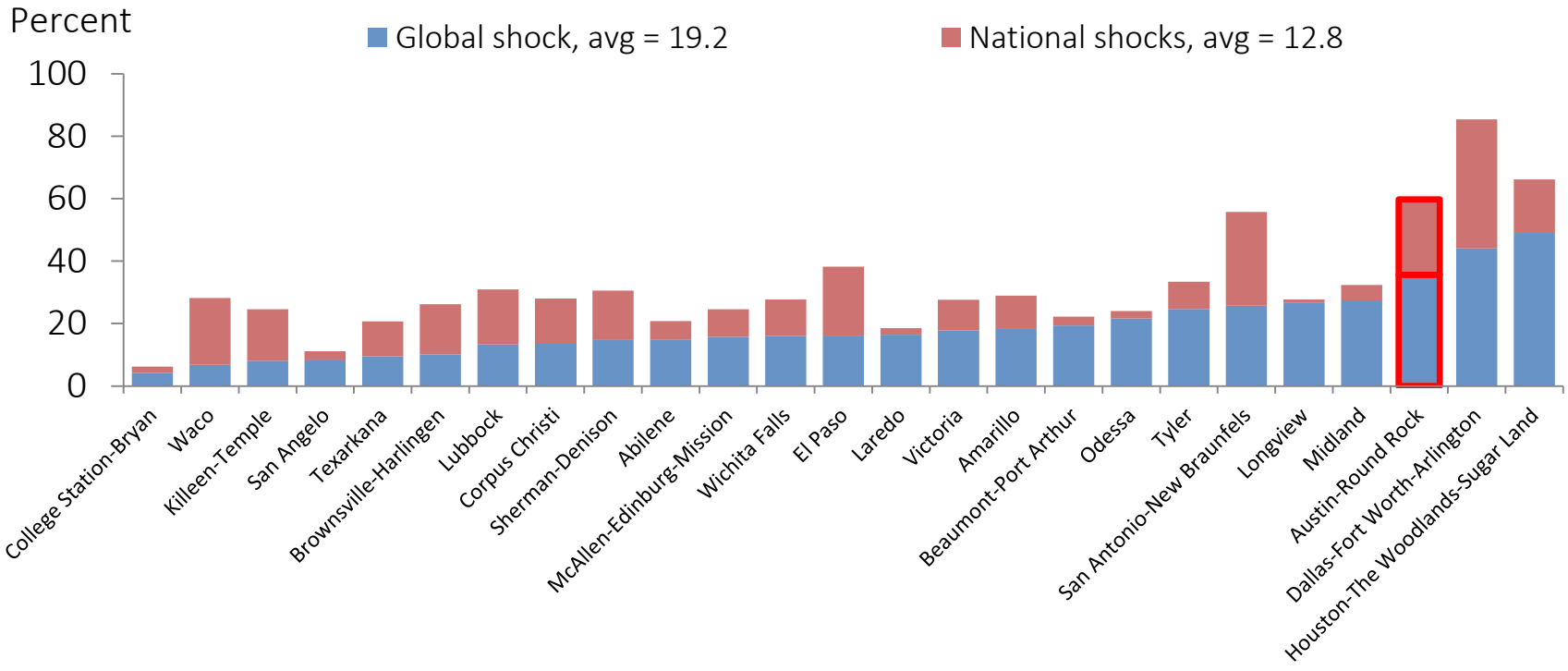

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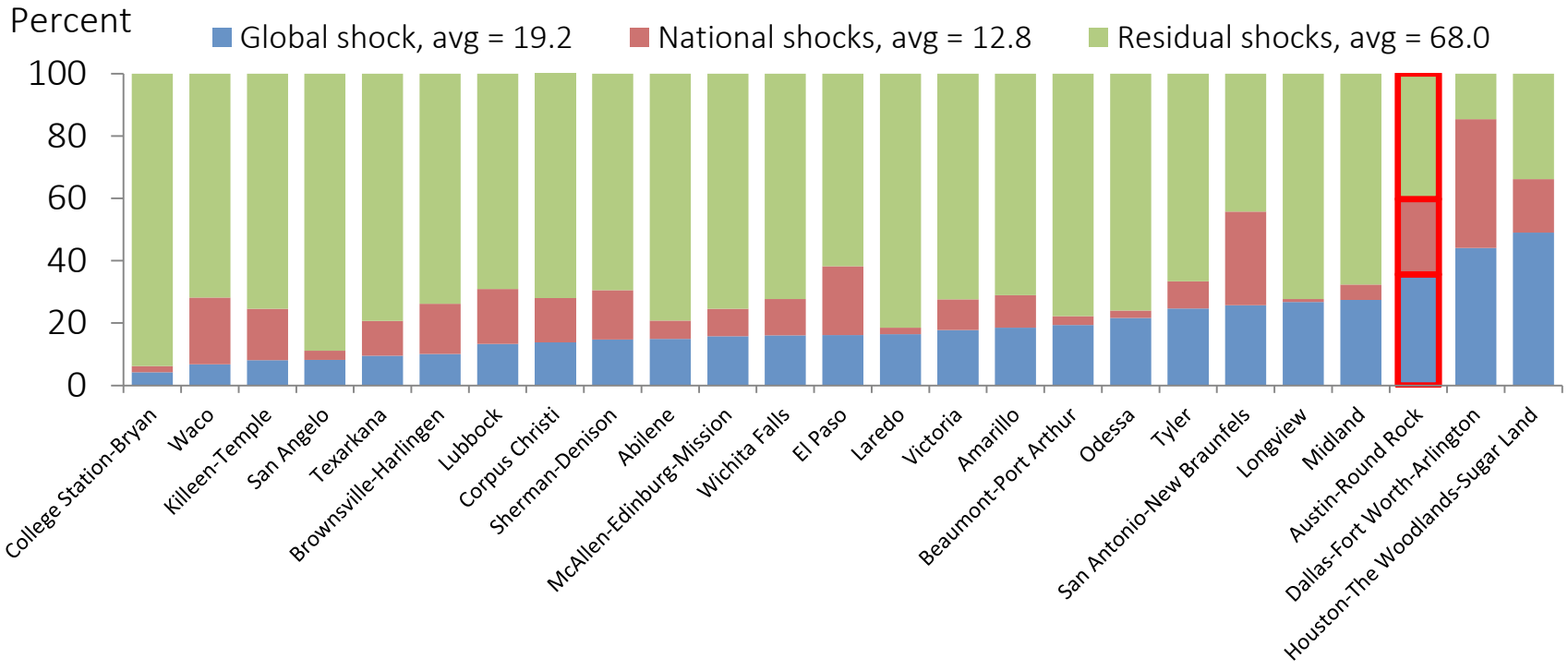
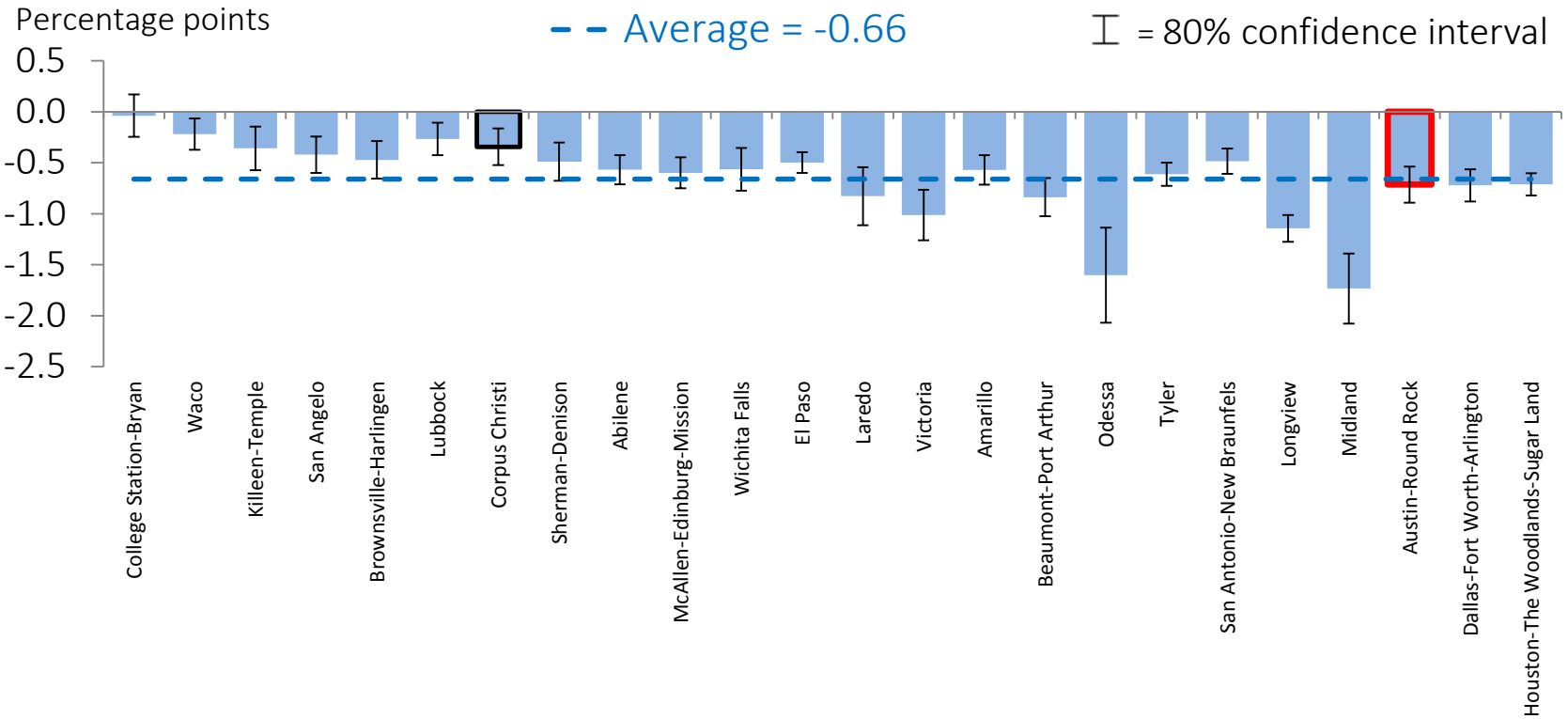


Cumulative one year effect of a 0.5% negative global foreign output shock on MSAs' employment growth



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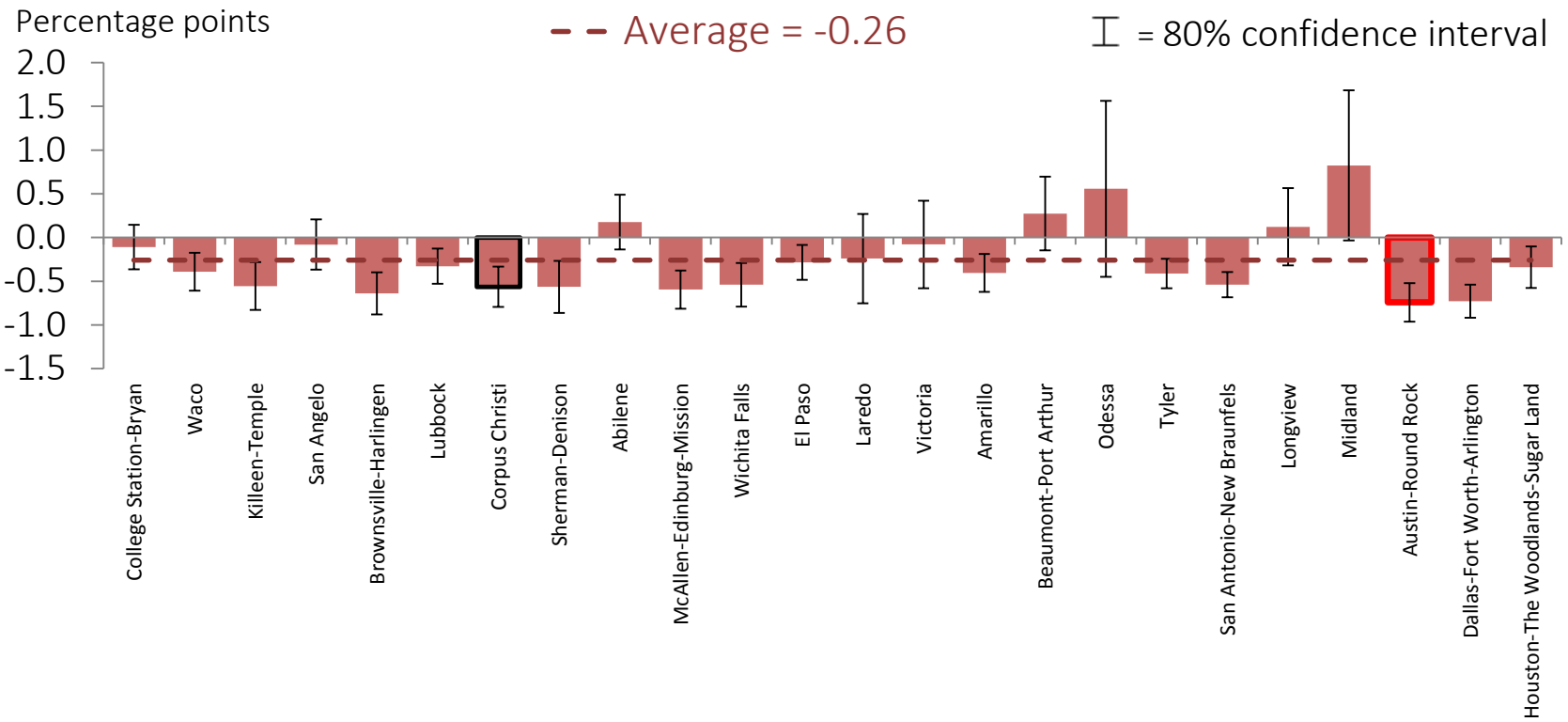

Summary and conclusions

- Global business cycle explains a non-trivial part of state-level employment fluctuations (about a quarter on average)
- Impact of shocks vary across states
  - Global and national business cycles have contributed in varying amounts to Texas and Pennsylvania's employment growth
  - A slow global recovery has held back these states' employment growth since 2012, while national factors have contributed to it
  - A 0.5% negative shock to global output leads to a total loss of 111,652 jobs in Texas, and 41,411 jobs in Pennsylvania, one year after the shock
- Further research is needed to explain why states are impacted differently
  - International trade is but one of the channels through which states are impacted by global economic developments

Model

- Global output model:
  - $y_t^* = \theta^* y_{t-1}^* + u_t^*$
- US model:
  - $\begin{bmatrix} y_{Nt} \\ \bar{e}_t \end{bmatrix} = \boldsymbol{q}_t = \boldsymbol{\Theta}_N q_{t-1} + \boldsymbol{b}_{N0} y_t^* + \boldsymbol{b}_{N1} y_{t-1}^* + \boldsymbol{u}_{Nt}$
- State-specific model:
  - $e_{j,t} = \psi_j e_{j,t-1} + \boldsymbol{\lambda}_{j0}' \boldsymbol{q}_t + \boldsymbol{\lambda}_{j1}' \boldsymbol{q}_{t-1} + \beta_{j0} y_t^* + \beta_{j1} y_{t-1}^* + v_{j,t}$