Micro and Macro effects of Policies

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Measuring Macro Effects of Policies

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

- 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

First-Time Homebuyer Tax Credit

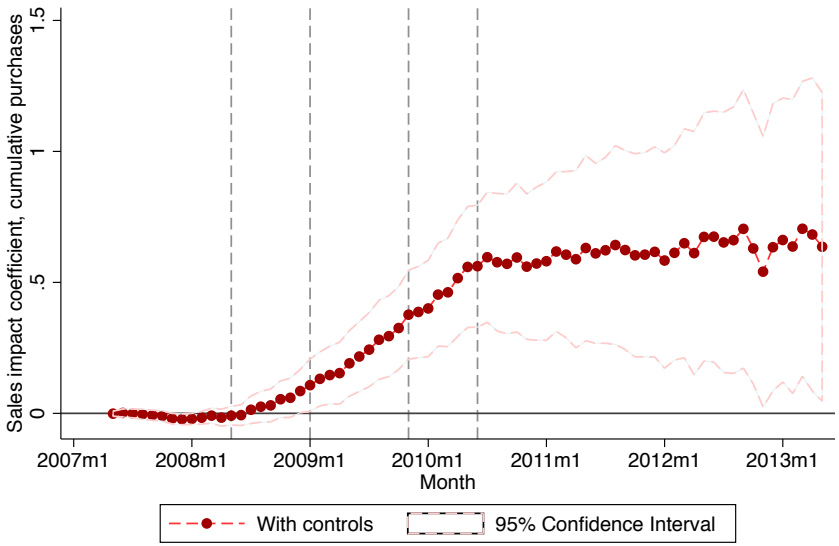
1. Temporary fiscal stimulus with three iterations
2. Maximum $8K credit for FTHC, $6.5K for LTHC
3. Eligibility requirements
   - For FTHC, must not own during 3-year period preceding purchase date
   - For LTHC, must have owned and used home for 5-year period in last 8 years
   - Must earn less than 75K-95K (single) or 150-170K (joint)
   - Must buy during policy window

First-Time Homebuyer Tax Credit

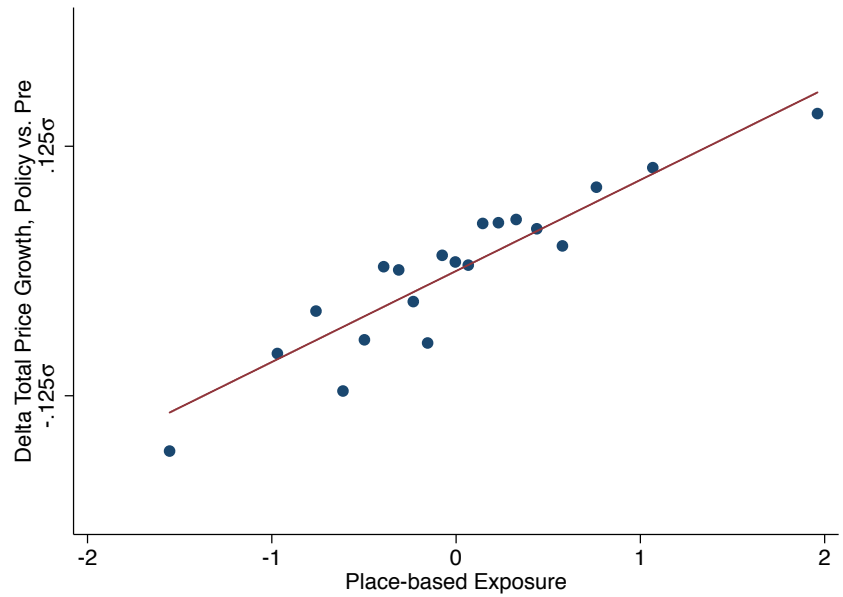
1. Temporary fiscal stimulus with three iterations
2. Maximum $8K credit for FTHC, $6.5K for LTHC
3. Eligibility requirements
4. Our Approach:
   - Measure geographic variation in ex ante exposure to FTHC
     - First-time homebuyer share in 2000
     - Estimate policy effect with a generalized diff-in-diffs 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

Exploit Geographic Variation in Exposure

Home sales



House Prices



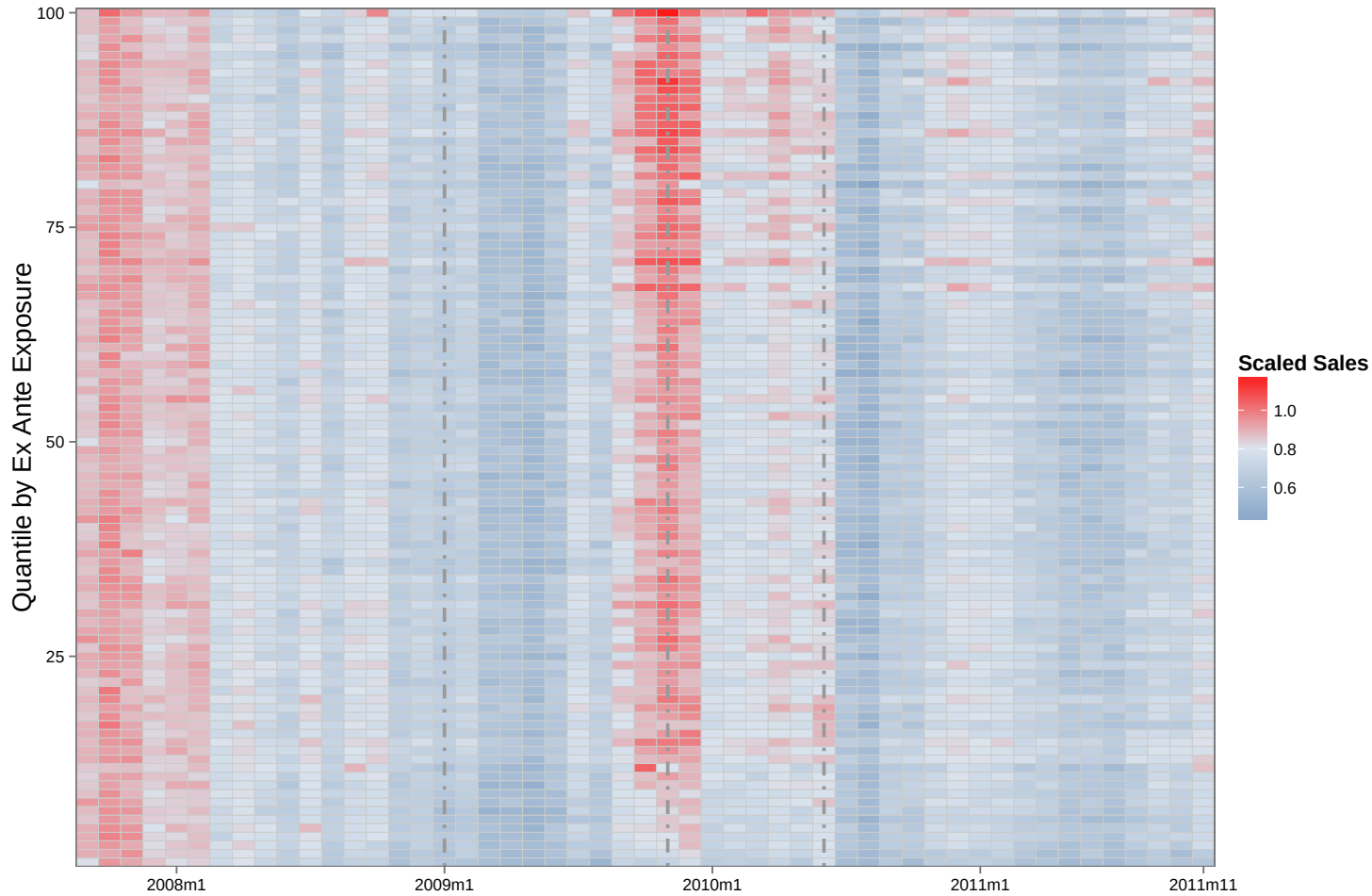
Direct Summation

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

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

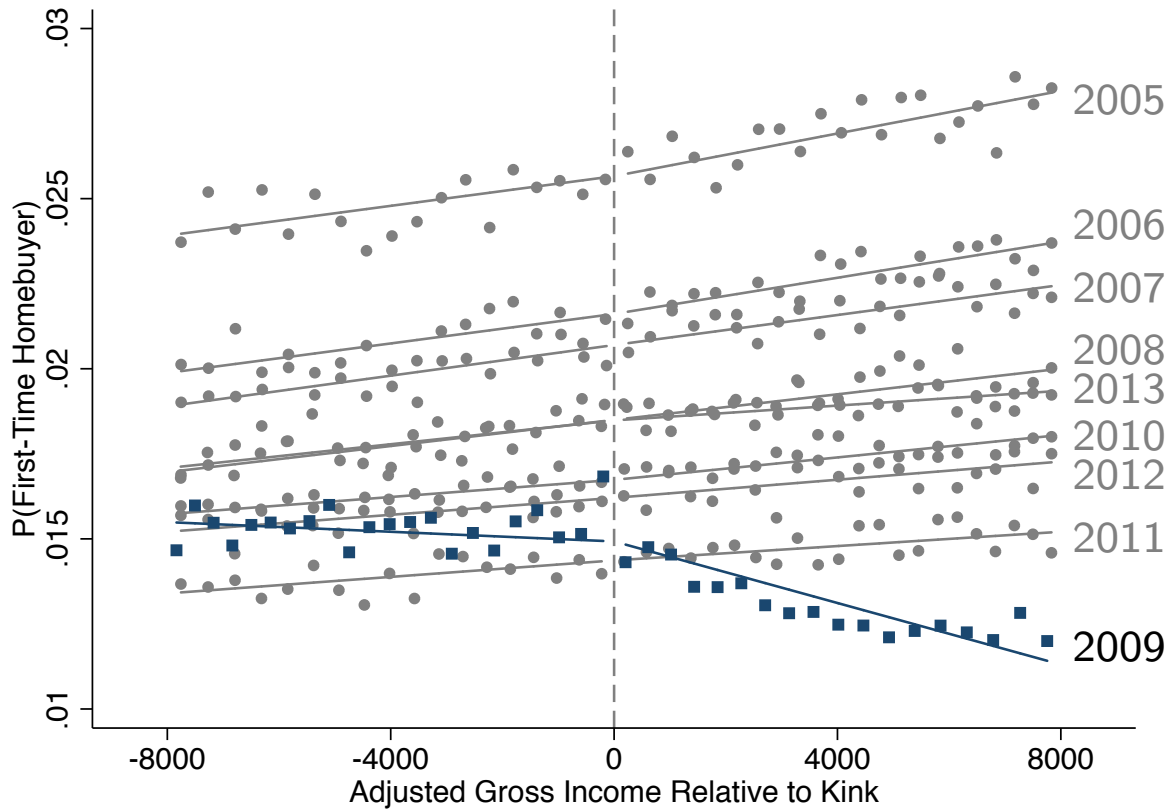
- By construction, any time-series effect of the policy shown by the bottom group is set to zero and removed from the effect computed for other groups.
- Induced sales relative to bottom quantile of 169K (8.1%)
  - 412K if similar effect in uncovered areas
  - Compare to 2.7M FTHC claims during this 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)

Regression Kink Results



Key Result: \$8K of FTHC $\rightarrow$ P(FTHB) increase 0.76 ppts

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

Indirect effects

Estimation Method	Aggregate (%)	Sample	Multipliers		
			Direct	Indirect (S)	Indirect (A)
Cross-sectional					
A. Relative to Bottom 1%	412K (8.2%)	169K	0.179	0.302	0.525
B. Relative to Zero	568K (11.3%)	233K	0.241	0.427	0.733
C. Average of A and B	490K (9.8%)	201K	0.208	0.354	0.629
Regression Kink					
Full Population	520K (10.3%)	n.a.	0.371	n.a.	n.a.
Eligible Only	610K (12.1%)	n.a.	0.435	n.a.	n.a.
Age Distribution					
Young Buyers	n.a.	261K	n.a.	n.a.	n.a.

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

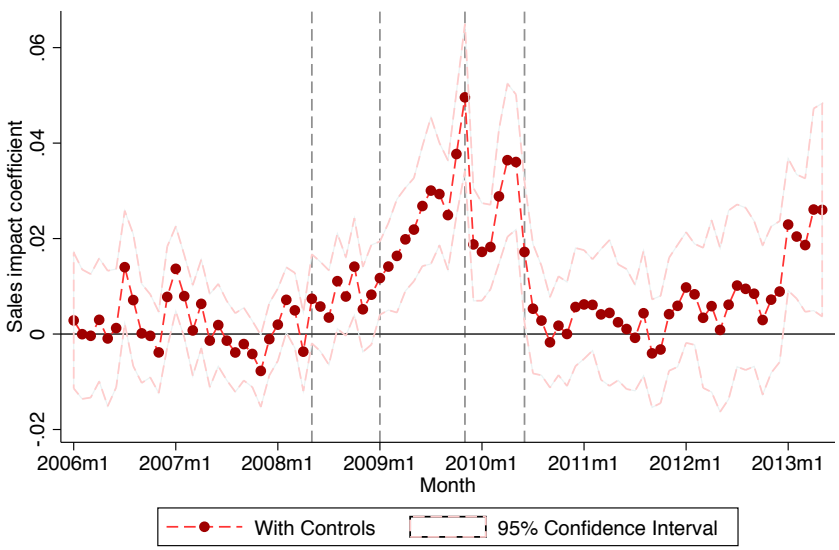
$$\frac{\Delta C_i}{\frac{\Delta P}{P}} = MPC_i PH_i$$

- Then use direct summation using price info

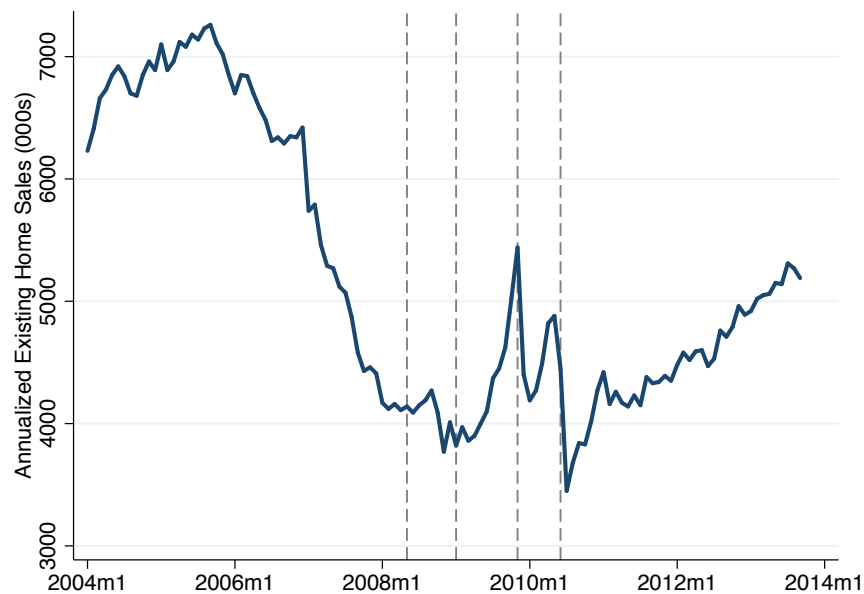
Bottom line

- 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



Aggregate time-series



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 ≈ 1.7.
  - 4 is small (0.2 at most).

Bottom line

- 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 $\underline{w}$ 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 - ω
   - Dustmann et. al. (2021) - *Reallocation Effect of Minimum Wages*
3. Firms respond to competitors wage changes - $\widetilde{\mu}$
   - Derenoncourt el. al. (2021) - *Spillover Effects from Voluntary Employer Minimum Wages*
   - Staiger et al (2010) - *Is there Monopsony in the Labor Market?*
4. Positive responses in concentrated markets, Negative in competitive
   - Von Wachter et al (2019) - *Min. Wage Employment Effects and Labor Market Concentration*

Effect on employment

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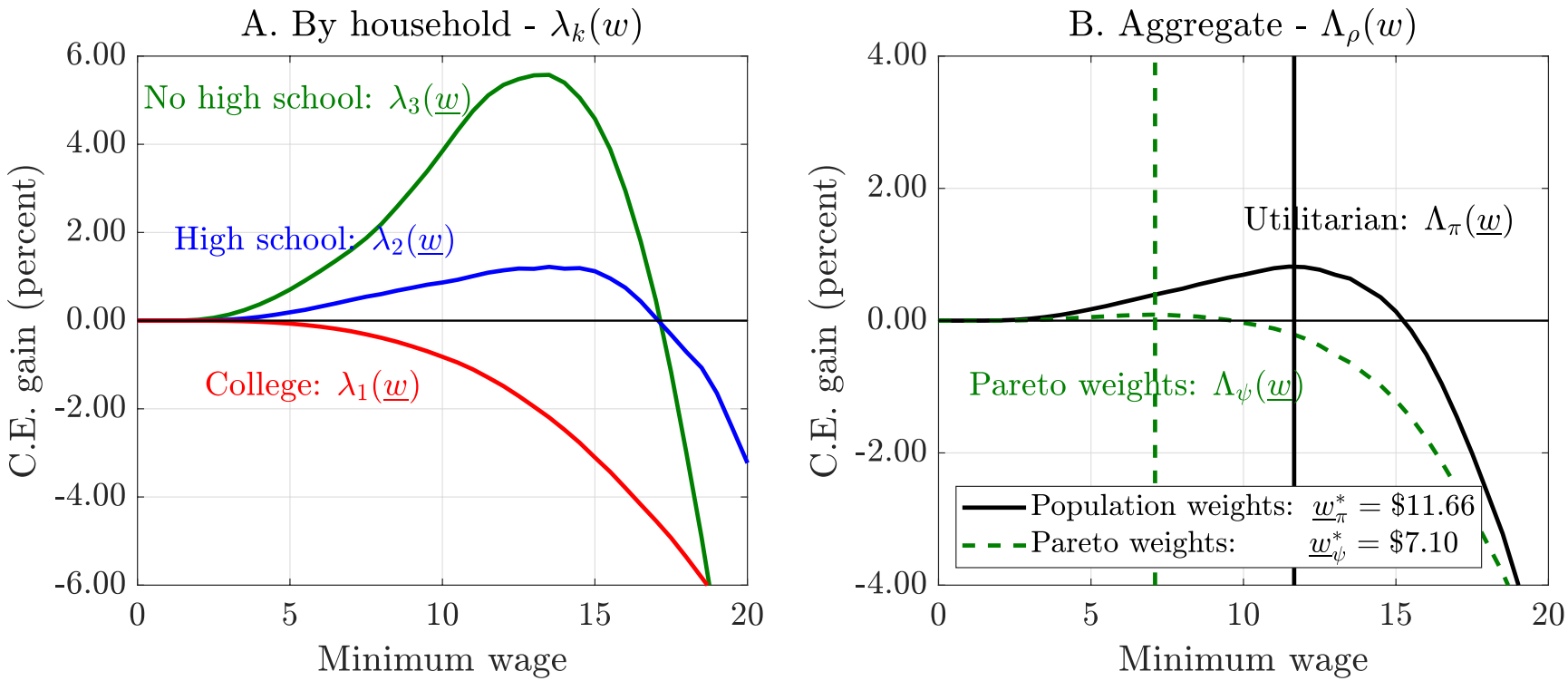
Gains from Increasing Min Wage



- 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 large or aggregate policies
  - This is a 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, Mishaillat, Saez 2018:

$$\underbrace{R = R^*\left(\epsilon^m, \frac{U'(c^u)}{U'(c^e)}\right)}_{\text{Baily-Chetty formula}} \quad \underbrace{\left(1 - \frac{\epsilon^M}{\epsilon^m}\right) \cdot \text{efficiency term}}_{\text{correction}} ;$$

  - ϵ^m: Microelasticity of unemployment wrt to UI
  - ϵ^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

- ϵ^m
  - Obtained by comparing identical jobseekers receiving different UI benefits in the same market
  - (Relatively) easy to precisely measure
- ϵ^M
  - Obtained by comparing identical labor markets receiving different UI benefits
  - Hard to measure precisely
- Landais, Mishaillat, 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!