The Impact of Minimum Wages: International Evidence

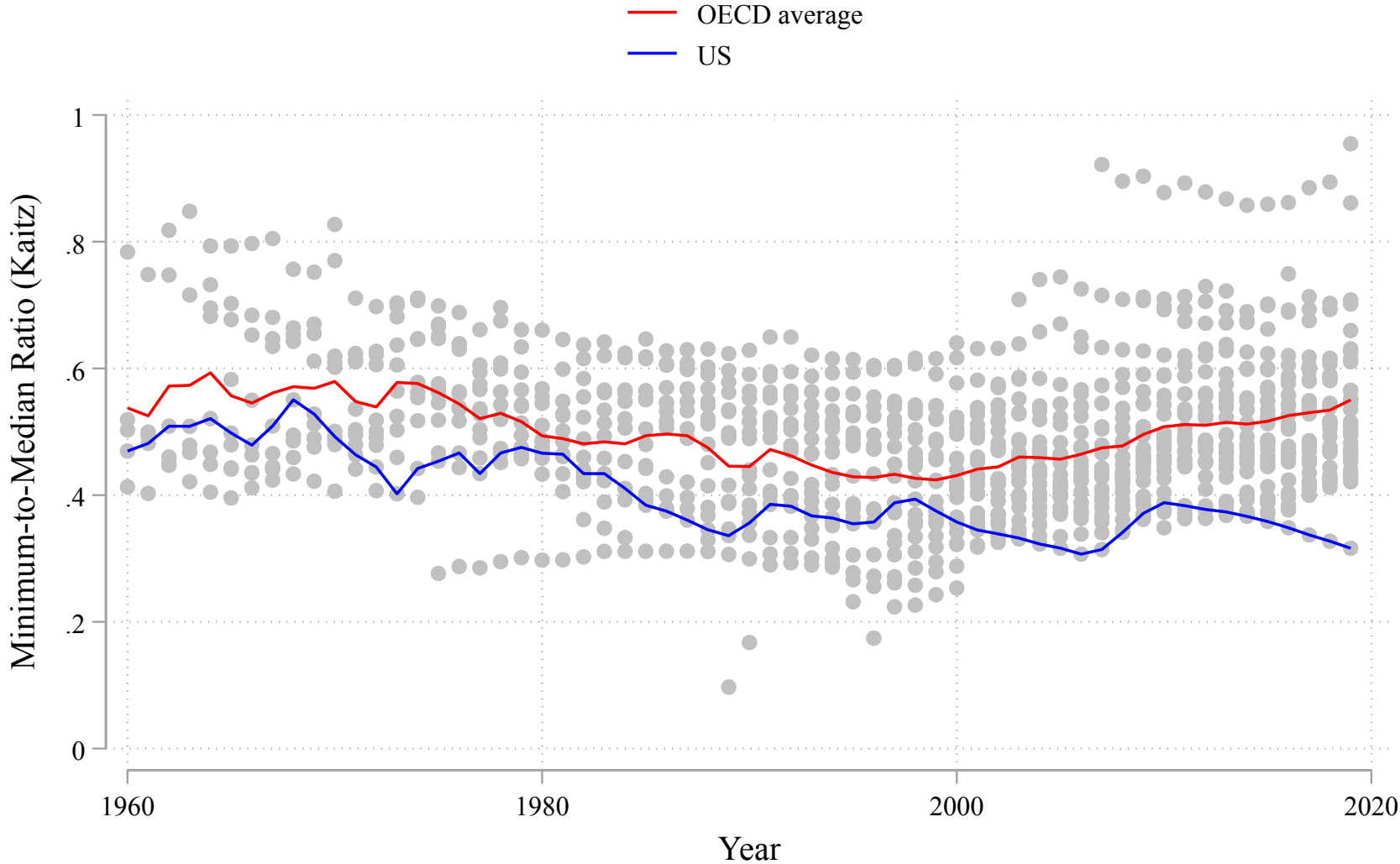Arindrajit Dube
Umass Amherst, and NBER

An outline for the talk

- International Context
  - What's happening with minimum wages?

- Conceptual Framework for Understanding Minimum Wage Impacts
  - Absorption of minimum wages in imperfectly competitive labor markets
  - Role of re-allocation

- Key evidence on overall effects of minimum wages on employment
  - Evidence from US states
  - National minimum wage and living wage in UK
  - Germany's national minimum wage
  - Overall meta-analysis using the Own-Wage-Elasticity of employment

- Recent evidence from "high minimum wages"
  - Recent increases in US states, cities
  - Recent increases in National Living Wage in UK

- Parting Thoughts
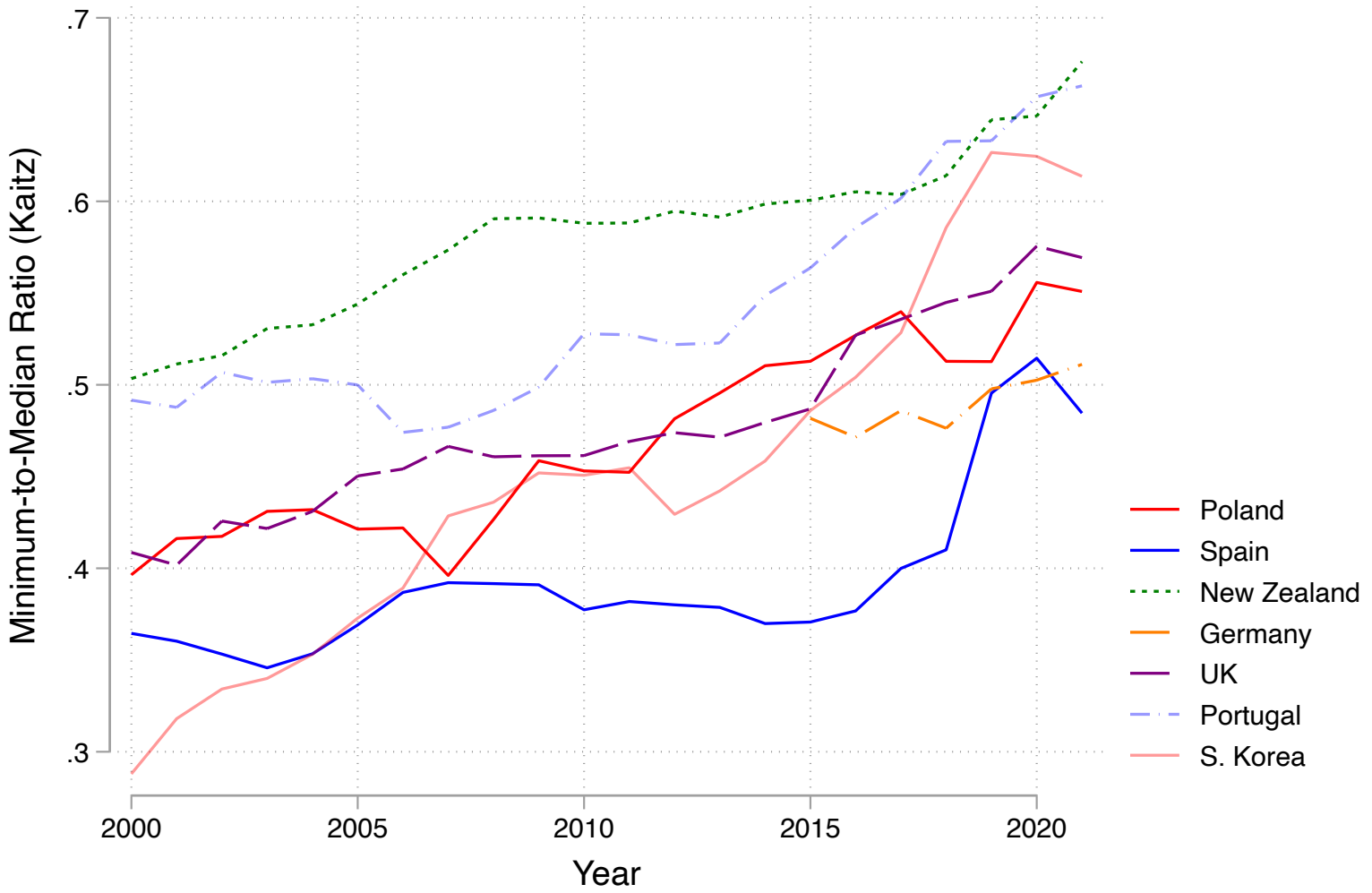 - Turning point by what?
  - Covid crisis

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Minimum Wages Are Rising Internationally

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Key aspects of how low wage labor markets

- Low wage labor markets have substantial monopsony power
  - Shown in contexts of US, UK, Germany, and more
  - Evidence from matched employer employee data in US (Bassier, Dube Naidu 2021)
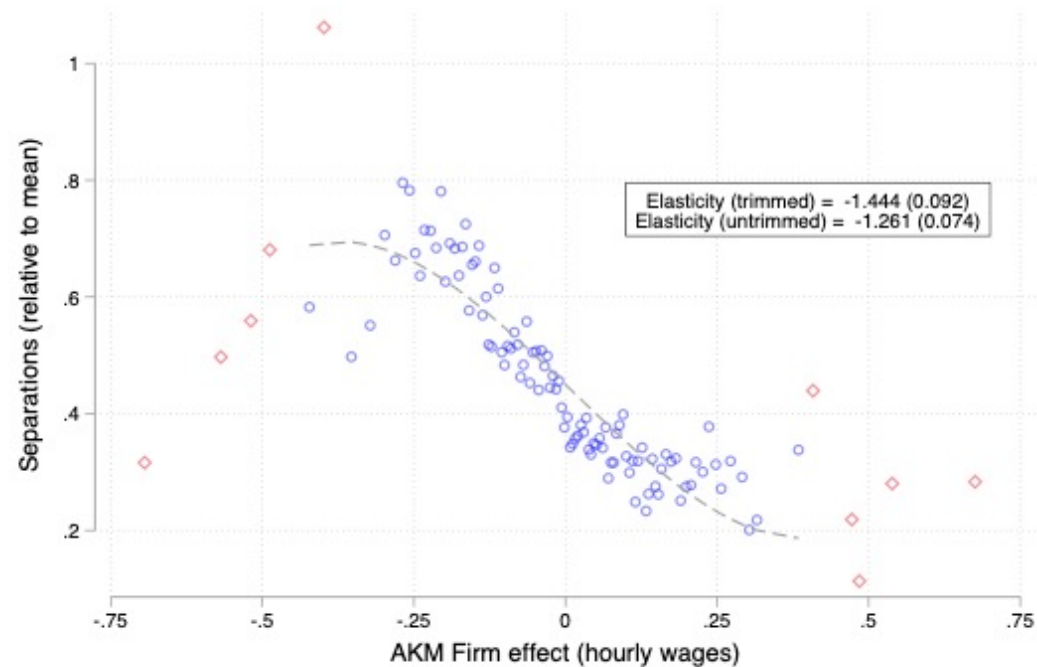
Key aspects of how low wage labor markets

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Figure 2: Separations and firm wage effects

Elasticity (trimmed) = -1.444 (0.092)
Elasticity (untrimmed) = -1.261 (0.074)

Key aspects of low wage labor markets

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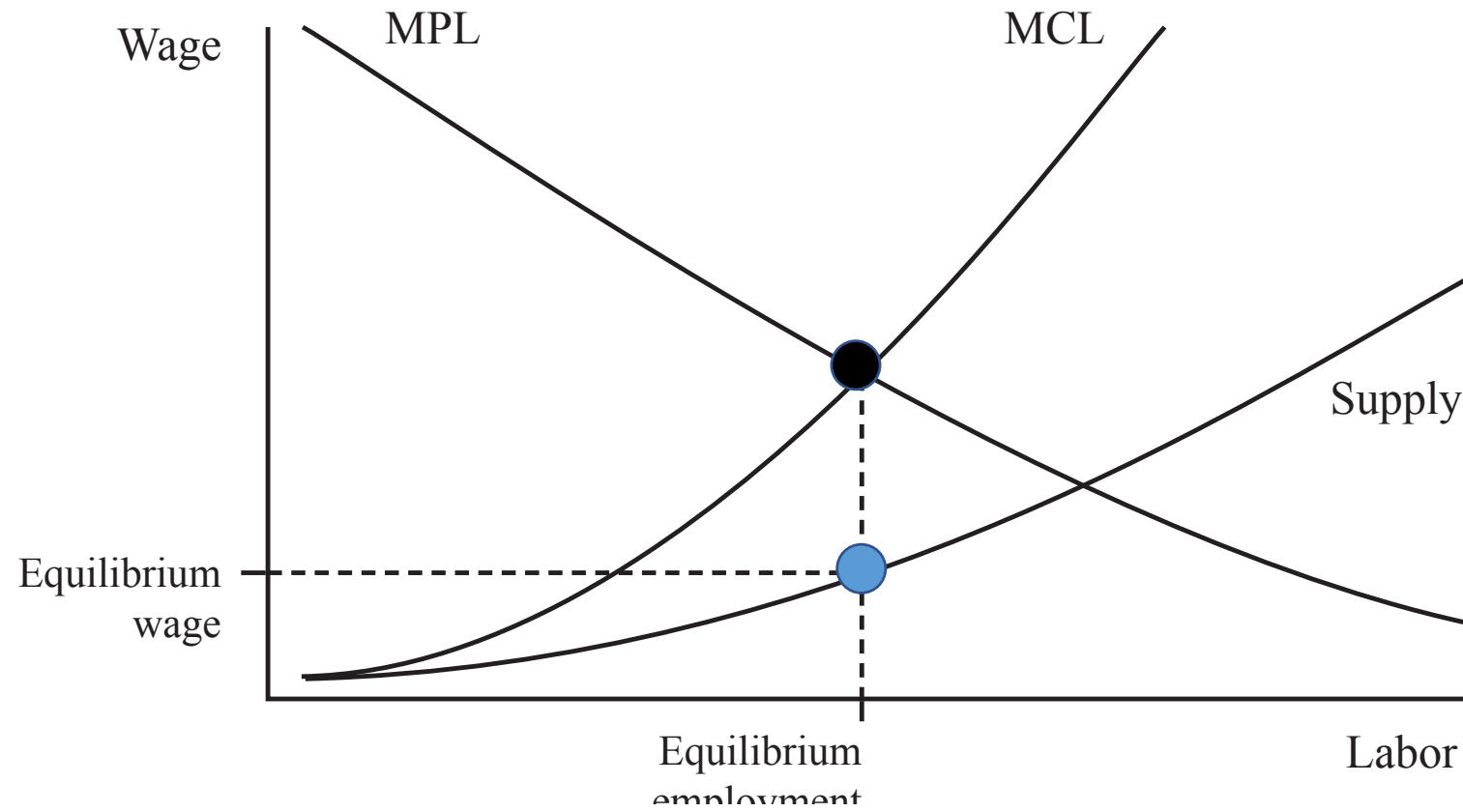 - Evidence from matched employer employee data in US (Bassier, Dube Naidu 2021)

- Minimum wage effects in monopsonistic labor markets are nuanced
  1. Labor supply versus demand constrained firms
  2. Reallocation effects
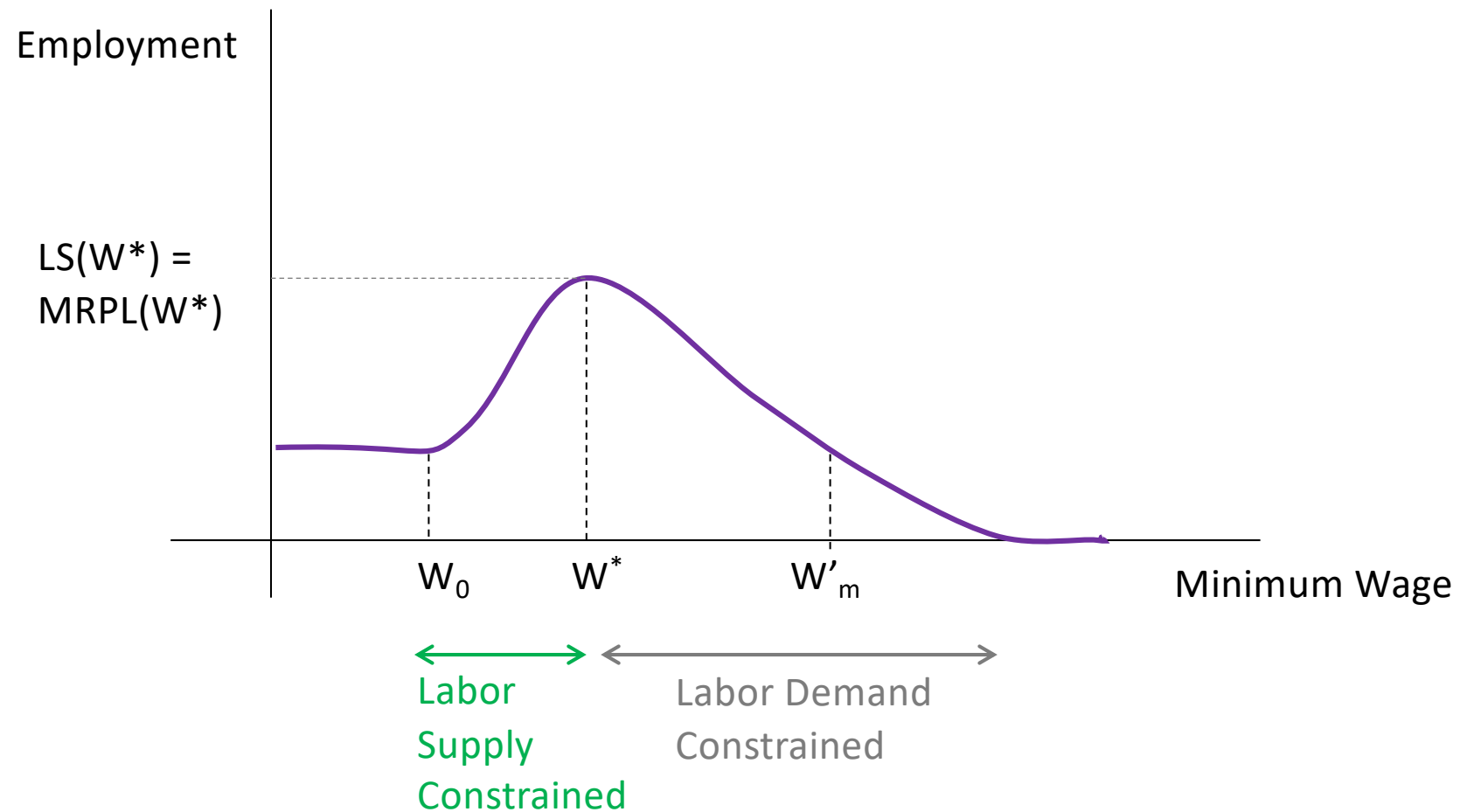 3. Heterogeneity by local labor market characteristics (wage level, concentration)

Minimum wage in monopsonistic labor market

Minimum wage in monopsonistic labor market
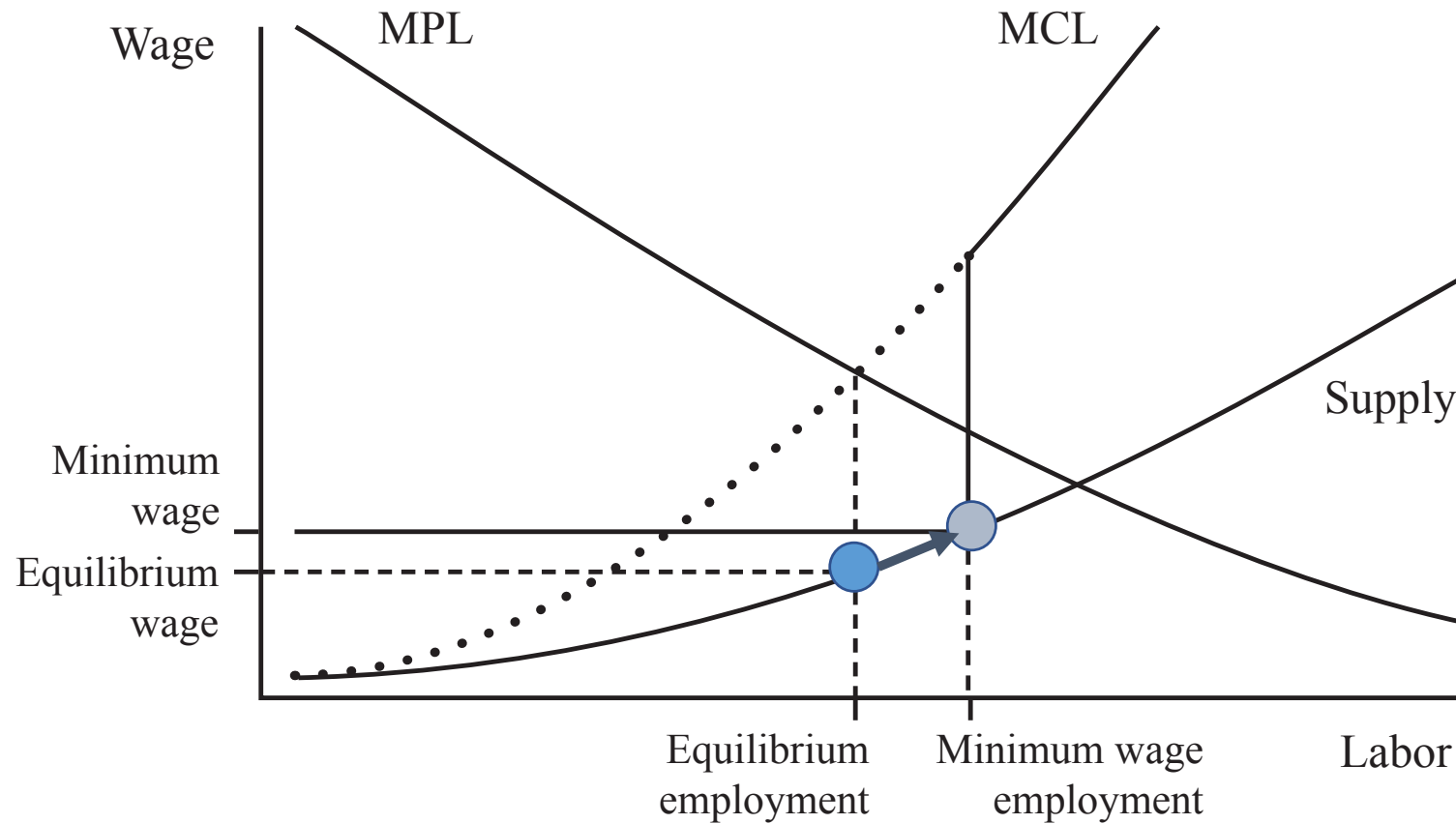
MW effect on employment in monopsony model

Reallocation effects in monopsonistic markets

- Firms have different productivity and wage policies

  - Low-productivity firm types are bound by labor demand: shrink in size from having to raise wages

  - Medium-productivity types bound by labor supply: some expand in size as they raise wages

  - Highest-productivity types whose wages were already substantially above the minimum may expand or shrink

Reallocation Effects from Germany's National Minimum Wage (Dustmann et al. 2022)
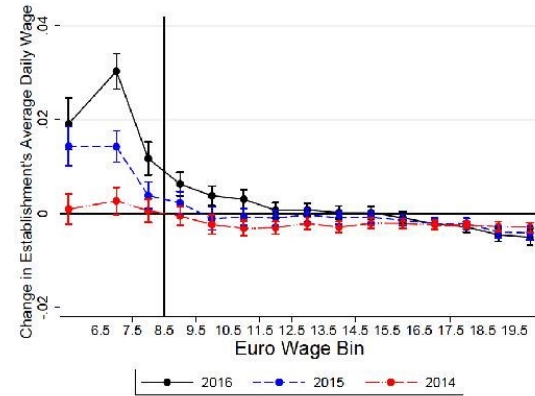
(A) Establishment's Average Daily Wage
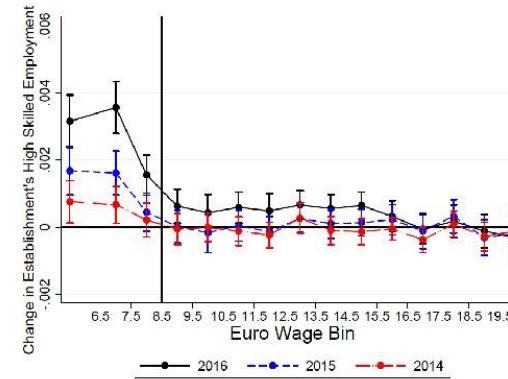
(B) Establishment's High-Skilled Employment Share
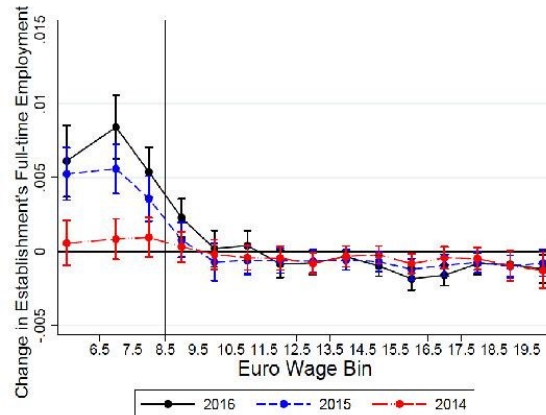
(C) Establishment's Full-Time Employment Share
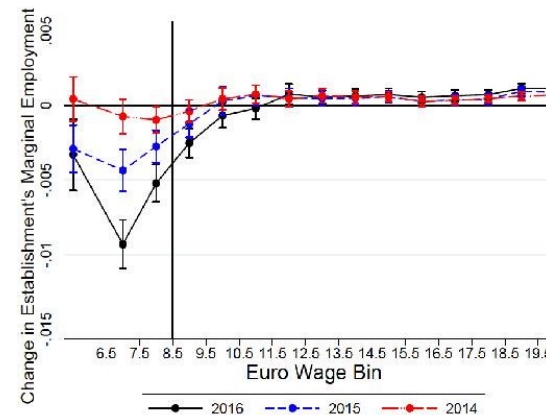
(D) Establishment's Marginal Employment Share

Concentration, monopsony power, and minimum wage effects

- Should we expect to detect larger job losses in less urban areas areas where minimum wage more binding?

  - Unclear since rural markets tend to *also* be more concentrated and are typically less tight.

  - Evidence from Azar et al. (2019) suggests that employment effects are more positive in more concentrated markets.

  - Suggests "turning points" may be tricky to detect using "bite" of the policy
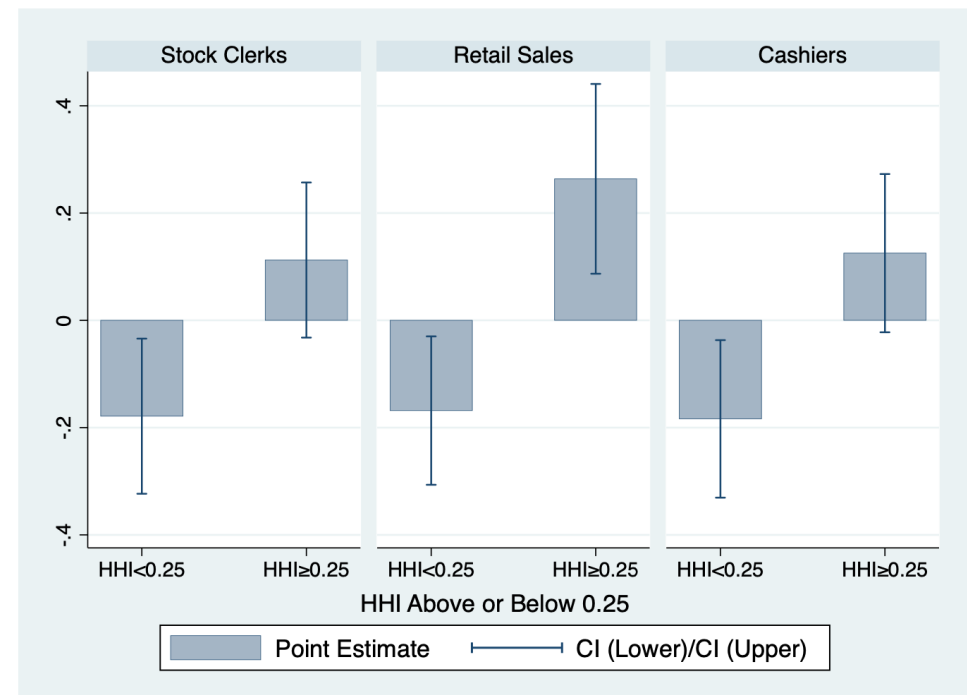
Figure 4. Employment Elasticities by High/Low Occupational Labor Market Concentration

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Measuring the size of minimum wage employment effects

- Need a way to quantify the size of employment effect
- Own wage elasticity (OWE) of employment:

$$\frac{\%\Delta \; Employment}{\%\Delta \; Wage}$$

- Until recently, the minimum wage literature typically used narrow "low-wage" groups like teens, young high-school dropouts, and restaurant workers
- Ideally want to know more comprehensive impact on low-wage jobs/workers

Approaches to Estimating the Overall Effect of Minimum Wages on Jobs

1. "Bunching approach" in Cengiz, Dube, Lindner Zipperer (2019, QJE)
    - Estimate impact of policy on frequency distribution of wages
    - Compare "missing jobs" below the minimum to "excess jobs" at or just above the minimum
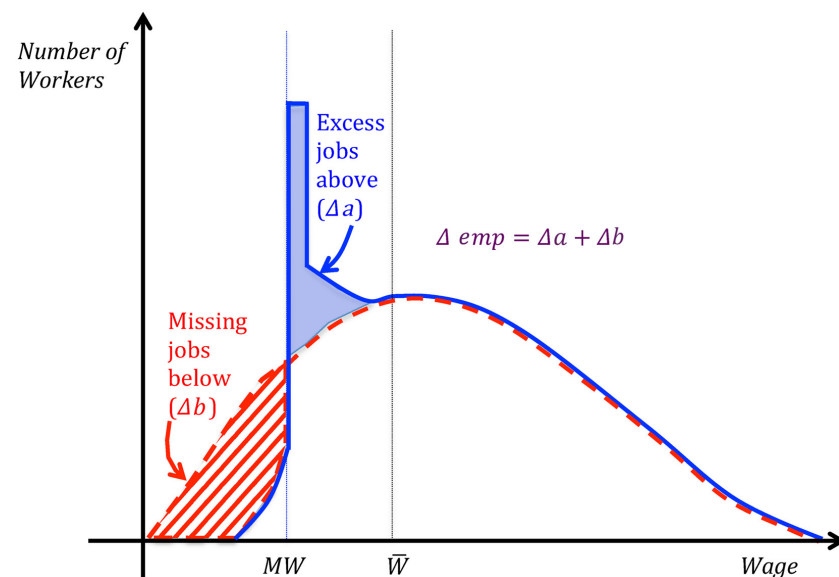
    - Implement using 138 prominent changes in US 1979-2016. Up to 7 years following policy change

Evidence from "bunching approach"

- OWE of 0.41 (s.e. 0.43)
  - FTE (with hours) OWE of 0.60 (s.e. 0.42)
- Evidence on wage spillovers
- Little heterogeneity by demographic or "skill" groups
- More negative impact in tradable sector, but small share of min wage workers
- Overall, event by event analysis can't rule out sharp null of zero effects

What Research Showed Across the United States

Estimates of the change in jobs five years after a change in the minimum wage, as a share of total employment before the increase

More jobs at or just above the new minimum wage

Fewer jobs below the new minimum wage

Wages relative to the new minimum

$0 to $1 $5 to $6 $10 to $11 $17+ more
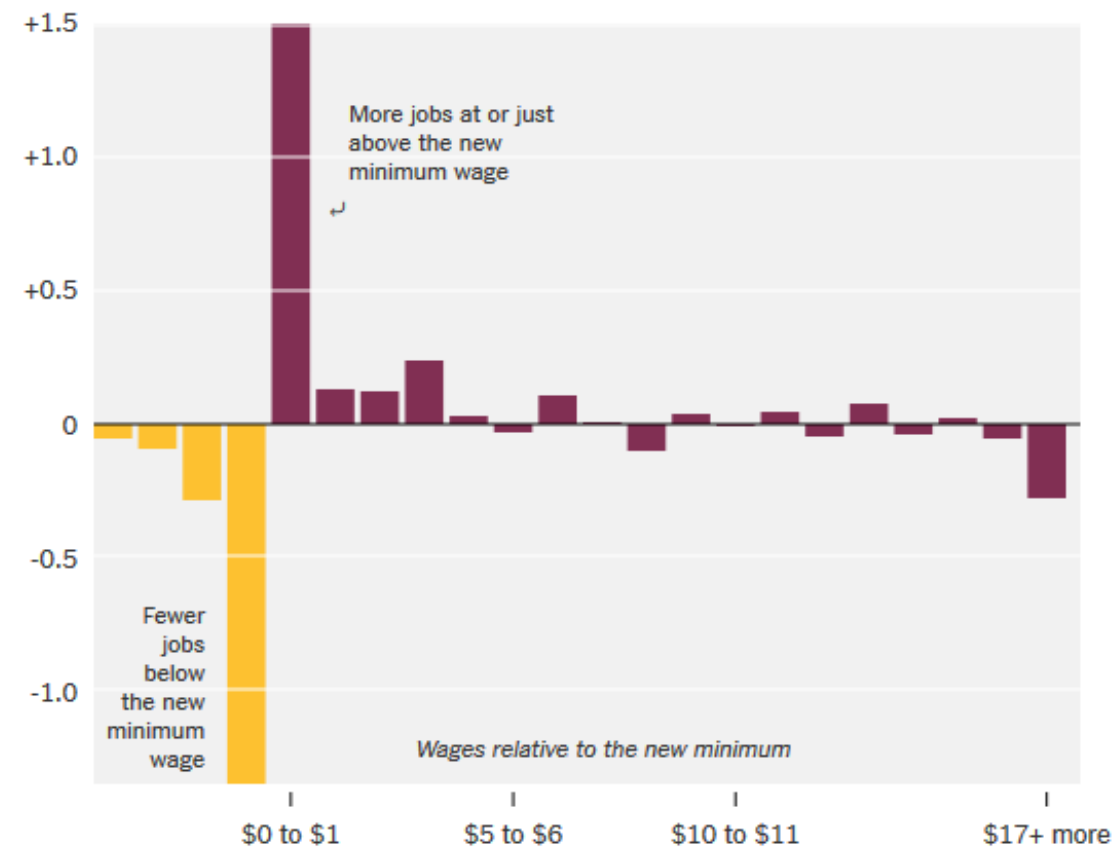
Based on 137 state-level minimum wage increases between 1979 and 2016

Source: "The Effect of Minimum Wages on the Total Number of Jobs: Evidence from the United States Using a Bunching Estimator"

Heterogeneity in impact by Kaitz Index

(A) Missing and excess jobs

Excess jobs, slope = 0.139 (0.057)

Missing jobs, slope = -0.133 (0.034)

Change in employment relative to pre-treatment total employment

Minimum-to-median wage ratio

(B) Employment change

Emp. change, slope = 0.006 (0.048)

Change in employment relative to pre-treatment total employment

Minimum-to-median wage ratio
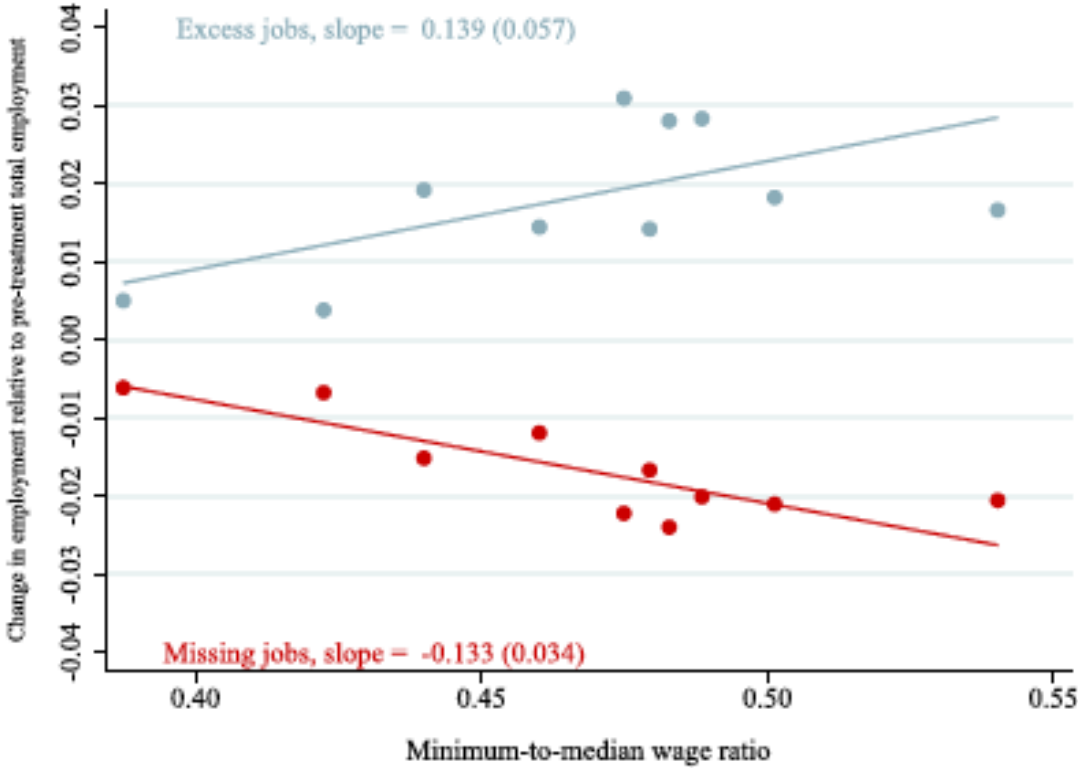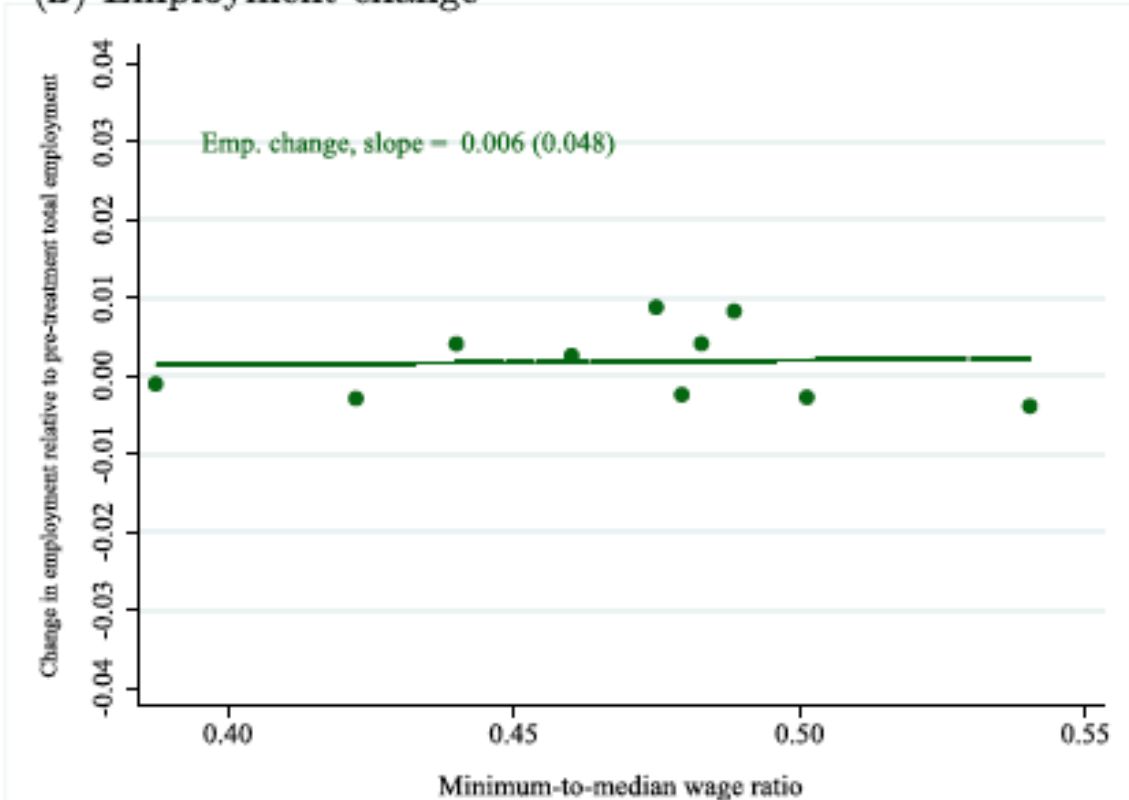
Source: Cengiz, Dube, Lindner, Zipperer (2019)

Approaches to Estimating the Overall Effect of Minimum Wages on Jobs

2. "Prediction approach" in Cengiz, Dube, Lindner Zentler-Munro (2022, *JoLE*)

- Use a ML-based model and demographic features to predict a "high probability" or "high recall" group; high recall group captures around ¾ of minimum wage workers but still gets a strong 1st stage wage effect
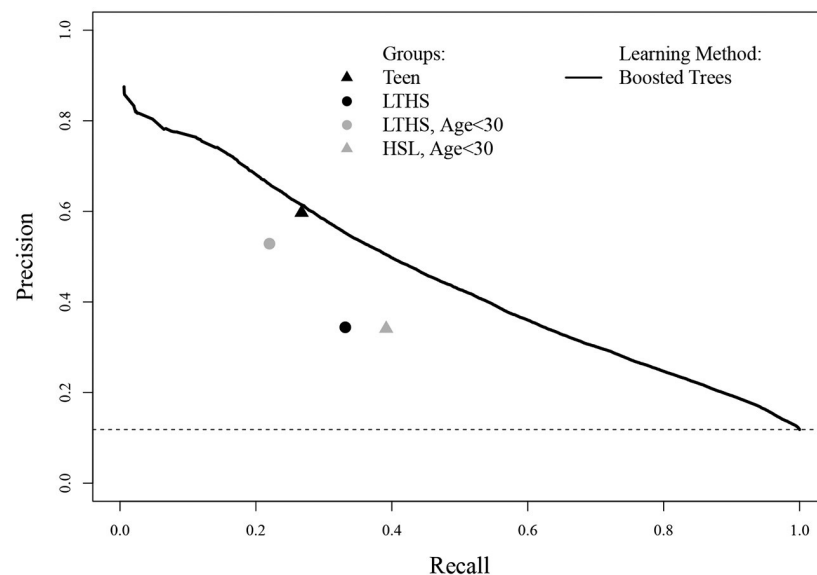
- Use 172 prominent changes in US 1979-2019.

Evidence from "prediction approach"

- OWE of 0.11 (s.e. 0.22) for "high recall" group; OWE of 0.29 (s.e. 0.32) for "high probability" group

- Little evidence of labor-labor substitution

- Some evidence of *increased* hours for "high probability" group, and zero effect on hours for "high recall" group.
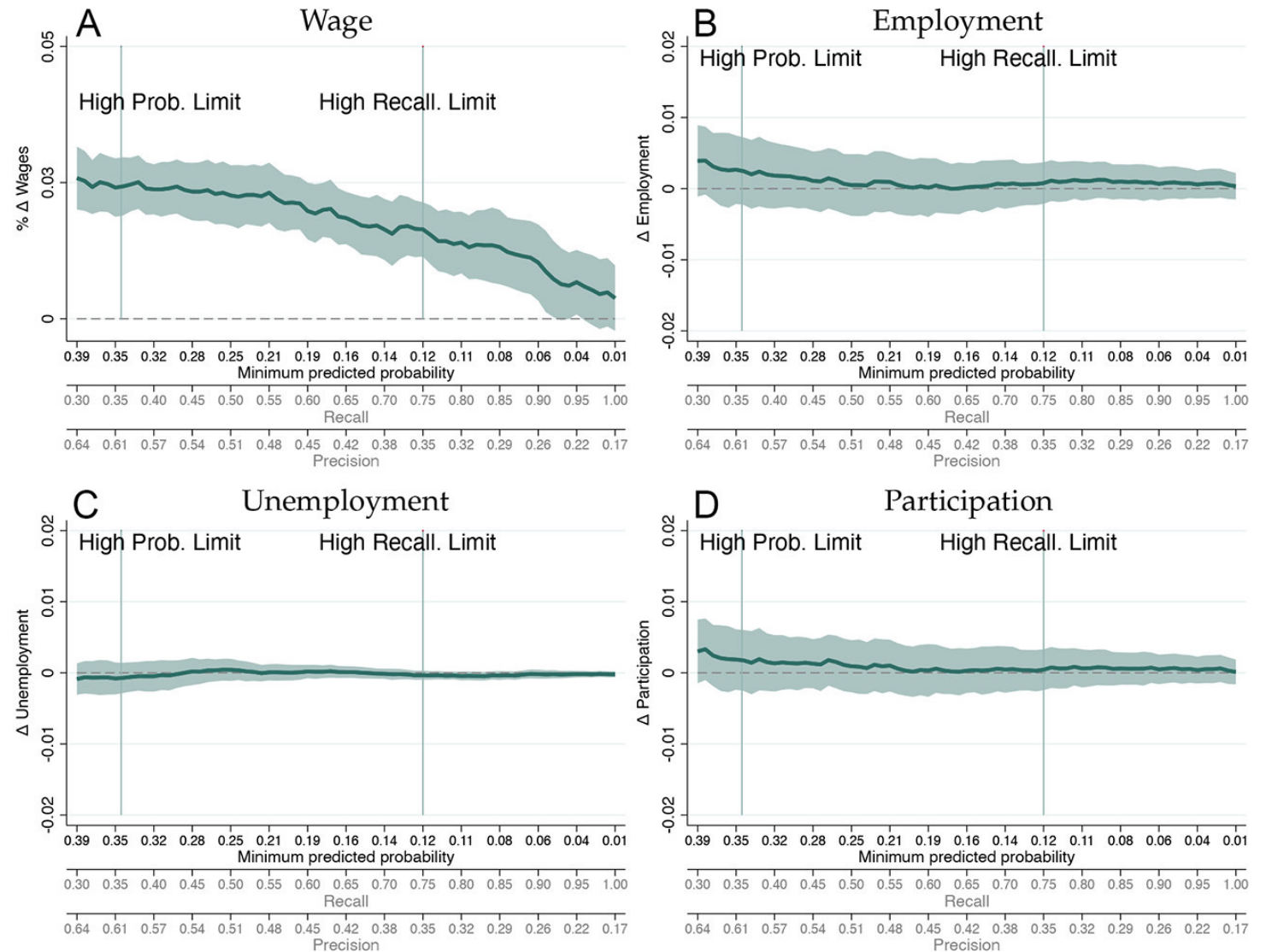
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Review of Evidence on Wages and Employment from 77 Studies

Own-wage elasticity:

$$\left(\frac{\% \Delta\, Emp}{\% \Delta MW}\right) \Big/ \left(\frac{\% \Delta\, Ave\ Wage}{\% \Delta MW}\right)$$

<u>Size:</u>

> -0.4	"Small"	(74%)
-0.4 to -0.8	"Medium"	(10%)
< -0.8	"Large"	(16%)

Source: updated from Dube 2019 review through 2022.

-0.075 (overall low wage workers), -0.15 (any group)

Cengiz et al. 2019
Dube 2019 (this report, U.S.)
Cengiz 2019
Stewart 2004
Cengiz et al. 2021
Dustmann et al.
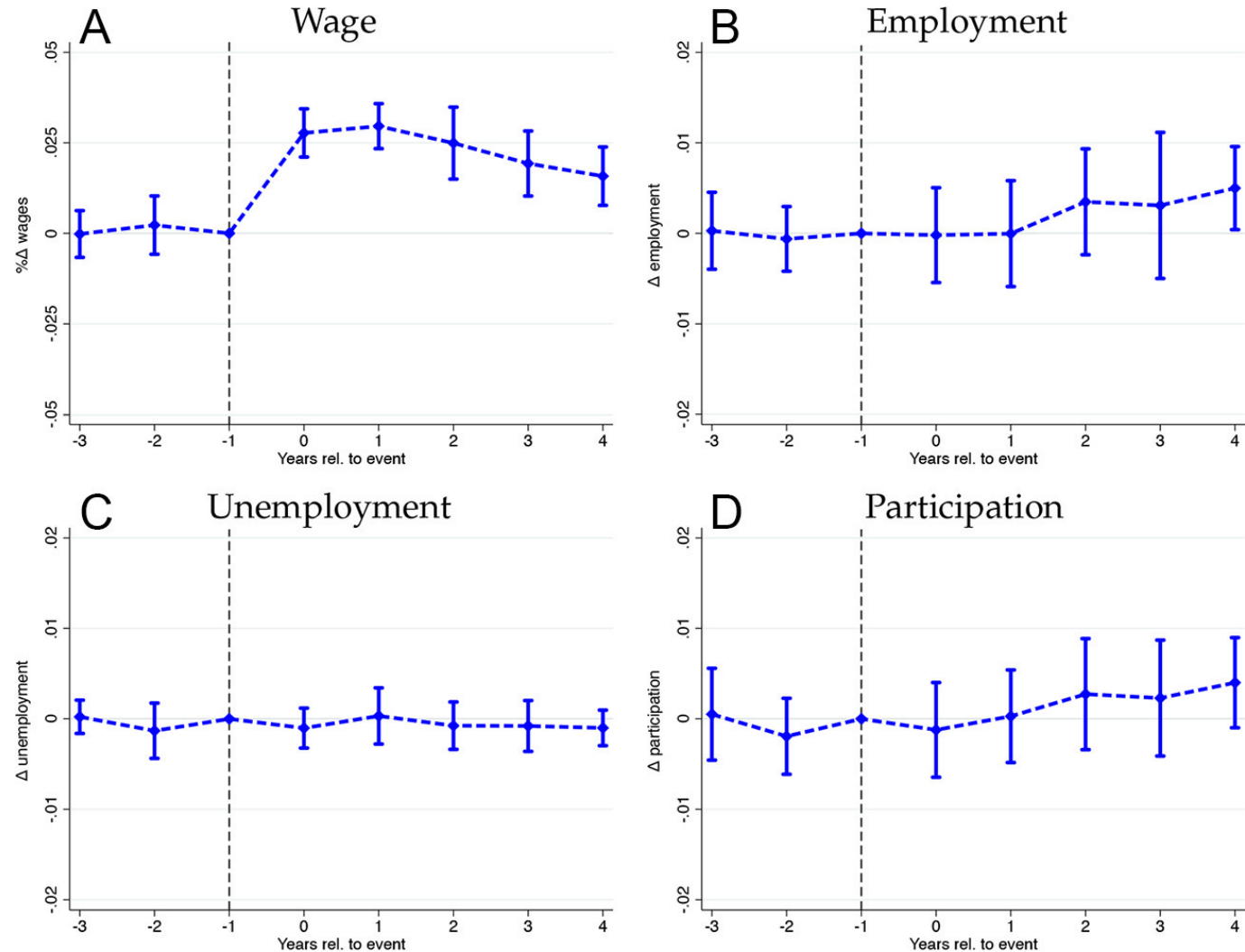Ashfeldt Roth Steidel 2018
Derenoncourt and Montialoux
Godoy and Reich 2019
Dube 2019 (this report, UK NLW)
Manning 2016
Dickens and Lind 2019
Dube and Lindner 2021
Bailey et al. 2018
Jardim et al. 2018b
Cribb et al. 2021
Aitken Dolton Riley 2019
Harasztosi and Lindner 2019
Neumark Schweitzer Wascher 2004
Bossler and Gerner
Monras
Jardim et al. 2018a
Katz & Krueger 1992
Katz and Krueger 1992
Card 1992b
Card 1992a
Addison, Blackburn, & Cotti 2009
Ruffini
Azar et al. 2019
Dow, Godoey, Lowenstein, and Reich 2019
Nadler et al. 2019
Eriksson & Pytlikova 2004 Czech
McPherson, Reich, Wiltshire 2022
Allegretto et al. 2011
Allegretto, Dube, Lester, Reich
Allegretto, Dube, Reich, & Zipperer 2017
Hirsch et al. 2015
Dube et al. 2010
Allegretto, Dube, Lester, Reich 2007
Dube et al. 2007
Gittings & Schmutte 2016
Addison, Blackburn, & Cotti
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Wursten 2020
Eriksson & Pytlikova 2004 Slovakia
Dube and Zipperer 2015
Draca et al. 2011
Totty 2018a
Slichter 2015
Zavodny 2000
Card et al. 1994
Totty 2018b
Wursten 2019
Fang and Lin 2015
Clemens and Strain 2022
Dube et al. 2016
Machin et al.
Thompson 2008
Orrenius and Zavodny 2008
Burkhauser et al. 2000
Dickens Riley Wilkinson 2015
Campolieti et al. 2006
Sabia 2008
Giuliano 2013
Brummund and Strain 2018
Liu et al.
Currie and Fallick 1996
Kim and Taylor 1995
Bell 1997 - Colombia
Neumark and Nizalova 2007
Bell 1997 - Mexico
Karabarbounis, Lise, Nath
Pereira 2003
Jha, Neumark, Rodriguez-Lopez 2022
Sabia 2014
Even & Macpherson 2014

Evidence from UK, Germany

- UK
  - Most NMW evidence (Stewart 2004, Manning 2016), early NLW evidence (Dube 2019, Aitken Dolton Riley 2019) point to little effect. (Exception for specific subgroup: part time women)
 - Median OWE from UK (N=9) of -0.15

- Germany
  - Ashfeldt Roth Steidel 2019; Bossler and Gerner 2019; Dustmann et al 2022 all point to small effects (OWE between -0.27 and 0.17)

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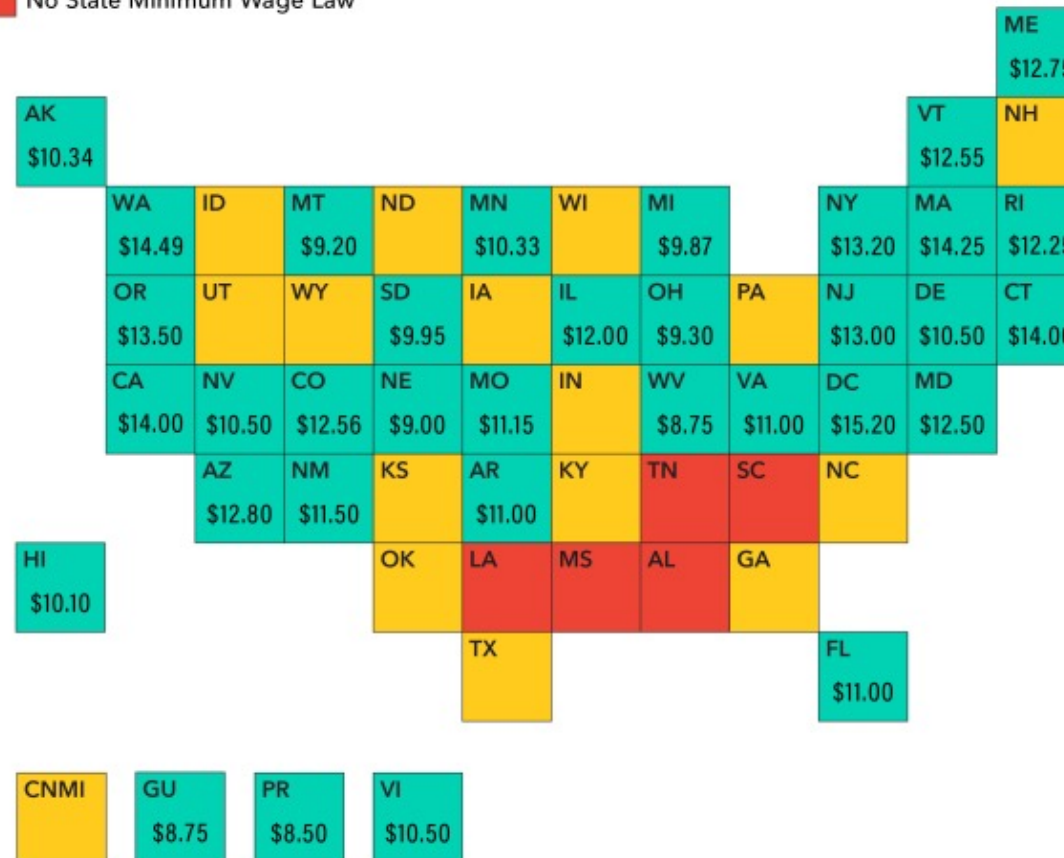# Minimum wages Across US States
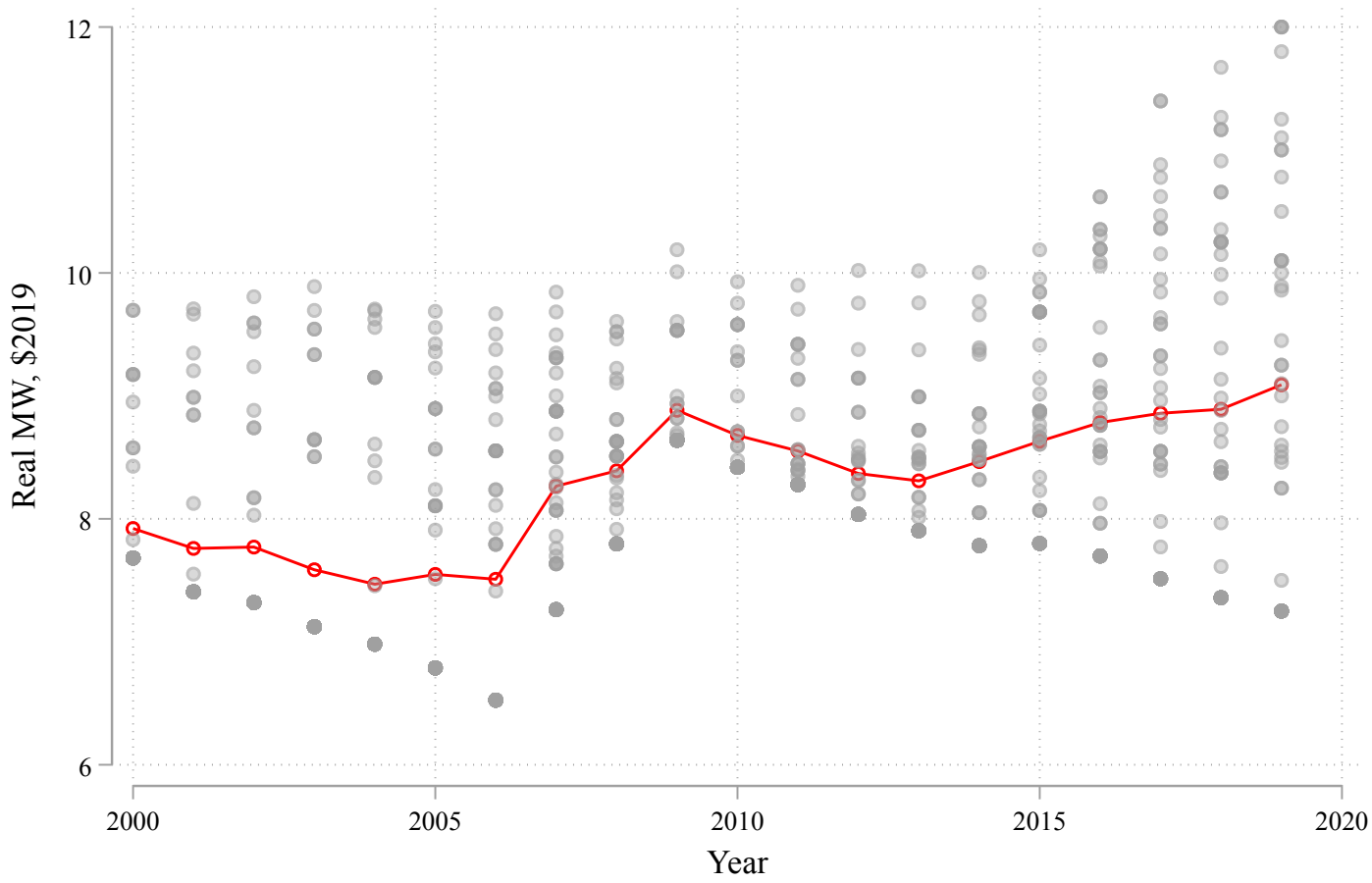
- 30 states have minimums > federal minimum wage in 2022

- 2019 population-weighted minimum wage was $9.09

Planned Minimum Wages Set to Rise to $15/ 2024 in 8 states

Minimum Wages as of 2022

Greater Than Federal Minimum Wage | Equals Federal Minimum Wage of $7.25

No State Minimum Wage Law

									ME $12.75
AK $10.34								VT $12.55	NH
	WA $14.49	ID	MT $9.20	ND	MN $10.33	WI	MI $9.87	NY $13.20	MA $14.25	RI $12.25
	OR $13.50	UT	WY	SD $9.95	IA	IL $12.00	OH $9.30	PA	NJ $13.00	DE $10.50	CT $14.00
	CA $14.00	NV $10.50	CO $12.56	NE $9.00	MO $11.15	IN	WV $8.75	VA $11.00	DC $15.20	MD $12.50
		AZ $12.80	NM $11.50	KS	AR $11.00	KY	TN	SC	NC
HI $10.10				OK	LA	MS	AL	GA	
					TX			FL $11.00	

| CNMI	GU $8.75	PR $8.50	VI $10.50

Note: Minimums may vary within California, New York, and other states based on region, employer size, and other factors.

Source: Department of Labor

Bloomberg Law

Search for turning point (1)

- Dube (2019) used similar method as CDLZ (2019, QJE) to provide initial evaluation of 7 states with highest min wages in US through 2018.

  - OWE 0.08 (s.e. 0.36) for overall low-wage emp

  - No pre-existing trends, but some indication of upper tail changes

  - Maybe the very highest wage states are not satisfying parallel trends
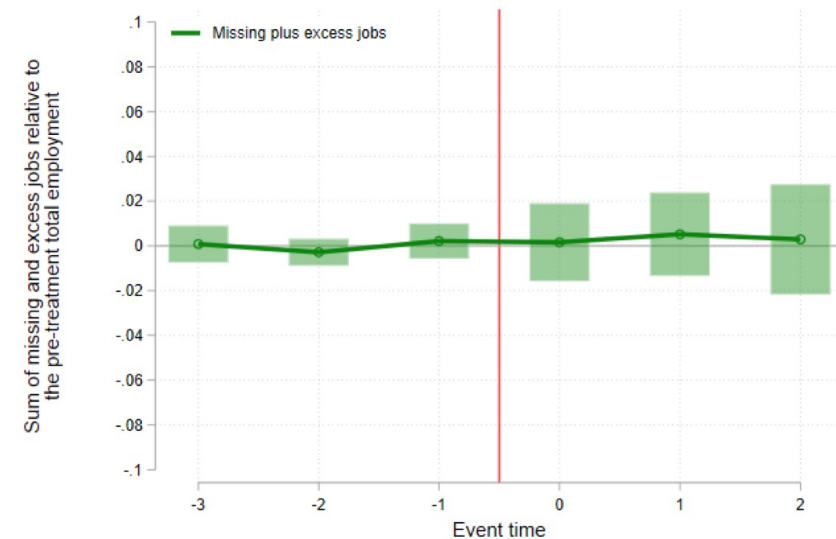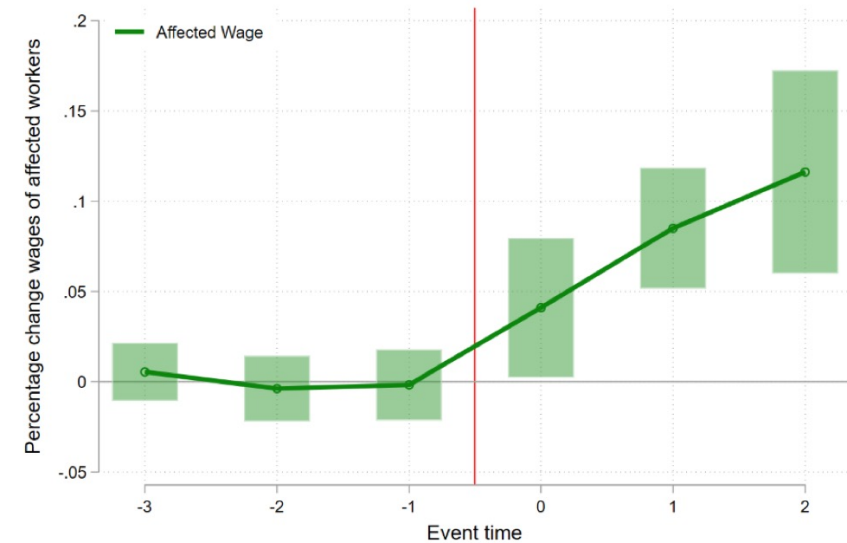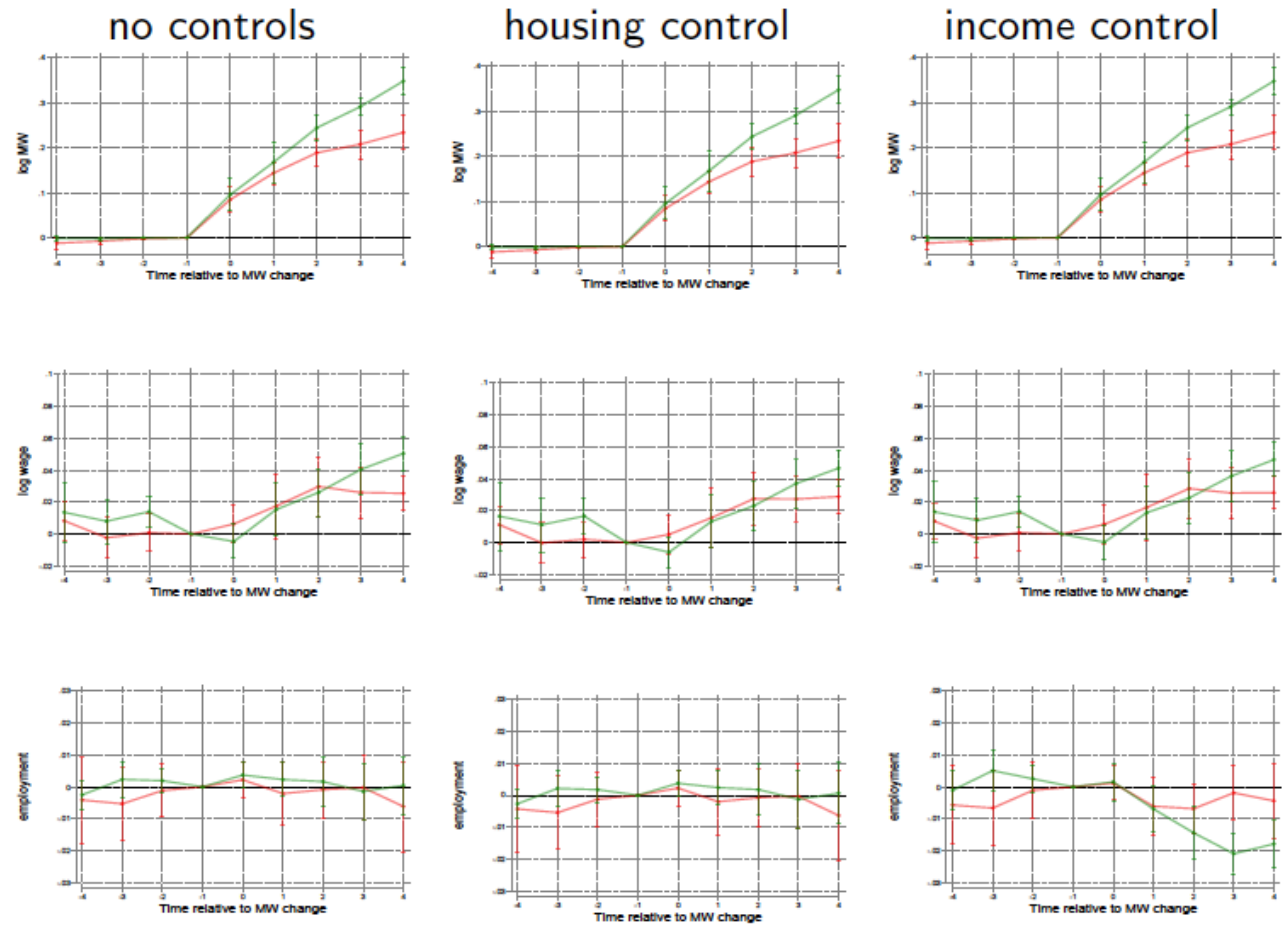
Search for turning point (2)

- Looking at specific lower skilled groups, Clemens and Strain (2021)

  - *Small effects overall (OWE of -0.25)*

  - Large heterogeneity for >$2.50/hour increase versus <$2.50/hour increase. OWE estimate of -0.71 for 7 larger increases, versus +0.21 for 16 smaller increases

  - Question: are the bites of these policies really that different? Or could it be something else driving it?

Search for turning point (3)

- Recent work by Dube, Lindner, Piqueras (2022) uses ACS data to evaluate major minimum wage changes between 2013 and 2019.

  - Similar to Clemens and Strain, find overall very little effect on employment

  - Employment heterogeneity highly sensitive to inclusion of "state income" control

Search for turning point (3)

- Recent work by Dube, Lindner, Piqueras (2022) uses ACS data to evaluate major minimum wage changes between 2013 and 2019.

  - The 7 "large changers" more likely to experience wage/employment change in "low probability" groups - suggesting violations of parallel trends
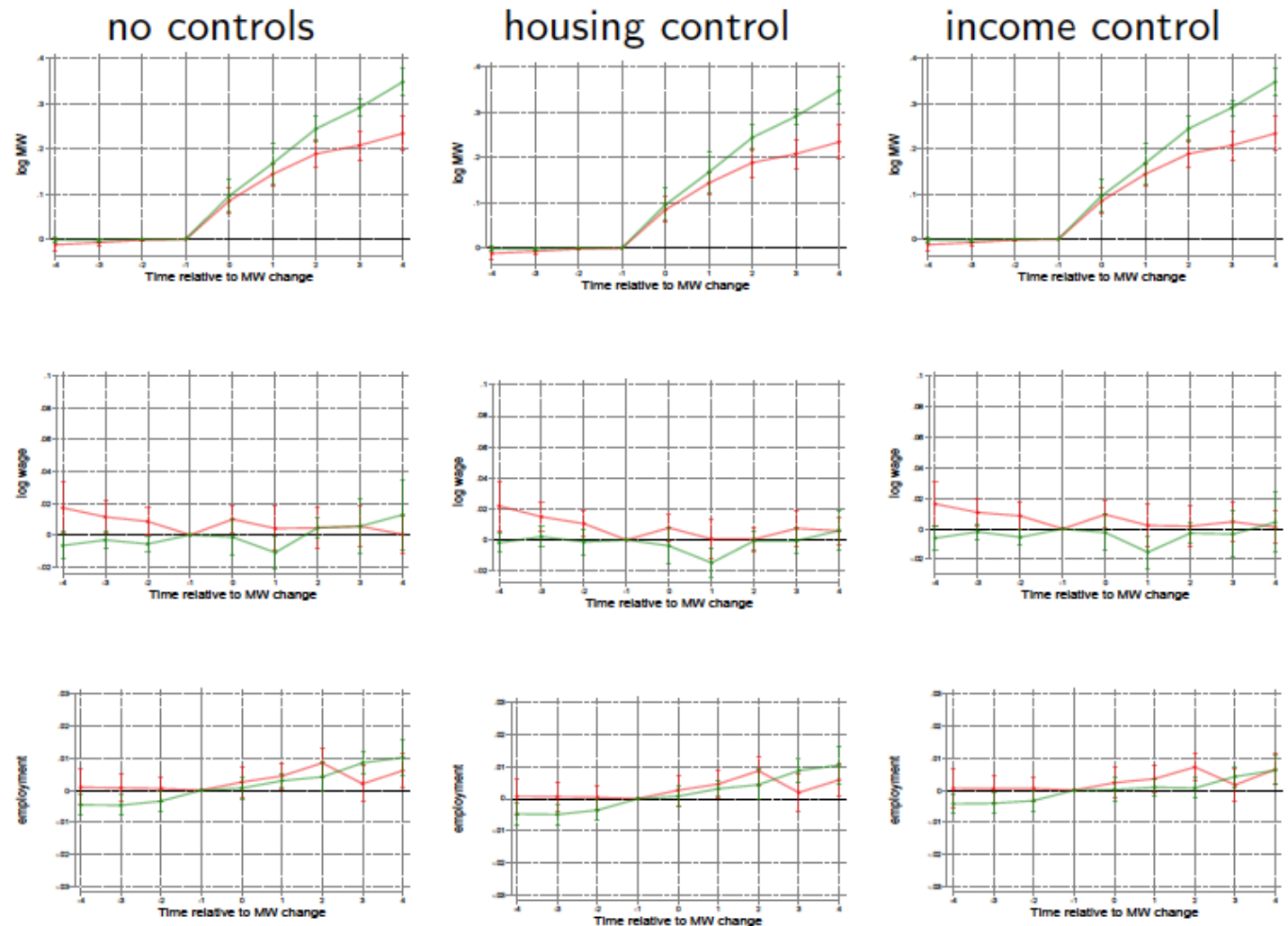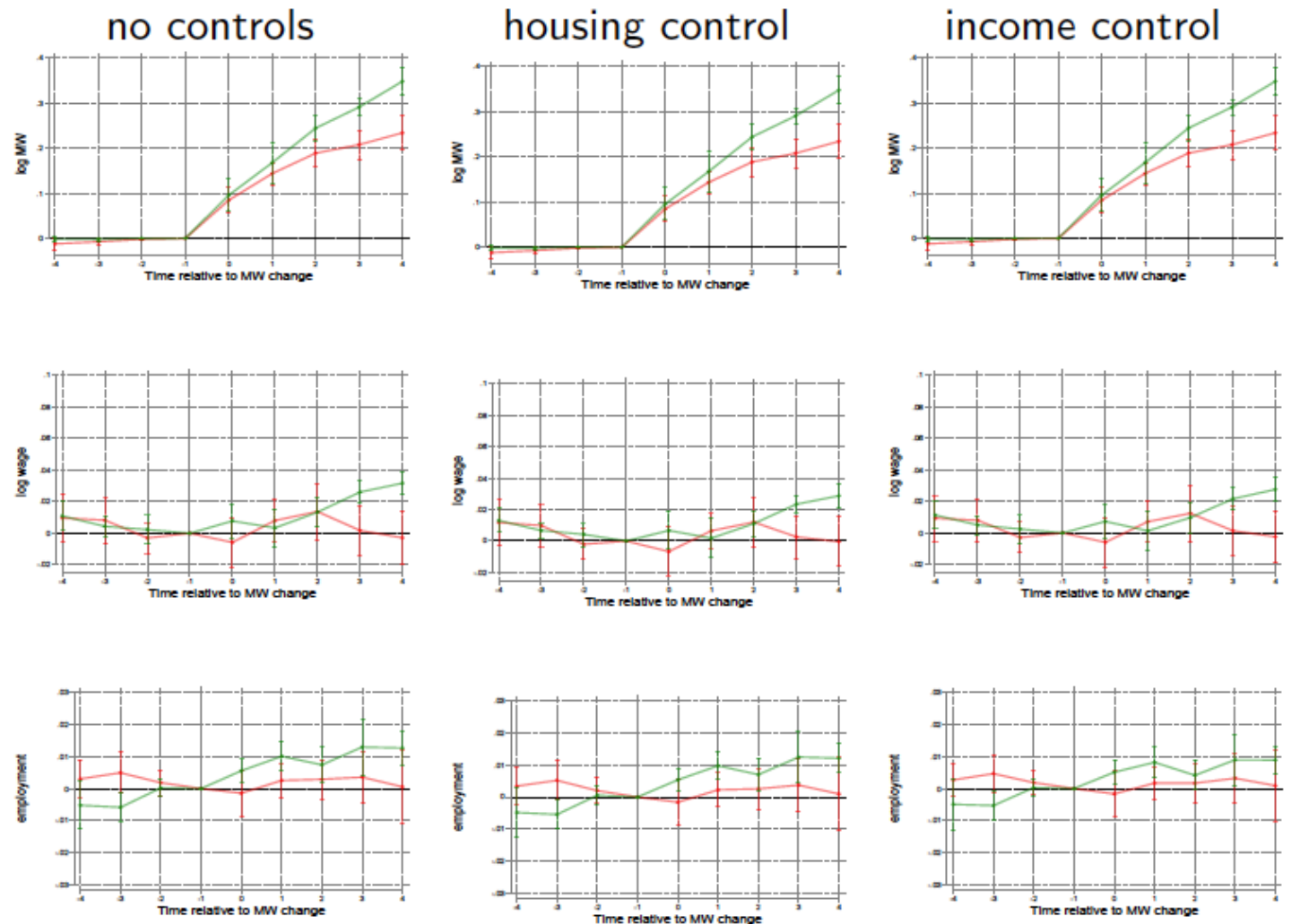
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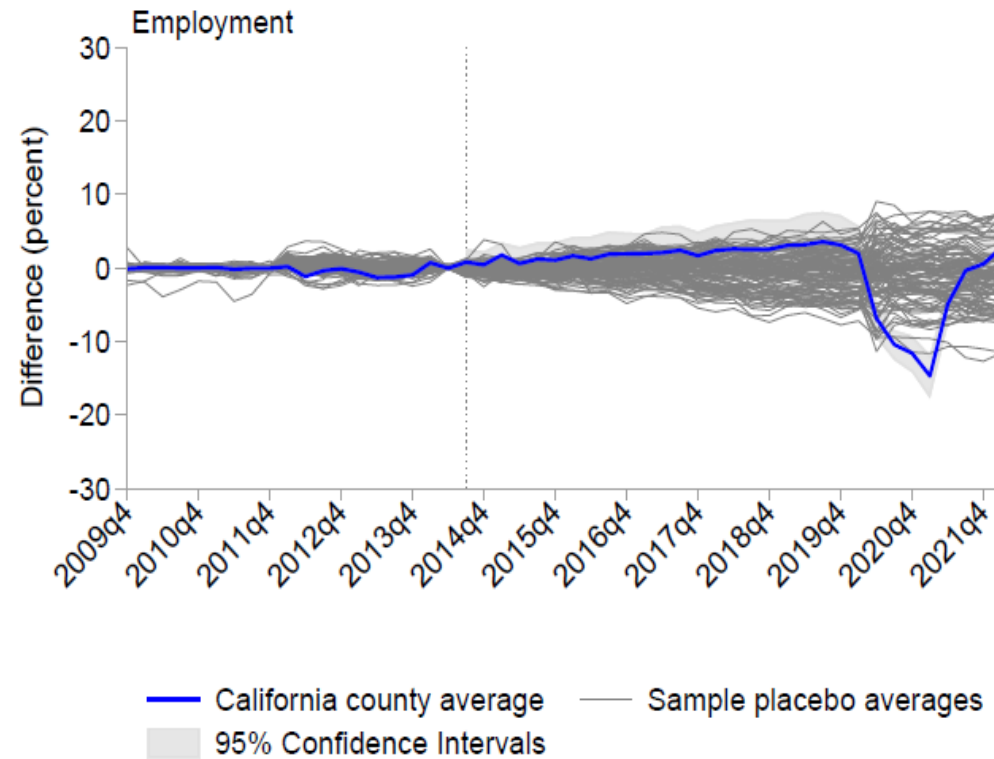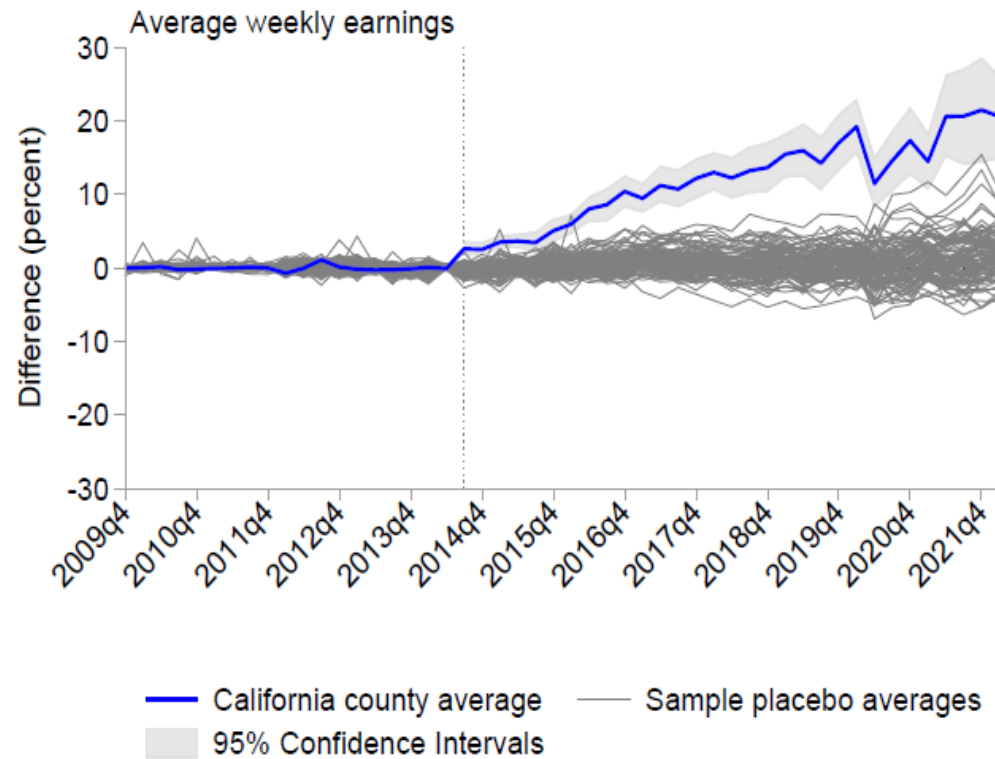
  - The 7 "large changers" more likely to experience wage/employment change in "low probability" groups - suggesting violations of parallel trends

Search for turning point (4)

- McPherson, Reich, Wiltshire (2022) apply *Synthetic Control Methods* to identify causal effects of a $15 MW in California, the first state to reach $15 in January 2022
  - An 87.5 percent increase since 2014 (from $8)
  - In some counties MW/median wage of .82
  - From a control group that has not changed its MW since 2009

- Comparison to previous MW research: Cengiz et al. QJE 2019
    Highest MW $12, avg increase 10 percent
    Highest MW/ median wage .59

Restaurant workers, average county-level estimates

Average weekly earnings

Employment

- California county average — Sample placebo averages
- 95% Confidence Intervals

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- 95% Confidence Intervals

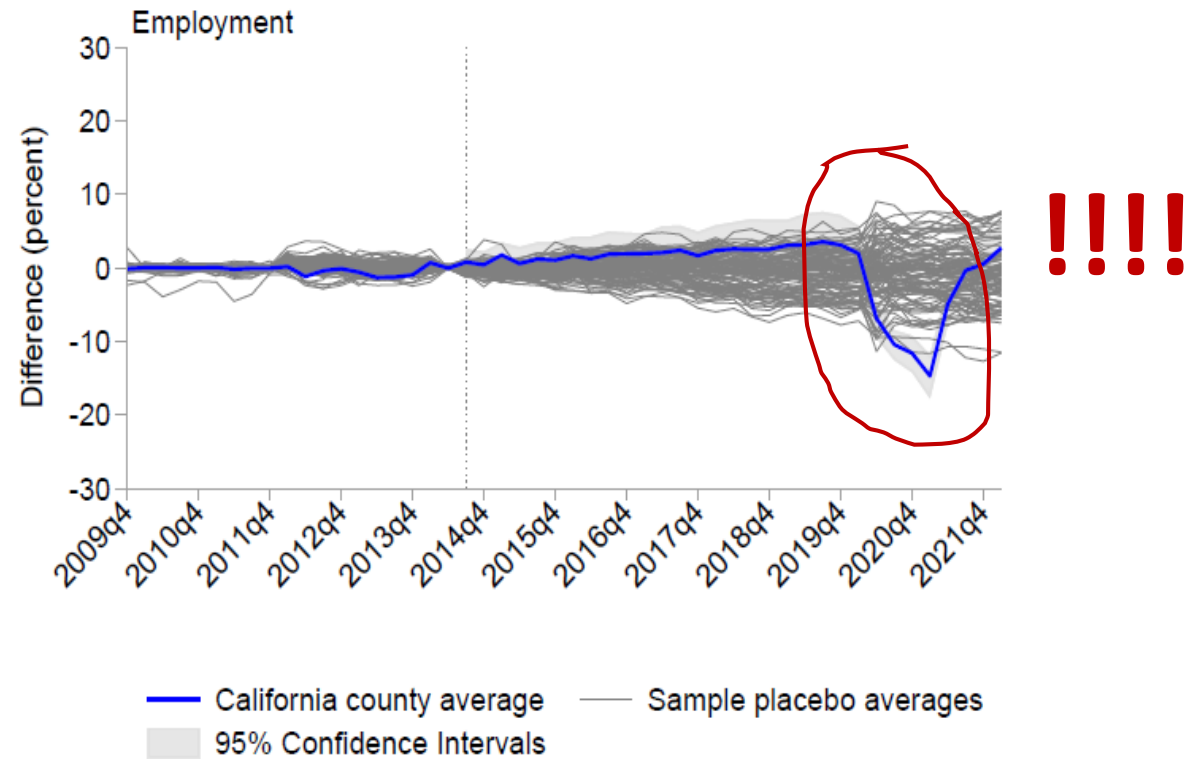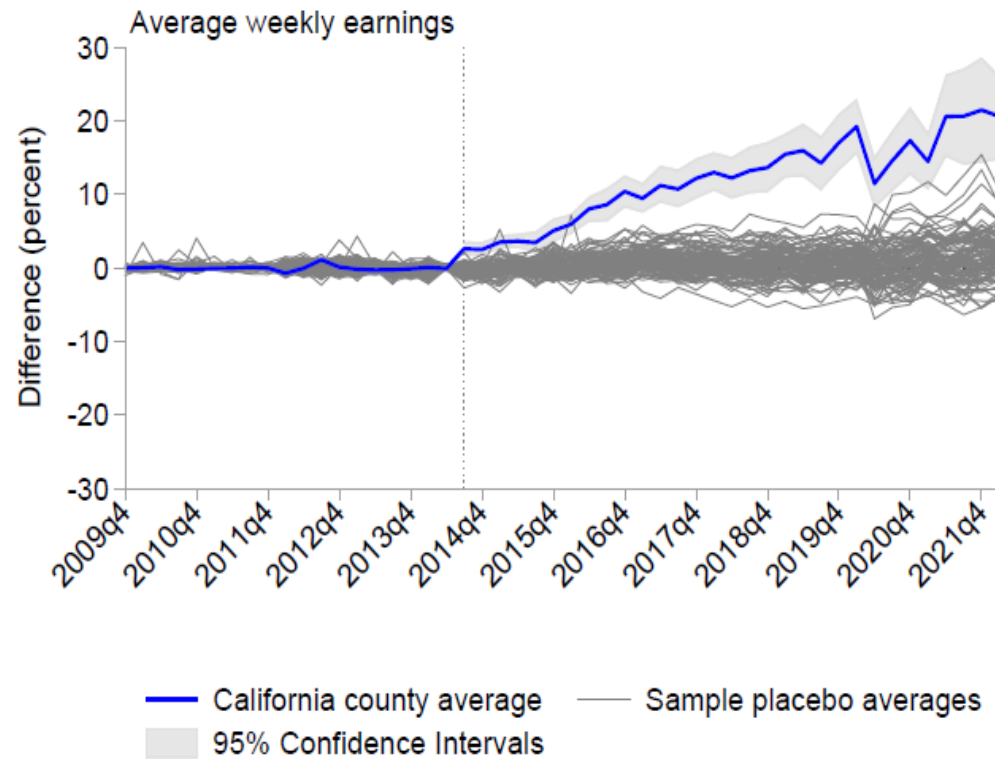|	Average weekly earnings (percent)	Employment (percent)	Own-wage Elasticity
Restaurant Workers, All Counties			
Treatment Effect	17.07	3.34	0.20
p-value	0.01	0.28	

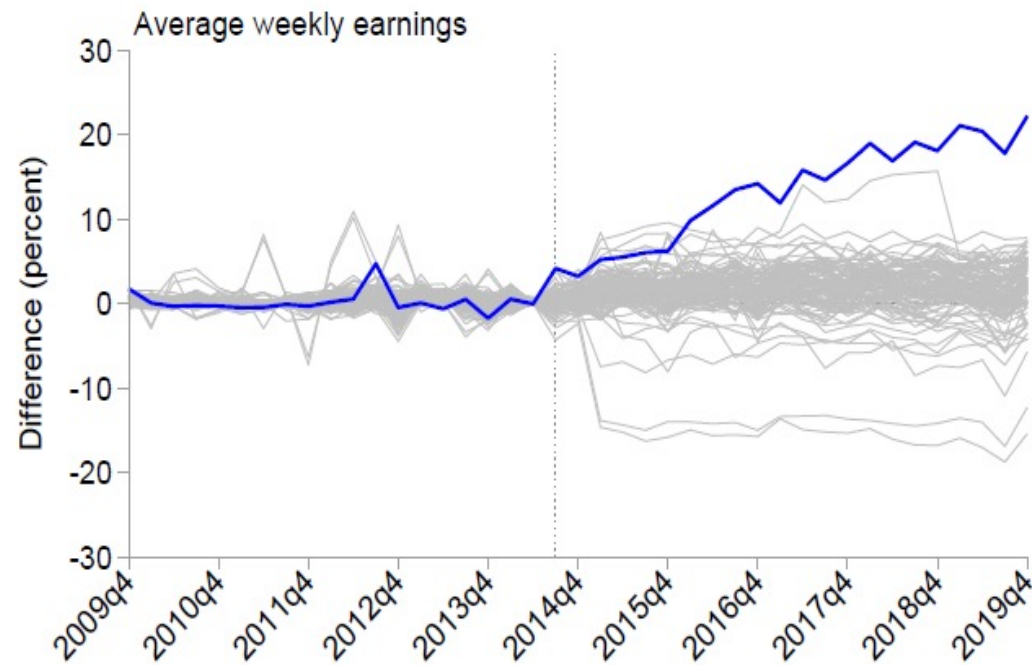# Restaurant workers, average county-level estimates

	Average weekly earnings (percent)	Employment (percent)	Own-wage Elasticity
Restaurant Workers, All Counties			
Treatment Effect	17.07	3.34	0.20
p-value	0.01	0.28	

Fast food workers, average county-level estimates

	Average weekly earnings (percent)	Employment (percent)	Own-wage Elasticity
Fast Food Workers, All Counties			
Treatment Effect	22.24	5.20	0.23
p-value	0.02	0.21	

Taking stock of new evidence from US states

- State increases in the US over the past 10 years shows estimates similar to before, though the minimum wage increases are occurring at a more elevated level

- If we want to study the highest of these state experiments—only around half a dozen—then it becomes trickier to get clear signal

  - General point: studying subgroup heterogeneity is harder than studying overall treatment effect!

Evidence from high minimum wages across US Cities
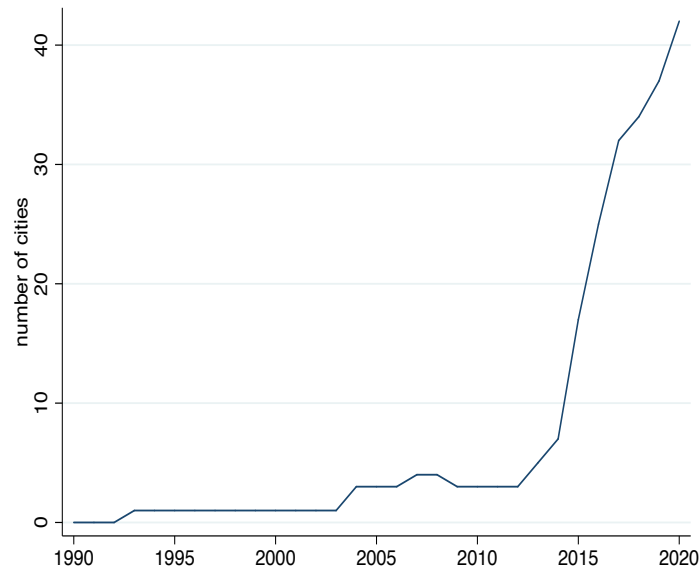
- Over 40 cities have minimums > federal minimum wage today

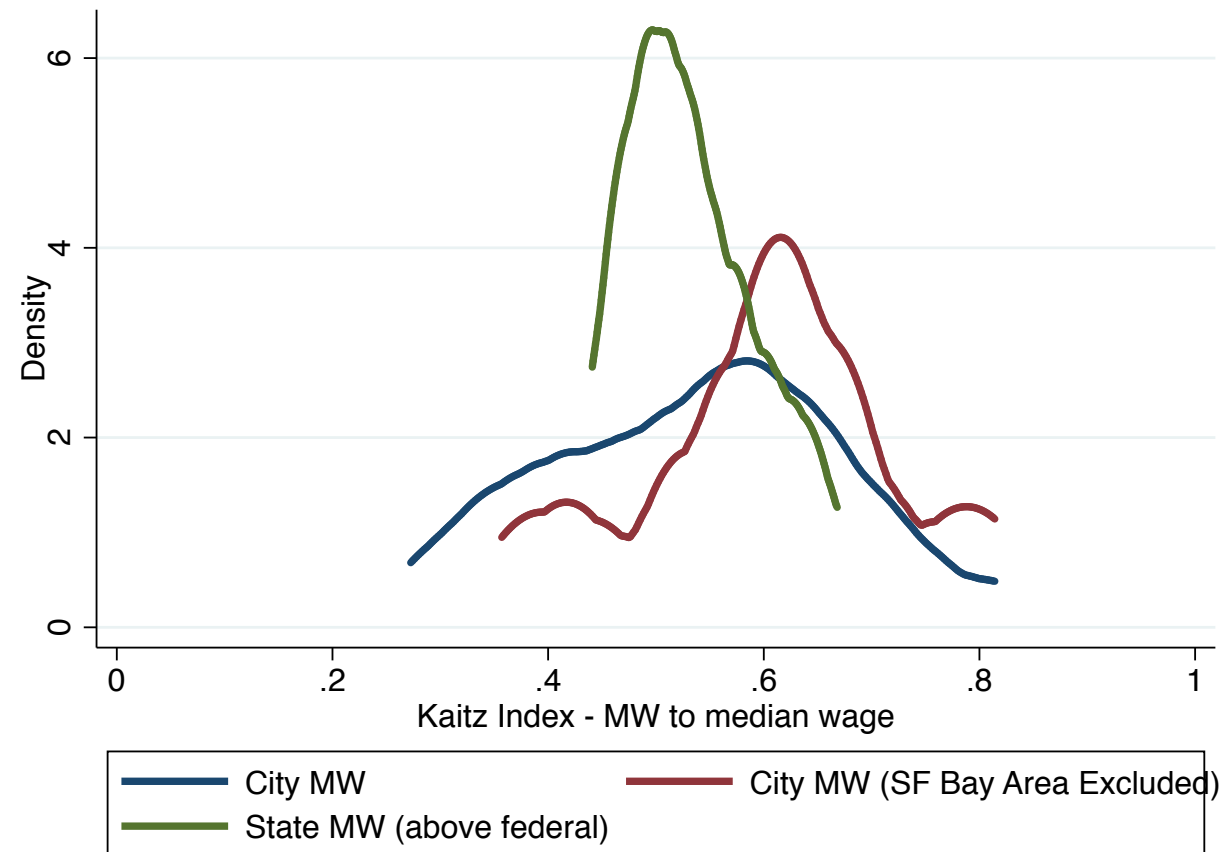- Heavily concentrated in West Coast; and Minneapolis, Chicago, NY, DC
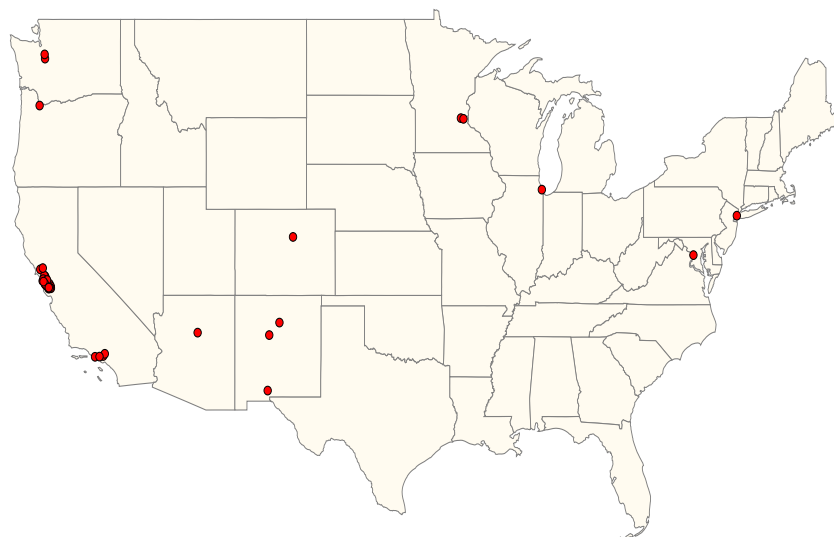
How high are city minimums in big cities?

Cities	Population	MW in 2020	Kaitz index	Planned nominal MW in 2022
Panel A: Largest cities with minimum wages above the state-level one				
1. New York City	8,398,748	15.00	0.66	15.00
2. Los Angeles	3,990,469	14.25	0.75	15.72
3. Chicago	2,705,988	13.00	0.65	13.60
4. San Jose	1,030,119	15.25	0.56	16.20
5. San Francisco	883,305	15.59	0.45	17.05
6. Seattle	744,949	16.39	0.57	17.19
7. Denver	716,492	12.85	0.58	15.87
8. Washington, D.C.	702,455	14.00	0.48	14.50
9. Portland	652,573	12.50	0.56	14.75
10. Albuquerque	560,234	9.35	0.55	9.60
Mean of top 10				
Unweighted	2,038,533	13.82	0.58	14.95
Pop weighted		14.33	0.64	15.04

Distribution of Kaitz Indices at city and state levels

- In general, city minimums are more binding than state minimums

- Especially true excluding high wage SF Bay Area

Recent evidence from city minimums

PAPER	CITY	WAGE	EMPLOYMENT	OWN-WAGE ELAST.
Allegretto et al. (2018b) - restaurants	Oakland	0.10 [0.06,0.14]	0.07 [0.03,0.11]	0.71 [0.20,1.22]
	San Francisco	0.06 [0.04,0.09]	0.01 [-0.05,0.07]	0.14 [-0.83,1.11]
	San Jose	0.11 [0.06,0.15]	0.00 [-0.06,0.06]	-0.02 [-0.5,0.53]
	Seattle	0.04 [0.02,0.07]	0.01 [-0.05,0.07]	0.20 [-1.16,1.57]
Dube, Naidu, Reich (2007) - restaurants	San Francisco	0.14 [0.06,0.22]	0.04 [-0.12,0.2]	0.29 [-0.34,0.91]
Jardim et al. (2017, 2018, 2020) - jobs below $19	Seattle, worker level	0.15 [0.14,0.17]	0.01 [-0.01,0.02]	0.03 [-0.04,0.11]
	Seattle, aggregate level	0.03 [0.03,0.03]	-0.07 [-0.14,-0.01]	-2.18 [-4.14,-0.22]
Moe, Parrott, Lathrop (2019) - full service restaurants	New York City	0.10 [0.03,0.16]	0.02 [-0.16,0.21]	0.25 [-2.89,3.38.]
Karabarbounis – low wage firms	Minneapolis	0.14 [0.07,0.21]	-0.16 [-0.25, -0.06]	-1.14 [-2.06, -.23]

Recent evidence from city minimums

PAPER	CITY	WAGE	EMPLOYMENT	OWN-WAGE ELAST.
Allegretto et al. (2018b) - restaurants	Oakland	0.10 [0.06,0.14]	0.07 [0.03,0.11]	0.71 [0.20,1.22]
	San Francisco	0.06 [0.04,0.09]	0.01 [-0.05,0.07]	0.14 [-0.83,1.11]
	San Jose	0.11 [0.06,0.15]	0.00 [-0.06,0.06]	-0.02 [-0.5,0.53]
	Seattle	0.04 [0.02,0.07]	0.01 [-0.05,0.07]	0.20 [-1.16,1.57]
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Take away from existing City-wide research

- Average across 9 estimates from 5 cities: mean OWE -0.19; median OWE +0.14
  - Some studies tend to find modest OWE's, similar to overall international evidence
    - Allegretto et al. (2018); Moe Parrott and Lathrop (2019)
  - Other studies find larger job losses
  - Jardim et al (2019) aggregate level OWE estimate is -2.1
    - Concern: wage growth in Seattle compared to other areas in WA can bias the estimated impact on total low-wage jobs. Individual level estimate is +0.03
  - Karabarbounis et al. (2021) find job loss for restaurants, with OWE estimate of -1.3

- But what about overall evidence? Dube and Lindner (2020, JEP) provide evidence on *aggregate* low-wage jobs pooling 21 city-wide policies

Impact of City Minimums on Wage Inequality

No controls

With controls

Source: Dube, Lindner, (2020)

American Community Survey (ACS)

All cities with a population of at least 100,000 in 2018: 21 city-level minimum wage changes

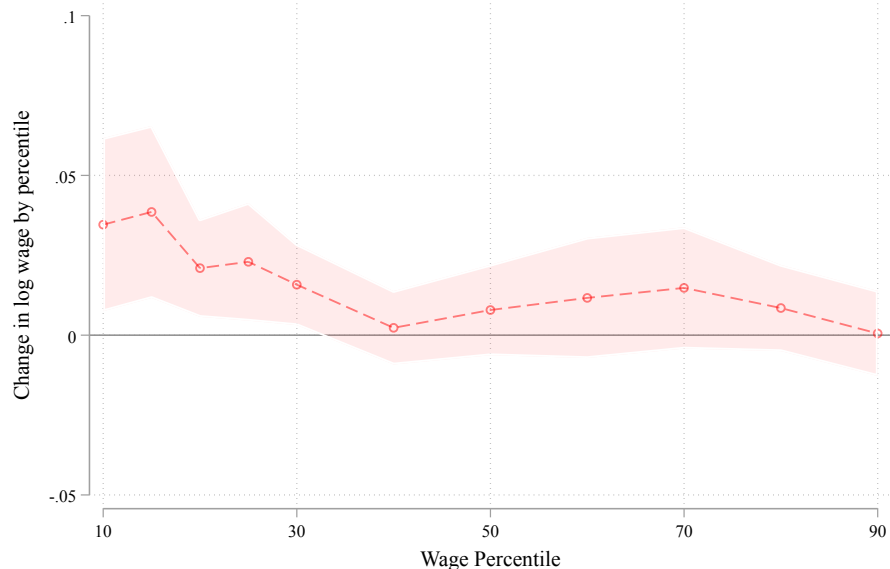We estimate the following regression using samples from 2012, 2013, 2017 and 2018:

-

$$y_{ct} = \beta_0 + \beta_1(Treat_c \times Post_t) + \beta_2(X_{c,2012} \times Post_t) + \mu_c + \tau_t + e_{ct}$$

Controls: *2012 values of cost of living, employment to population ratio, average wage, wage percentiles, shares of employment below wage cutoffs, and 1-digit level sectoral shares*

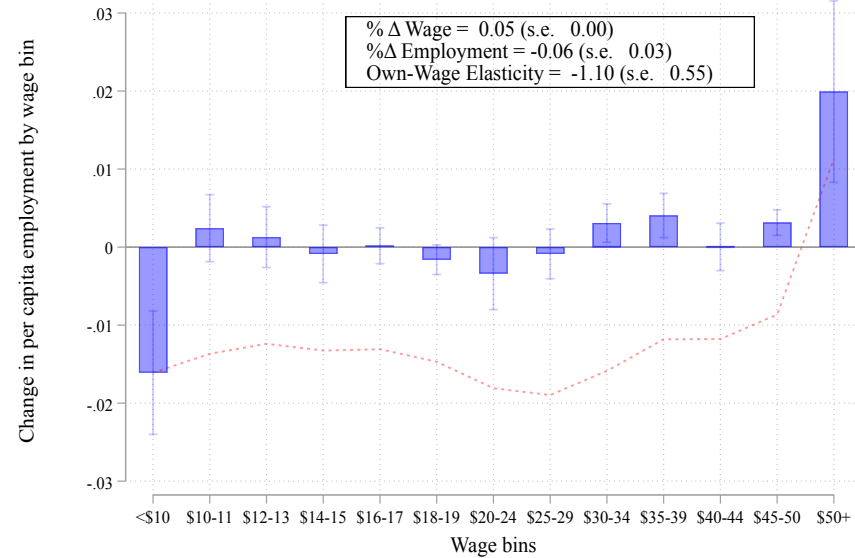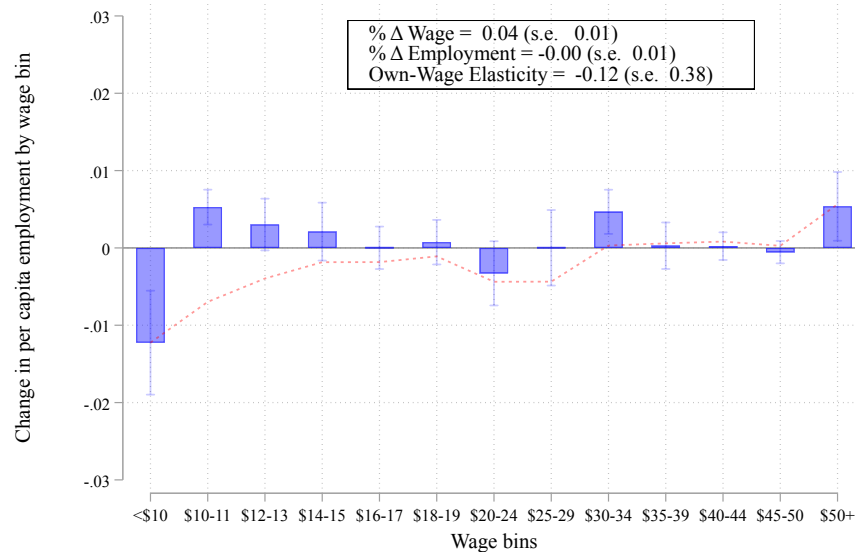Controls matter! Else fail upper tail falsification (like Autor, Manning Smith 2016)

Impact of City Minimums on Jobs

Source: Dube, Lindner, (2020)

Without controls, findings strikingly similar to Jardim et al. (2019) aggregate estimates

But this is due to wage drift (as shown above)

Controls matter! Else fail upper tail falsification (see Cengiz et al. 2019)

Once we better match cities raising wages to those that are not based on past characteristics, OWE of -0.12 (s.e. 0.38) very close to overall international evidence

Overall, evidence from strategy similar to Jardim et al., and Cengiz et al., but better matching city characteristics suggests city wage policies have lowered inequality with modest impact on jobs.

National Living Wage, Recent Upratings

- Cribb et al. (2021) extend *bunching estimator* to using cross-sectional difference in bite and look at more recent "ambitious" upratings.

- Even as the Kaitz increased from 0.47 to 0.55 using FT wage between 2013 and 2019, (of 60% of overall wage) employment effects were elusive

Figure 3. IMPACT OF THE MINIMUM WAGE ON THE WAGE DISTRIBUTION: BASELINE ESTIM ON WORKERS AGED 25-64
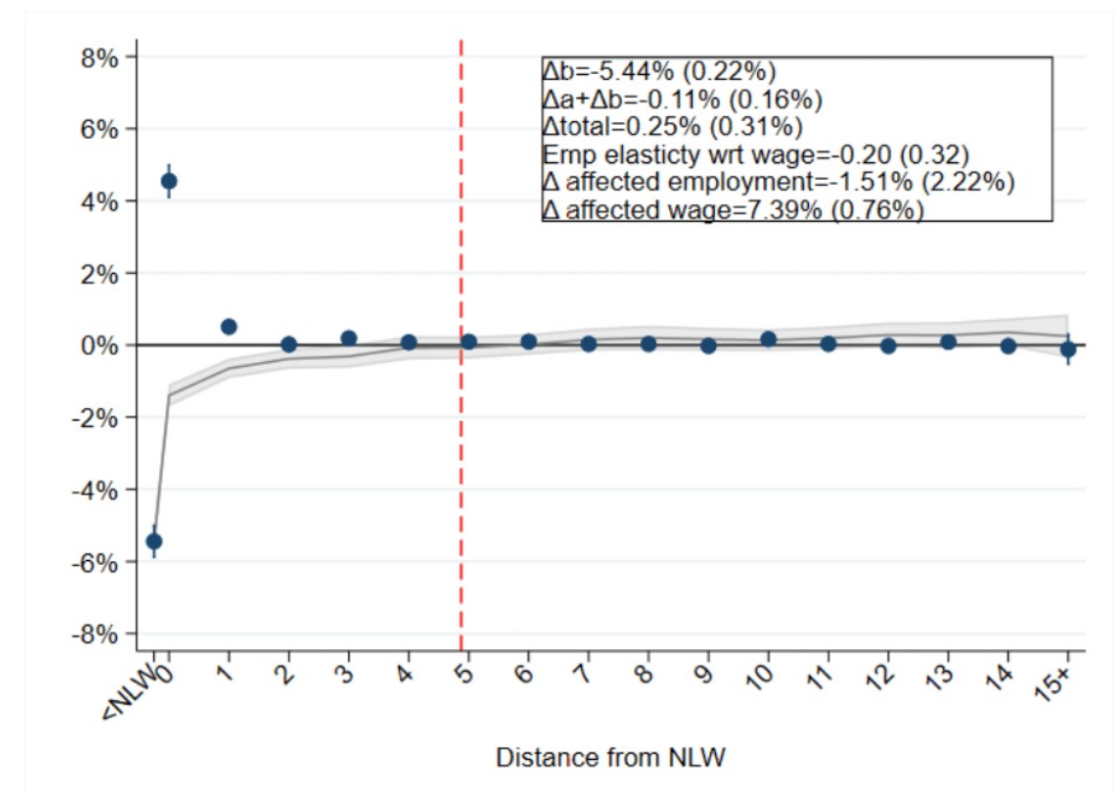
An outline for the talk

- International Context
  - What's happening with minimum wages?

- Conceptual Framework for Understanding Minimum Wage Impacts
  - Absorption of minimum wages in imperfectly competitive labor markets
  - Role of re-allocation

- Key sources of evidence
  - Overall meta-analysis using the Own-Wage-Elasticity of employment
  - German minimum wage
  - Recent increases in US states, cities
  - National Living Wage in UK

- New frontiers ("high minimum wages")
  - Evidence from Cities, States in US
  - Evidence from UK National Living Wage

- Methodological Challenges
  - Turning point by what?
  - Covid crisis

Conclusions

- Minimum wages are on the rise internationally
  - Even in US, though not at the federal level

- We're also seeing increased granularity in US context
  - High wage/cost cities have raised minimums more. This is sensible from targeting perspective. But are there bigger costs?
  - Overall evidence from the past decade does not suggest substantial disemployment effects
  - However, turning points and nonlinearities are **even tougher** to identify than overall policy effects: requires stronger identifying assumptions
  - US evidence on a small number of highest wage states is more mixed

- Extracting signal from noise of the pandemic is a formidable challenge
  - Best to probably separately analyze the pre-2020 or post-2021 periods
  - At the minimum, probably should drop 2020/21 from all policy evaluations