Micro and Macro effects of Policies

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Question: What can well-identified causal estimates from micro data tell us about macro effects of policies?

▶ Approach 1: Directly extrapolate micro evidence (with some help from theory)
  ▶ Direct summation
  ▶ Use sufficient statistics
  ▶ Use theory to bound estimates
  ▶ Bounding local GE Effects (won’t discuss)

▶ Approach 2: Indirectly use micro evidence to discipline key model parameters (lean more on relevant theory)
  ▶ Match moments in a structural model
Micro-to-Macro

▶ Micro to macro is hard!
  ▶ Even though I will sound negative, we have learned a lot

▶ Common view circa 2010:
  ▶ Just do applied micro and extrapolate

▶ I am quite negative about this view for a number of reasons:
  ▶ Theory is crucial in all approaches
  ▶ External validity is important:
    Nakamura and Steinsson (2018) "even very cleanly identified monetary and fiscal natural experiments give us, at best, only a partial assessment of how future monetary and fiscal policy actions—which may differ in important ways from those in the past—will affect the economy."
  ▶ SUTVA violations: important policies often violate SUTVA so no suitable control group. Do we really only want to focus on small policies?
An example from my own work: First-Time Homebuyer Tax Credit (Berger, Turner, Zwick 2020)

- Uses rich data from tax returns to estimate policy effect
- We use multiple designs and direct summation to measure aggregate effects of policy for home sales
- Use a rule-of-thumb result from Berger, Guerrieri, Lorenzoni and Vavra (2020) to measure indirect effects via house prices
  - Pretty coarse estimate

- Highlights challenges and limitations of the approach
First-Time Homebuyer Tax Credit

1. Temporary fiscal stimulus with three iterations
   - V1 (April 2008-June 2009): Interest-free loan up to $7.5K for first-time homebuyers
   - V2 (Feb 2009-Nov 2009): Refundable tax credit of $8K for first-time homebuyers
   - V3 (Nov 2009-May 2010): Extended V2 and expanded to long-time homebuyers

We focus on V2 and V3 (refundable tax credit).
First-Time Homebuyer Tax Credit

1. Temporary fiscal stimulus with three iterations

2. Maximum $8K credit for FTHC, $6.5K for LTHC
   ▶ Claimed on federal tax return and delivered by refund
   ▶ Could be applied to prior return to accelerate payment
   ▶ Bridge loans administered by state FHAs and pvt lenders; could be applied to down payment or closing costs

3. Eligibility requirements

4. Our Approach:
   ▶ Measure geographic variation in ex ante exposure to FTHC
   ▶ First-time homebuyer share in 2000
   ▶ Estimate policy effect with a generalized diff-in-diffs design using ex ante exposure as the instrument
   ▶ Regression Kink design exploiting Eligibility requirements
   ▶ Must earn less than 75K-95K (single) or 150-170K (joint)
   ▶ Benefit declines linearly within income window
   ▶ Use both direct summation and sufficient statistics to evaluate policy
First-Time Homebuyer Tax Credit

1. Temporary fiscal stimulus with three iterations

2. Maximum $8K credit for FTHC, $6.5K for LTHC

3. Eligibility requirements
   - For FTHC, must not own during 3-year period preceding purchase date
   - For LTHC, must have owned and used home for 5-year period in last 8 years
   - Must earn less than 75K-95K (single) or 150-170K (joint)
   - Must buy during policy window

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Exploit Geographic Variation in Exposure

Home sales

House Prices

Delta Total Price Growth, Policy vs. Pre
**Direct Summation**

- 1 SD of exposure $\Rightarrow$ 50-60% more sales cumulatively

$$\Delta \text{Sales}_g = 17 \times \beta \times (e_g - e_{g,low}) \times s_{g,2007}$$

- By construction, any time-series effect of the policy shown by the bottom group is set to zero and removed from the effect computed for other groups.

- Induced sales relative to bottom quantile of 169K (8.1%)
  - 412K if similar effect in uncovered areas
  - Compare to 2.7M FTHC claims during this time
  - Lower bound if lowest exposure group also responds
  - If $e_{g,low} = 0$, then aggregate is 568K (11.2%)
EVALUATING ZERO INTERCEPT ASSUMPTION

Still, need a theoretical justification lowest exposure places don’t respond (high frequency, localness of housing markets helps)
Key Result: $8K of FTHC → P(FTHB) increase 0.76 ppts

- Increases baseline rate by 53 percent
- Aggregate effect is 520K-610K induced transitions
## Indirect effects

<table>
<thead>
<tr>
<th>Estimation Method</th>
<th>Aggregate (%)</th>
<th>Sample</th>
<th>Multipliers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Direct</td>
<td>Indirect (S)</td>
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<tr>
<td>Cross-sectional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Relative to Bottom 1%</td>
<td>412K (8.2%)</td>
<td>169K</td>
<td>0.179</td>
</tr>
<tr>
<td>B. Relative to Zero</td>
<td>568K (11.3%)</td>
<td>233K</td>
<td>0.241</td>
</tr>
<tr>
<td>C. Average of A and B</td>
<td>490K (9.8%)</td>
<td>201K</td>
<td>0.208</td>
</tr>
<tr>
<td>Regression Kink</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Full Population</td>
<td>520K (10.3%)</td>
<td>n.a.</td>
<td>0.371</td>
</tr>
<tr>
<td>Eligible Only</td>
<td>610K (12.1%)</td>
<td>n.a.</td>
<td>0.435</td>
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<tr>
<td>Age Distribution</td>
<td></td>
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<tr>
<td>Young Buyers</td>
<td>n.a.</td>
<td>261K</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

- Measure indirect effects on consumption from increase in house prices using the rule-of-thumb from Berger, Guerrieri, Lorenzoni and Vavra (2021)

\[
\frac{\Delta C_i}{\Delta P} = MPC_i PH_i
\]

- Then use direct summation using price info
**Bottom line**

- Even with multiple empirical approaches, lots of uncertainty
- Even more so when considering hard to measure indirect or spillover effects
- And despite lots of work: many people didn’t believe our aggregate numbers because of non-reversal result!

### Cross-sectional estimates

![Cross-sectional estimates graph]

### Aggregate time-series

![Aggregate time-series graph]
 Bounds: Lessons From Local Multipliers

- Nice Chodorow-Reich (2019) survey article on local multipliers.
- Local multipliers are unique in four ways:
  1. Do not allow monetary policy response.
  2. May induce “expenditure switching” due to relative price changes.
  3. May induce local spending on other regions’ output due to income effect.
  4. Typically deficit financed today or in future.
- Argument:
  2 and 3 make local multiplier smaller than aggregate multiplier.
  Thus local multiplier is rough lower bound for “closed economy ZLB deficit-financed aggregate multiplier,” which is $\approx 1.7$.
  4 is small (0.2 at most).
Fiscal multipliers are best case scenario for bounding approach

But not possible in all cases and still many external validity concerns
Match Moments in a Structural Model

- Easier and generally applicable, but often less convincing

- Two keys:
  1. Moment must be about key mechanism that matters for the policy or GE. e.g. Investment stimulus papers: Zwick and Mahon (2018) evidence disciplines elasticity of investment stimulus to changes in cost of capital.
  2. Moment is useful is if helps discriminates between models (e.g. fiscal multipliers)

- Important but less discussed: How we close models often matters for aggregate response (e.g. free entry conditions)
  - Ideally we would have micro evidence to discipline then
  - I think this is more promising then using time-series moments to test GE moments
  - If do latter, be humble
Example: Minimum Wage

- How high should the minimum wage be?

- Use framework of Berger, Herkenhoff, Mongey (2021)
  - Firm heterogeneity, strategic interactions, worker heterogeneity (Non-HS, HS, College)

- Accommodates different sides of the minimum wage debate
  - Firms have labor market power vs. Misallocation $w$ pushed too high

- Key value of the model: us speak about effect of 15 dollar US min wage

- Minimum to be believeable is matching micro studies that speak to the key mechanisms
Replicate minimum wage studies

1. Positive effects for small increases, negative effects for large increases
   - Clemens Strain (2021) - *The Heterogeneous Effects of Large and Small Min Wage Changes*

2. Minimum wages reallocate employment across firm distribution - $\omega$
   - Dustmann et al. (2021) - *Reallocation Effect of Minimum Wages*

3. Firms respond to competitors wage changes - $\tilde{\mu}$
   - Derenoncourt el. al. (2021) - *Spillover Effects from Voluntary Employer Minimum Wages*

4. Positive responses in concentrated markets, Negative in competitive
**Effect on Employment**

**A. Change in employment**

![Graph showing change in employment against minimum wage](image)
Gains from Increasing Min Wage

- Even though it’s a sophisticated model, still significant uncertainty about total welfare effects
- Helpful that Hurst et. al (2021) find similar results despite different model
Takeaways from Structural Approach

- Model allows for lots of fun counterfactuals
- Can handle non-linearities that may be crucial for evaluation of large or aggregate policies
  - This is a concern that I have about these new linear time series approaches (but need to learn more)
- GE effects often lurk in the background
  - e.g. when small firms shut down, what types of firms replace them? Are new entrants better or worse?
  - These are empirical questions but matter a lot for the welfare consequences of the policy
- Goal should NOT be to give up on GE but rather
  1. Be open about current limitations
  2. Try and measure effects precisely even if with time-series data
Theory can help

Example from Landais, Mishraillat, Saez 2018:

\[
R = R^* \left( \epsilon^m, \frac{U'(c^u)}{U'(c^e)} \right) \left( 1 - \frac{\epsilon^M}{\epsilon^m} \right) \cdot \text{efficiency term}
\]

\text{Baily-Chetty formula} \quad \text{correction}

\(\epsilon^m\): Microelasticity of unemployment wrt to UI

\(\epsilon^M\): Macroelasticity of unemployment wrt to UI

Optimal UI \(\neq\) Baily-Chetty if

- UI affects market tightness: \(\epsilon^m \neq \epsilon^M\)
- Tightness is inefficient: efficiency term \(\neq 0\)
Theory can help

- $\epsilon^m$
  - Obtained by comparing identical jobseekers receiving different UI benefits in the same market
  - (Relatively) easy to precisely measure

- $\epsilon^M$
  - Obtained by comparing identical labor markets receiving different UI benefits
  - Hard to measure precisely

- Landais, Mishaillet, Saez 2018 argue these corrects matter
  - Optimal replacement rates are countercyclical

- Bottom line: helpful to have a better sense of what parameters need to be measured
CONCLUSION

- Progress is slow but we have learned a lot!
- Models definitely needed
  - Matching right moments is key
  - More humbleness about what we don’t know
  - Both theorists and empiricists can help
- Might benefit from partial approaches (Mckay and Wolf wp)
- Can’t wait to see what we know in 10 years
Thanks!