Discussion:
Breaking Down the U.S. Employment Multiplier Using Micro-Level Data
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How far we've come

- Chodorow-Reich, Feiveson, Liscow, Woolston (2012):
  - Single cross-section, state-level variation.
  - Spillovers analysis: government, health, education sectors versus other.
- Briganti, Dwyer, Gabriel, Sellemi (2025):
  - Panel, MSA-level variation.
  - Spillovers analysis: recipient establishments versus other.

Summary

1. MSA shift-share analysis.
   - Econometric comments.
   - Interpretation.
2. Establishment-level contractor analysis.
   - Suggestions to do more.
   - Interpretation.
3. What have we learned?
   - Sub-national versus national multipliers.

Exposure-design setup

Second stage: $$\frac{E_{\ell,t+h} - E_{\ell,t-1}}{E_{\ell,t-1}} = \beta_h \left[\frac{G_{\ell,t+h} - G_{\ell,t-1}}{Y_{\ell,t-1}} \right] + \lambda_{t,h} + \alpha_{\ell,h} + u_{\ell,t+h}.$$

First stage: $$\left[\frac{G_{\ell,t+h} - G_{\ell,t-1}}{Y_{\ell,t-1}} \right] = \gamma Z_{\ell,t+h} + e_{\ell,t+h}.$$

Instrument: $$Z_{\ell,t+h} = \frac{\overbrace{\left((1/19) \sum_{\tau=2001}^{2019} (G_{\ell,\tau}/G_{\tau}) \right)}^{\text{Exposure } s_\ell} \overbrace{(G_{t+h} - G_{t-1})}^{\text{Shifter}}}{Y_{\ell,t-1}}.$$

Discussion in paper

Shifter: In the first part of the sample, defense spending increased dramatically following the 9/11 terrorist attacks, due to the ensuing wars in Afghanistan and Iraq. Second, several budget cuts were repeatedly delayed until March 2013, when budget sequestrations were finally implemented. Following the Russian invasion of Crimea in 2014, after President Trump's election in 2016, a substantial increase in defense procurement spending reversed the downward trend caused by the sequestrations. Overall, exogenous events drive the shifts in the instrument.

Exposure: The MSA with the largest share of contracts is Washington-Arlington-Alexandria, accounting for about 12% of DoD spending. More broadly, MSAs with high defense contract shares are typically characterized by long-standing military activities whose location was determined by geostrategic, rather than economic, considerations well before the start of our sample period. Thus the geographic allocation of national funds across regions is plausibly pre-determined relative to current economic conditions.

Comment I: fix exposure interpretation

- Scaling by local output $Y_{\ell,t-1}$ changes shift-share interpretation.
- Rewrite instrument: $Z_{\ell,t+h} = \left(\frac{1}{19} \sum_{\tau=2001}^{2019} \frac{G_{\ell,\tau}/Y_{\ell,t-1}}{G_{\tau}/Y_{t-1}} \right) \left(\frac{G_{t+h} - G_{t-1}}{Y_{t-1}} \right)$.
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- Clearer and cleaner to use $Z_{\ell,t+h} = \underbrace{\left(\frac{1}{19} \sum_{\tau=2001}^{2019} \frac{G_{\ell,\tau}}{Y_{\ell,\tau}} \right)}_{\text{Exposure}} \underbrace{\left(\frac{G_{t+h} - G_{t-1}}{Y_{t-1}} \right)}_{\text{Shifter}}$.

COMMENT II: EXPOSURE-DESIGN ECONOMETRICS

- Basic DGP ($h = 0$, first stage=1): $\Delta E_{\ell,t} = \beta \left[s_\ell \Delta G_t \right] + \lambda_t + \alpha_\ell + u_{\ell,t}$.

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  - Violated if $u_{\ell,t} = \gamma [s_\ell X_t] + \varepsilon_{\ell,t}$, $\mathbf{E}_t \left[X_t \Delta G_t \right] \neq 0$.
  - Valid if ΔG_t strictly exogenous — same as **time series regression**.
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- Cluster by MSA not sufficient with shifter exogenous (Adao et al., 2018).
  - Suppose $\gamma \neq 0$ and shifter exogeneity holds. Residuals $\{u_{\ell,t}\}$ of high s_ℓ areas correlated through dependence on X_t.

What to do?

- Fix instrument and exposure discussion.
- More transparency on differences between high/low exposure areas.
- Rotemberg weights: which areas "drive" identification.
- Over-identification test: if believe exogenous shares, report 19 cross-sectional coefficients.
- Add controls: e.g. industry shift-share employment to address Dot-Com exposure.
- Drop DC area in robustness: big outlier in s_ℓ and exposed more broadly to sequestration.
- Cluster SEs by time (Chodorow-Reich et al., 2021) accounting for finite clusters.
- Report first stage coefficient (why would it differ from 1?).

Headline result

- Three-year employment multiplier $\Rightarrow$ cost/job=\$284k.
- Chodorow-Reich (2019) survey: cost/job $25k - \$125k$.
- Paper's interpretation: defense is high wage industry.
  - Testable: estimate total payroll multiplier.
  - Defense may also be capital-intensive with more sourcing outside MSA.
- Another possibility: the numerator is wrong.
  - Footnote 18: contracts assigned to award date, not amortized over contract duration.
  - Cox et al. (2024) fact 4: value-weighted median contract is 1,279 days.

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- Put wages and salaries on LHS.
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- Cannot compare recipient response to total to infer spillovers.
  - Recipient analysis uses 5% of all awards that are "unexpected." Half of these are for construction.
  - Figure B.9: smaller employment response at service contractors.
  - Garin (2019): 55% of ARRA highway contracts to firms in different CZ than place-of-work.
  - Why is analysis at establishment and not firm level?

Awards by CBSA of recipient and place-of-work

	Construction		
	No	Yes	Total
	Billions of USD		
Same CBSA	318.9	6.9	325.7
Different CBSA	85.3	15.4	100.7
Missing CBSA	42.3	6.7	48.9
Total	446.5	28.9	475.4

Notes: extends Garin (2019) to cover non-highway spending using the 2016 USA Spending data set.

What have we learned?

- More variation (panel, MSA) unambiguously better.
  - But still need to understand where variation comes from.
- Narrowing direct treatment to contractor is cool.
  - But are spillovers sub-contracting, supply chain, or Keynesian?
- Neither MSAs nor states are close economies.

LOCAL-TO-NATIONAL MULTIPLIER (CHODOROW-REICH, 2019)

1. Local multiplier outside-financed.
   - Not first-order for transitory spending and *deficit-financed* national multiplier.
2. Monetary policy reacts nationally.
   - Compare to *fixed interest rate* (e.g. ZLB) national multiplier.
3. Local prices rise and local residents spend income on outside goods.
   - Makes local multiplier *smaller* (leakage).
4. Local region can import labor, capital, materials from outside.
   - Makes local multiplier *bigger* (flatter supply curve).
5. (3) and (4) likely more pronounced for MSAs than states.