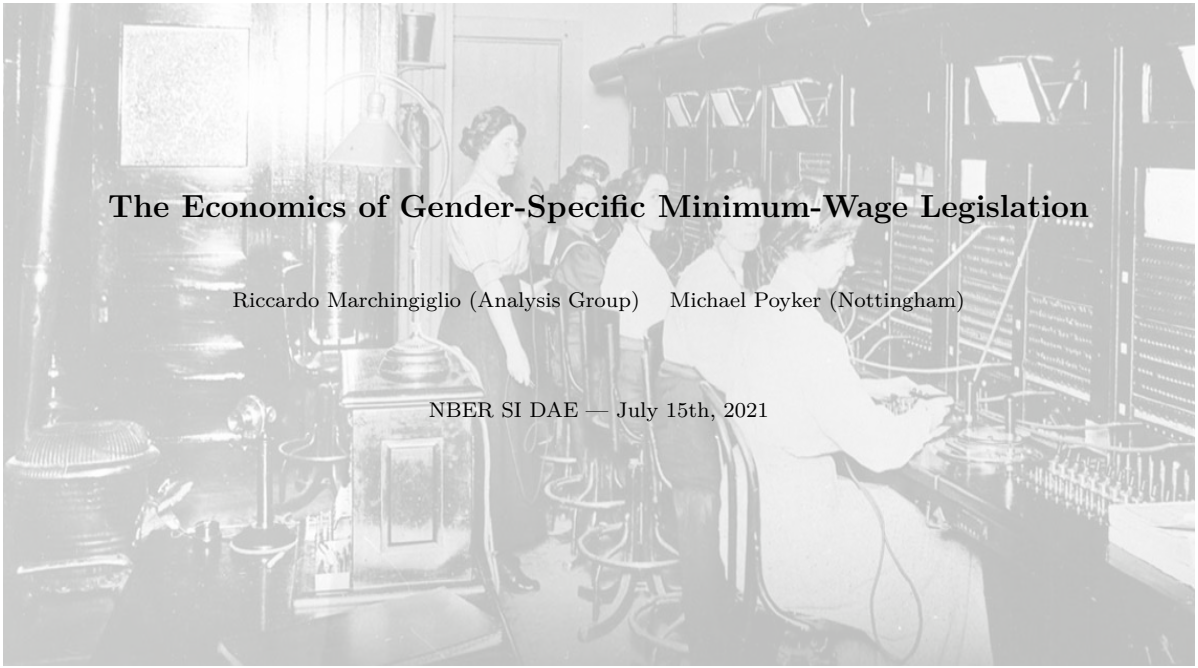


The Economics of Gender-Specific Minimum-Wage Legislation

Riccardo Marchingiglio (Analysis Group) Michael Poyker (Nottingham)

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Impact of Minimum-Wage Policies

- Effects depend on the industry, other contemporaneous labor market regulation, and the degree of competition in the labor market
- The identification of the impact of minimum wage is challenging:
  - No clearly defined control group
  - Laws usually affect all workers
  - No longitudinal data: impossible to disentangle within-worker vs composition effects
- Female wage workers are often over-represented among those earning at or below minimum-wage levels

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This Paper Studies Implementation of the First Minimum-Wage Laws in the History of the United States (12 States in 1910s)

- These laws were applying to **specific industries** and **only to female employees**
- This context allows us to examine the effect of minimum-wage legislation:
  - With a well-defined control group (location-industry-time)
  - In an environment with much less labor regulation
  - Capture the effect of moving from a zero to a nonzero minimum wage
  - By gender $\longrightarrow$ gender elasticity of substitution
- We use data for the universe of the U.S. adult population from the full-count census

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Empirical Strategy

- Earnings effect (case study):
  - Semi-parametric evidence using longitudinal data from Oregon
- Aggregate employment effect **by gender** at **county-industry** level and **county** level
  - Identification: (difference-in-)difference-in-differences + contiguous county pairs
  - The role of local cross-industry concentration
- Individual-level responses
  - Identification: within woman variation + linked sample
  - Switching industry vs. leaving the labor force: the role of marital status
- The elasticity of substitution between men and women
  - Using relative employment and wage changes

Preview of Results

- Wages increased for women earning below minimum wage, stayed constant for higher earners
  - Before vs After: The 25th percentile of weekly earnings increased by up to 40%; 75th percentile is unchanged.
- In treated industry-localities, employment decreased for women ($\sim 3\%$), increased for men ($\sim 2\%$)
- The impact of minimum wage is smaller, the more concentrated is the market (OWE $\in [-1.6, 0.8]$)
- Women either switch to untreated industries or exit the labor force, with different results depending on marital status
- Genders are gross substitutes (i.e., $\sigma > 1$)

First Paper on Gender-Specific Minimum-Wage Effects

- Minimum-wage literature (Dube et al. 2010, Neumark et al. 2014, Fishback and Seltzer 2021, among many others)
  - Legislation is gender-specific and industry-specific
  - Own-wage elasticity as a function of cross-industry concentration (in line with the findings in Azar et al., 2019)

- Development of American labor institutions and the literature on the labor outcomes of women (Goldin 2000, Naidu 2012, Naidu and Yuchtman 2016)
  - Substitution of women by men due to states' economic policy interventions
  - New equilibrium increased the employment gap between men and women, but it may have decreased the earnings gap, conditional on employment

- Literature on the gender gap in the labor market (Acemoğlu et al. 2004, Autor et al., 2016, Bailey et al. 2021)
  - Individual response of women to a negative shock to labor demand: marital status determines how affected female workers respond to the shock
  - Exploiting a demand shock that is asymmetric across genders, we estimate the elasticity of substitution between genders

Background & Data

Identification

Results

Conclusion

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Minimum-Wage Legislation

- Starting in 1912, 11 U.S. states and the District of Columbia passed laws guaranteeing a minimum wage for female laborers:
  - Arizona, Arkansas, California, Kansas, Massachusetts, Minnesota, North Dakota, Oregon, Utah, Washington, and Wisconsin
  - In some jurisdictions (CA, KS, MA, ND, and DC) — only in certain industries

- Range
  - Highest: North Dakota, $20 per week for women working in office occupations
  - Lowest: Kansas, $7 per week for women working in the laundry and dry cleaning industry

- Largest relative minimum-wage increase (minimum-wage-to-median-earnings ratio) in U.S. history.
  - The minimum wage was between 90% and 103% of median earnings before the regulation was put into effect.

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Why and How

- Why minimum wage?
  - The majority of women could not afford to satisfy their basic needs with the existing wage levels
  - E.g., Kansas Industrial Welfare Commission (1917) surveyed 5,436 women employees and found that 31% of them earned below $6 per week, concluding that "*they hardly have enough to sustain life.*"

- Why only women?
  - Introducing a minimum wage would deprive **male** workers and employers of their liberty to negotiate the terms of the employment relationship (the *Lochner era*)
  - Due to **patriarchal** views they thought it is fine to negotiate contracts for women

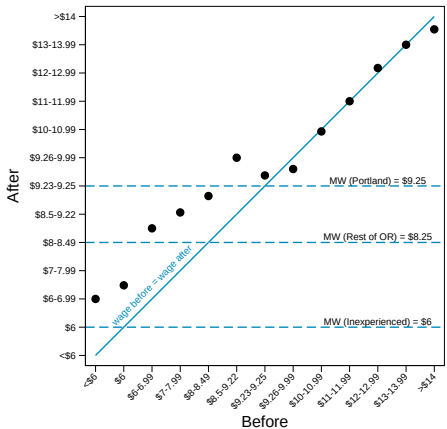
Reactions and Aftermath

- Objections
  - Almost immediately after the implementation of the first law by the state of Oregon, manufacturers started to oppose minimum wage
  - The Supreme Court of D.C. struck down its minimum-wage law in *Adkins v. Children Hospital* in 1923 and deemed it unconstitutional.

- Differential state-level responses
  - The court rule slowed down further adoption of the laws in other states
  - Abolished in Arizona (1925), Arkansas (1927), California (1925), Kansas (1925), Utah (1929), and Wisconsin (1924)
  - Continued to exist until the introduction of the universal federal minimum wage in 1938 (Massachusetts, Minnesota, North Dakota, Oregon, and Washington)

◂ Summary of laws

Case Study of Wage Effects: Evidence from Oregon Data



- Longitudinal data on 374 women employed in Oregon before and after the MW enactment
- Only workers below the newly established minimum wages got a bump
- Wage is unchanged for “top” earners

Data

- Full count Censuses 1880, 1900, 1910, 1920, 1930, 1940
  - Panel of industry-county-gender cells over time
  - Newly constructed longitudinal sample of microdata on women

- The Women's Bureau published a list of laws related to employment of women
  - We collected and coded these laws
  - We matched those laws to our dataset using Census industry codes

Background & Data

Identification

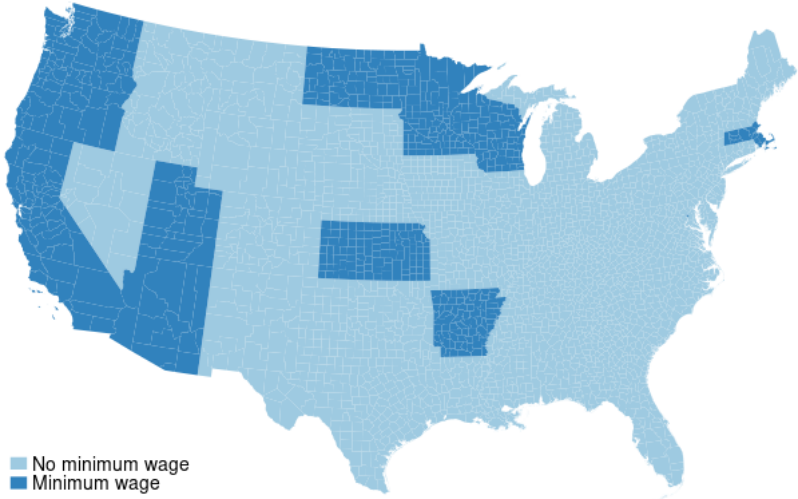
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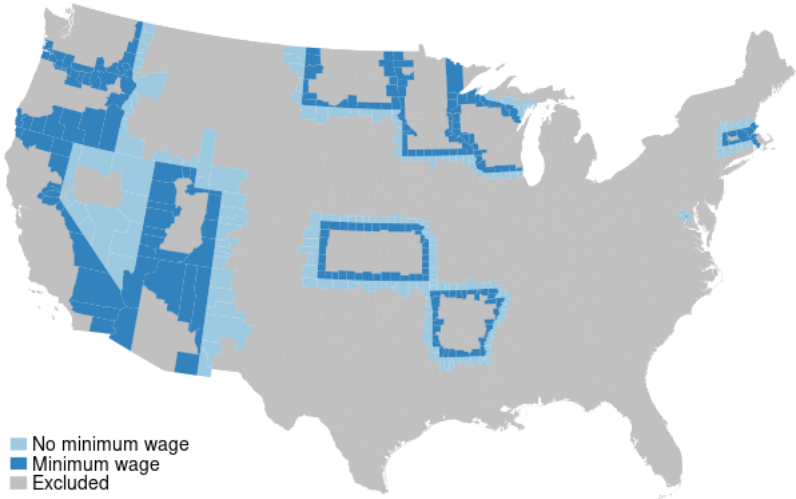
Identification of Employment Effects

- Exploit variation across states, industries, over time
- Preferred specification: compare within-gender changes in employment in the same industry, across counties in neighboring county-pairs that straddle state borders
  - Focusing on county-pairs across bordering states when identifying the effect of state-level changes in minimum wages
  - Allows controlling for local trends in gender discrimination in the labor market, labor-force participation, and growth in female-intensive industries

Minimum-Wage Laws & Identification



Minimum-Wage Laws & Identification



Contiguous-Border County Pairs

	Pairs		# counties			Types of min.wage laws		Avg. weekly min. wage, $		# periods when laws are active	
Segment	1	2	1	2	#pairs	1	2	1	2	1	2
1	AR	LA	6	8	14	ind.	no	13.3	0	1	0
2	AR	MO	12	11	22	ind.	no	13.3	0	1	0
3	AR	MS	5	6	10	ind.	no	13.3	0	1	0
4	AR	OK	8	5	12	ind.	no	13.3	0	1	0
5	AR	TN	2	4	6	ind.	no	13	0	1	0
6	AR	TX	2	2	3	ind.	no	13.3	0	1	0
7	AZ	CA	2	3	4	all	ind.	10	11.8	1	1
8	AZ	CO	1	1	1	all	no	10	0	1	0
9	AZ	NM	3	6	8	all	no	10	0	1	0
10	AZ	NV	1	2	2	all	no	10	0	1	0
11	AZ	UT	4	3	6	all	all	10	7.5	1	1
12	CA	NV	10	7	17	ind.	no	11.8	0	1	0
13	CA	OR	3	5	7	ind.	all	11.8	8.3	1	2
					.....						
42	WI	MI	5	4	11	all	no	11	0	1	0
Total	36				419					58	

◂ Balance Table

Industry Variation if Both States Had Minimum Wage

	Pairs		# counties			Types of min.wage laws		Avg. weekly min. wage, $		# periods when laws are active	
Segment	1	2	1	2	#pairs	1	2	1	2	1	2
1	AR	LA	6	8	14	ind.	no	13.3	0	1	0
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5	AR	TN	2	4	6	ind.	no	13.3	0	1	0
6	AR	TX	2	2	3	ind.	no	13.3	0	1	0
7	AZ	CA	2	3	4	all	ind.	10.0	12	1	1
8	AZ	CO	1	1	1	all	no	10	0	1	0
9	AZ	NM	3	6	8	all	no	10	0	1	0
10	AZ	NV	1	2	2	all	no	10	0	1	0
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Also Able to Use Variation in the Levels of Minimum Wage

	Pairs		# counties			Types of min.wage laws		Avg. weekly min. wage, $		# periods when laws are active	
Segment	1	2	1	2	#pairs	1	2	1	2	1	2
1	AR	LA	6	8	14	ind.	no	13.3	0	1	0
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Balance Table

Variation in Periods when Laws were Active

	Pairs		# counties			Types of min.wage laws		Avg. weekly min. wage, $		# periods when laws are active	
Segment	1	2	1	2	#pairs	1	2	1	2	1	2
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Overall Use 419 County-Pairs in 42 Segments in 36 States

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Aggregate Employment Effects at Locality-Industry Level

$$\ln\left(EmpShare_{gip(c)t}\right) = \beta \cdot \text{Minimum wage}_{ist} + \mu_{st} + \Psi_{p(c)t} + \Phi_{is} + \Phi_{it} + \Phi_{p(c)i} + \epsilon_{gip(c)t}, \quad g = \{w\} \quad (1)$$

- County-pair $p(c)$ - industry i - decade t estimated by gender g
- $\ln\left(EmpShare_{gip(c)t}\right) \equiv \ln\left(\frac{\#employed_{gip(c)t}}{\#total_{gp(c)t}}\right)$
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Gender-Specific Minimum Wage Laws Decreased Employment of Women

	I	II	III	IV	V	VI
	Dependent variable: Log employment share (women)					
Panel A:						
Minimum wage, $10	-0.056**	-0.032**	-0.025***	-0.053*	-0.025**	-0.015***
(mean min. wage $10.2)	(0.027)	(0.013)	(0.008)	(0.027)	(0.011)	(0.0044)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
Panel B:						
1(Minimum wage)	-0.075***	-0.050***	-0.041***	-0.075***	-0.045***	-0.031***
	(0.024)	(0.009)	(0.006)	(0.024)	(0.008)	(0.0032)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
Panel C:						
log (Minimum wage)	-0.023**	-0.013***	-0.011***	-0.023**	-0.011***	-0.008***
inverse hyperbolic sin	(0.009)	(0.003)	(0.001)	(0.010)	(0.003)	(0.0006)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
County-pair & year FEs	✓	✓	✓			
County-pair-year FEs				✓	✓	✓
Industry-state & occupation-state FEs	✓	✓	✓	✓	✓	✓
State-year FEs	✓	✓	✓	✓	✓	✓
Industry-year & occup.-year FEs		✓	✓		✓	✓
Ind.-county-pair & occup.-county-pair FEs			✓			✓

Robust to Using County-Pair-Year Fixed Effects

	I	II	III	IV	V	VI
	Dependent variable: Log employment share (women)					
Panel A:						
Minimum wage, $10	-0.056**	-0.032**	-0.025***	-0.053*	-0.025**	-0.015***
(mean min. wage $10.2)	(0.027)	(0.013)	(0.008)	(0.027)	(0.011)	(0.0044)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
Panel B:						
1(Minimum wage)	-0.075***	-0.050***	-0.041***	-0.075***	-0.045***	-0.031***
	(0.024)	(0.009)	(0.006)	(0.024)	(0.008)	(0.0032)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
Panel C:						
log (Minimum wage)	-0.023**	-0.013***	-0.011***	-0.023**	-0.011***	-0.008***
inverse hyperbolic sin	(0.009)	(0.003)	(0.001)	(0.010)	(0.003)	(0.0006)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
County-pair & year FEs	✓	✓	✓			
County-pair-year FEs				✓	✓	✓
Industry-state & occupation-state FEs	✓	✓	✓	✓	✓	✓
State-year FEs	✓	✓	✓	✓	✓	✓
Industry-year & occup.-year FEs		✓	✓		✓	✓
Ind.-county-pair & occup.-county-pair FEs			✓			✓

Robust to Using a Dummy for Minimum Wage

	I	II	III	IV	V	VI
	Dependent variable: Log employment share (women)					
Panel A:						
Minimum wage, $10	-0.056**	-0.032**	-0.025***	-0.053*	-0.025**	-0.015***
(mean min. wage $10.2)	(0.027)	(0.013)	(0.008)	(0.027)	(0.011)	(0.0044)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
Panel B:						
1(Minimum wage)	-0.075***	-0.050***	-0.041***	-0.075***	-0.045***	-0.031***
	(0.024)	(0.009)	(0.006)	(0.024)	(0.008)	(0.0032)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
Panel C:						
log (Minimum wage)	-0.023**	-0.013***	-0.011***	-0.023**	-0.011***	-0.008***
inverse hyperbolic sin	(0.009)	(0.003)	(0.001)	(0.010)	(0.003)	(0.0006)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
County-pair & year FEs	✓	✓	✓			
County-pair-year FEs				✓	✓	✓
Industry-state & occupation-state FEs	✓	✓	✓	✓	✓	✓
State-year FEs	✓	✓	✓	✓	✓	✓
Industry-year & occup.-year FEs		✓	✓		✓	✓
Ind.-county-pair & occup.-county-pair FEs			✓			✓

Robust to Using Inverse Hyperbolic Sin

	I	II	III	IV	V	VI
	Dependent variable: Log employment share (women)					
Panel A:						
Minimum wage, $10	-0.056**	-0.032**	-0.025***	-0.053*	-0.025**	-0.015***
(mean min. wage $10.2)	(0.027)	(0.013)	(0.008)	(0.027)	(0.011)	(0.0044)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
Panel B:						
1(Minimum wage)	-0.075***	-0.050***	-0.041***	-0.075***	-0.045***	-0.031***
	(0.024)	(0.009)	(0.006)	(0.024)	(0.008)	(0.0032)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
Panel C:						
log (Minimum wage)	-0.023**	-0.013***	-0.011***	-0.023**	-0.011***	-0.008***
inverse hyperbolic sin	(0.009)	(0.003)	(0.001)	(0.010)	(0.003)	(0.0006)
R-squared	0.713	0.734	0.792	0.719	0.740	0.797
Observations	273,883	273,883	273,883	273,883	273,883	273,883
County-pair & year FEs	✓	✓	✓			
County-pair-year FEs				✓	✓	✓
Industry-state & occupation-state FEs	✓	✓	✓	✓	✓	✓
State-year FEs	✓	✓	✓	✓	✓	✓
Industry-year & occup.-year FEs		✓	✓		✓	✓
Ind.-county-pair & occup.-county-pair FEs			✓			✓

Alternative Explanations

- Sanity check: results are driven by lower occupational score percentiles
- Parallel trends:
  - Test for pre-trends (fully-dynamic difference-in-differences specification)
  - Placebo treatment
- Women in affected counties-industries do not deferentially migrate out
- Potentially confounding factors:
  - Contemporary labor legislation
  - WWI draft and marriage bars

Robustness

- Robustness to exclusion of state
- Robustness to exclusion of industry
- Robustness to non-occupational industries
- Robustness to alternative empirical specifications
- Robustness to dropping 1880, 1930, or both
- Effects of abolishment of minimum wage laws
- Full sample results

Going From Location-Industry Effects to Location Effects

- Contiguous counties sample

$$\ln\left(EmpShare_{gp(c)t}\right) = \beta_1 \cdot \text{Min. wage}_{st} + \beta_2 \cdot \text{Min. wage}_{st} \times \text{Interaction} + \mu_t + \Psi_{p(c)} + \Phi_s + t\lambda_s + \mathbb{X}_{p(c)t} + \varepsilon_{gp(c)t}, \quad (10)$$

- Interactions:
  - Share affected workers$_{p(c),1910}$ — share of female workers employed in industries affected by minimum-wage laws in 1910
  - $HHI_{c,1910} = \sum_{i \in I_{c,1910}} s_{ic}^2$ — measure of county-level concentration across industries

Minimum Wage Decreased Aggregate Employment of Women

	I	II	III
	Dependent variable: Log employment share (women)		
Average minimum wage, $	-0.017**	0.015	-0.125***
(mean av. min. wage $6)	(0.006)	(0.017)	(0.044)
Average minimum wage, $		-0.035**	
x Share women in treated industries in 1910		(0.017)	
Average minimum wage, $			0.184**
x HHI in 1910			(0.071)
Mean of the interacted variable	-	0.71	0.59
R-squared	0.797	0.798	0.800
Observations	3,020	3,020	3,020

◂ Panels B and C

Larger Effects for Locations with Higher Share of Women in Affected Industries

	I	II	III
	Dependent variable: Log employment share (women)		
Average minimum wage, $	-0.017**	0.015	-0.125***
(mean av. min. wage $6)	(0.006)	(0.017)	(0.044)
Average minimum wage, $ x Share women in treated industries in 1910		-0.035**	
		(0.017)	
Average minimum wage, $ x HHI in 1910			0.184**
			(0.071)
Mean of the interacted variable	-	0.71	0.59
R-squared	0.797	0.798	0.800
Observations	3,020	3,020	3,020

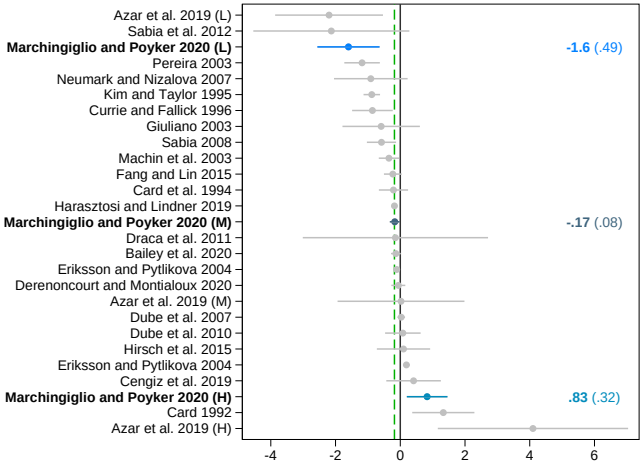
◂ Panels B and C

Localities with Higher Market Concentration Reacted Less

	I	II	III
	Dependent variable: Log employment share (women)		
Average minimum wage, $	-0.017**	0.015	-0.125***
(mean av. min. wage $6)	(0.006)	(0.017)	(0.044)
Average minimum wage, $		-0.035**	
x Share women in treated industries in 1910		(0.017)	
Average minimum wage, $			0.184**
x HHI in 1910			(0.071)
Mean of the interacted variable	-	0.71	0.59
R-squared	0.797	0.798	0.800
Observations	3,020	3,020	3,020

◂ Panels B and C

Own-Wage Employment Elasticity: Ours and in the Previous Literature



Summary of the Aggregate Effects

- Aggregate female employment decreased **both** at the locality-industry and at the locality level
  - The effects are larger for the areas with higher shares of women in affected industries and smaller in areas with high market concentration
  - Our OWE elasticities are in line with the literature

- Did affected women switch between industries?
  - Linked census of women: within-worker variation
  - Can use full sample (instead of county-pairs)

Individual-Level Results: Linked Women 1910–1920

Empirical specifications:

$$y_{i(c(s),j),1910-20} = \beta \cdot \mathbb{1}\text{Minimum wage}_{s,j,1910-20} + \delta_{c,1910} + \gamma_{j,1910} + \eta X_i + \varepsilon_{i,1920}, \tag{11}$$

- Linking process similar in spirit to Ferrie (1996) and Abramitzky, Boustan, and Eriksson (2012, 2014, 2019).
- Supplemental restrictions:
  - String matching (Jaro-Winkler score)
  - Ethnicity/Race matching
- Ex-post sample restrictions:
  - Women who are *always* married or *never* married
  - Women aged $\in [16, 65]$ in 1920.
  - Women who are in the labor force in 1910.
- Limitations:
  - At risk of losing mostly young unmarried women between 16 and 30, who account for 12% of the total female population in 1910

Affected Women were Less Likely to Remain Employed in the Same Industry

	I	II	III
	Dependent variable:		
	1(Same industry)	1(LFP)	1(Same industry)
Sample:	All	All	In the LF
Panel A:			
1(Minimum wage)	-0.043**	-0.032*	-0.058**
	(0.020)	(0.019)	(0.025)
R-squared	0.178	0.285	0.318
Observations	55,190	55,190	22,064
Panel B:			
1(Minimum wage) x Married	-0.029*	-0.045**	-0.045
	(0.016)	(0.022)	(0.054)
1(Minimum wage) x Never married	-0.037*	-0.005	-0.059**
	(0.019)	(0.014)	(0.025)
R-squared	0.215	0.412	0.318
Observations	55,190	55,190	22,064
FEs: County in 1910	✓	✓	✓
FEs: Industry in 1910	✓	✓	✓
Individual controls	✓	✓	✓

◂ RHS, $, ◂ RHS, log

Affected Women were Less Likely to Remain in the Labor Force

	I	II	III
	Dependent variable:		
	1(Same industry)	1(LFP)	1(Same industry)
Sample:	All	All	In the LF
Panel A:			
1(Minimum wage)	-0.043**	-0.032*	-0.058**
	(0.020)	(0.019)	(0.025)
R-squared	0.178	0.285	0.318
Observations	55,190	55,190	22,064
Panel B:			
1(Minimum wage) x Married	-0.029*	-0.045**	-0.045
	(0.016)	(0.022)	(0.054)
1(Minimum wage) x Never married	-0.037*	-0.005	-0.059**
	(0.019)	(0.014)	(0.025)
R-squared	0.215	0.412	0.318
Observations	55,190	55,190	22,064
FEs: County in 1910	✓	✓	✓
FEs: Industry in 1910	✓	✓	✓
Individual controls	✓	✓	✓

◂ RHS, $, ◂ RHS, log

Robust to Keeping Women in the Labor Force

	I	II	III
	Dependent variable:		
	1(Same industry)	1(LFP)	1(Same industry)
Sample:	All	All	In the LF
Panel A:			
1(Minimum wage)	-0.043**	-0.032*	-0.058**
	(0.020)	(0.019)	(0.025)
R-squared	0.178	0.285	0.318
Observations	55,190	55,190	22,064
Panel B:			
1(Minimum wage) x Married	-0.029*	-0.045**	-0.045
	(0.016)	(0.022)	(0.054)
1(Minimum wage) x Never married	-0.037*	-0.005	-0.059**
	(0.019)	(0.014)	(0.025)
R-squared	0.215	0.412	0.318
Observations	55,190	55,190	22,064
FEs: County in 1910	✓	✓	✓
FEs: Industry in 1910	✓	✓	✓
Individual controls	✓	✓	✓

◂ RHS, $, ◂ RHS, log

Similar Effects on Industry Switching Between Married and Never-Married Women

	I	II	III
	Dependent variable:		
	1(Same industry)	1(LFP)	1(Same industry)
Sample:	All	All	In the LF
Panel A:			
1(Minimum wage)	-0.043**	-0.032*	-0.058**
	(0.020)	(0.019)	(0.025)
R-squared	0.178	0.285	0.318
Observations	55,190	55,190	22,064
Panel B:			
1(Minimum wage) x Married	-0.029*	-0.045**	-0.045
	(0.016)	(0.022)	(0.054)
1(Minimum wage) x Never married	-0.037*	-0.005	-0.059**
	(0.019)	(0.014)	(0.025)
R-squared	0.215	0.412	0.318
Observations	55,190	55,190	22,064
FEs: County in 1910	✓	✓	✓
FEs: Industry in 1910	✓	✓	✓
Individual controls	✓	✓	✓

◂ RHS, $, ◂ RHS, log

Labor-Force Effect Driven by Married Women

	I	II	III
	Dependent variable:		
	1(Same industry)	1(LFP)	1(Same industry)
Sample:	All	All	In the LF
Panel A:			
1(Minimum wage)	-0.043**	-0.032*	-0.058**
	(0.020)	(0.019)	(0.025)
R-squared	0.178	0.285	0.318
Observations	55,190	55,190	22,064
Panel B:			
1(Minimum wage) x Married	-0.029*	-0.045**	-0.045
	(0.016)	(0.022)	(0.054)
1(Minimum wage) x Never married	-0.037*	-0.005	-0.059**
	(0.019)	(0.014)	(0.025)
R-squared	0.215	0.412	0.318
Observations	55,190	55,190	22,064
FEs: County in 1910	✓	✓	✓
FEs: Industry in 1910	✓	✓	✓
Individual controls	✓	✓	✓

◂ RHS, $, ◂ RHS, log

Switching Between Industry Driven by Non-Married Women

	I	II	III
	Dependent variable:		
	1(Same industry)	1(LFP)	1(Same industry)
Sample:	All	All	In the LF
Panel A:			
1(Minimum wage)	-0.043**	-0.032*	-0.058**
	(0.020)	(0.019)	(0.025)
R-squared	0.178	0.285	0.318
Observations	55,190	55,190	22,064
Panel B:			
1(Minimum wage) x Married	-0.029*	-0.045**	-0.045
	(0.016)	(0.022)	(0.054)
1(Minimum wage) x Never married	-0.037*	-0.005	-0.059**
	(0.019)	(0.014)	(0.025)
R-squared	0.215	0.412	0.318
Observations	55,190	55,190	22,064
FEs: County in 1910	✓	✓	✓
FEs: Industry in 1910	✓	✓	✓
Individual controls	✓	✓	✓

◂ RHS, $, ◂ RHS, log

Substitution Between Men and Women

- Male employment increased ◂ Industry-locality ◂ Locality
  - Substitution effect was particularly strong for people under the age of 18 ◂
- Compute gender elasticity of substitution ◂
  - Men and women are on average gross substitutes ($\sigma > 1$) ◂
  - Female-to-men labor demand is larger for industries where men and women have similar shares ◂
  - Margin of substitution is driven by the replacement of women in low-rank occupations with men in middle- or high-rank occupations ◂

Background & Data

Identification

Results

Conclusion

Conclusion

- Pre-FLSA minimum wage increased wages for women with below min-wage earnings
- Imposition of a price floor on their labor decreased employment for women and increased demand for men → within-industry substitution
- Local aggregate female employment also decreased, and the magnitude depends on industry concentration
- Longitudinal data show that women either switched to different industries or left the labor force, with choice at least partially driven by marital status
- In the long-run, women might have been discouraged from the LF participation
- Evidence that 'paternalism' towards women may have had unintended effects

Potentially confounding factor: contemporary labor legislation

	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
	Women			Men		
1(Minimum wage)	-0.043***			0.022**		
	(0.006)			(0.011)		
Minimum wage, $		-0.003**			0.002***	
(mean min wage $10.2)		(0.001)			(0.000)	
log (Minimum wage)			-0.012***			0.004*
inverse hyperbolic sin			(0.003)			(0.002)
1(Max. working hours law)	0.001	0.003	0.003	0.015*	0.014	0.014
x 1(State ever had minimum wage)	(0.015)	(0.015)	(0.015)	(0.008)	(0.009)	(0.010)
R-squared	0.740	0.740	0.740	0.654	0.654	0.654
Observations	272,397	272,397	272,397	801,903	801,903	801,903

Back to Talk

Parallel trends: shift the time-period of the treatment 20 years back

1900-1910 placebo treatment	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
	Women			Men		
Minimum wage, $10	0.021			-0.015		
(mean min wage $10.2)	(0.015)			(0.019)		
1(Minimum wage)		0.012			-0.035	
		(0.029)			(0.022)	
log (Minimum wage)			0.005			-0.009
inverse hyperbolic sin			(0.008)			(0.008)
R-squared	0.78	0.784	0.784	0.656	0.656	0.656
Observations	93,947	93,947	93,947	335,623	335,623	335,623

Back to Talk

WWI draft and the effect of returning veterans

	I	II	III
	Dependent variable: Log employment share (women)		
Average minimum wage, $	-0.017***	-0.028**	-0.018***
(mean av. min. wage $6)	(0.006)	(0.011)	(0.007)
Log WWI veterans x 1920	0.011	0.008	
inverse hyperbolic sin	(0.010)	(0.010)	
Average minimum wage, $ x		0.001	
Log WWI veterans x 1920		(0.001)	
Log WWI veterans x 1930			0.029*
inverse hyperbolic sin			(0.014)
Average minimum wage, $ x			-0.001
Log WWI veterans x 1930			(0.001)
R-squared	0.797	0.797	0.798
Observations	3,020	3,020	3,020

Back to Talk

Introduction vs. abolishment of the minimum wages

	I	II	III
	Dependent variable: Log employment share (women)		
Introduction: Minimum wage, $10 (mean min. wage $10.2)	-0.012*** (0.0026)		
Abolishment: Minimum wage, $10 (mean min. wage $10.2)	0.019** (0.0083)		
Introduction: 1(Minimum wage)		-0.029*** (0.0032)	
Abolishment: 1(Minimum wage)		0.036*** (0.0129)	
Introduction: log (Minimum wage) inverse hyperbolic sin			-0.007*** (0.0004)
Abolishment: log (Minimum wage) inverse hyperbolic sin			0.010*** (0.0019)
R-squared	0.797	0.797	0.797
Observations	273,883	273,883	273,883

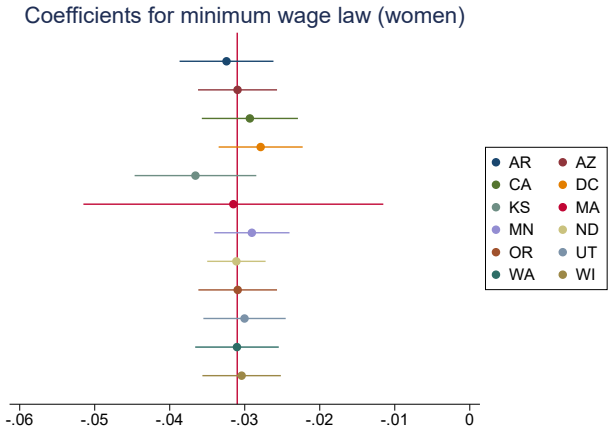
◂ Back to Talk

Full sample

	I	II	III	IV	V	VI
	Dependent variable: Log employment share (women)					
Panel A:						
Minimum wage, $10	-0.013	-0.003	-0.001	-0.013	-0.003	0.004
(mean min. wage $10.2)	(0.021)	(0.011)	(0.010)	(0.021)	(0.011)	(0.0081)
R-squared	0.673	0.689	0.750	0.681	0.697	0.756
Observations	1,363,979	1,363,979	1,363,979	1,363,979	1,363,979	1,363,979
Panel B:						
1(Minimum wage)	-0.035	-0.024	-0.021	-0.035	-0.022	-0.014
	(0.022)	(0.016)	(0.018)	(0.023)	(0.015)	(0.0138)
R-squared	0.673	0.689	0.750	0.681	0.697	0.756
Observations	1,363,979	1,363,979	1,363,979	1,363,979	1,363,979	1,363,979
Panel C:						
log (Minimum wage)	-0.009	-0.005	-0.004	-0.009	-0.004	-0.002
inverse hyperbolic sin	(0.008)	(0.005)	(0.005)	(0.009)	(0.005)	(0.0041)
R-squared	0.673	0.689	0.750	0.681	0.697	0.756
Observations	1,363,979	1,363,979	1,363,979	1,363,979	1,363,979	1,363,979
County FEs	✓	✓	✓			
County-year FEs				✓	✓	✓
Industry-state & occupation-state FEs	✓	✓	✓	✓	✓	✓
State-year FEs	✓	✓	✓	✓	✓	✓
Industry-year & occup.-year FEs		✓	✓		✓	✓
Ind.-county & occup.-county FEs			✓			✓

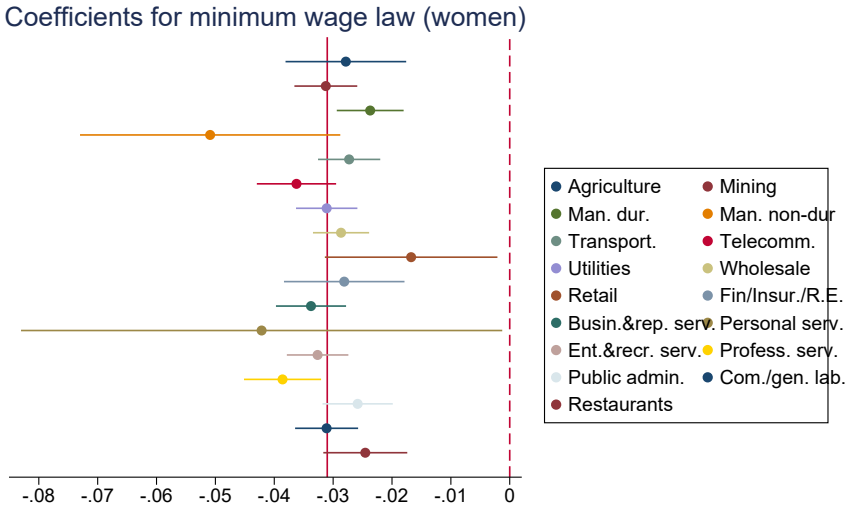
◂ Back to Talk

Robust to omission of state



Back to Talk

Robust to omission of industry



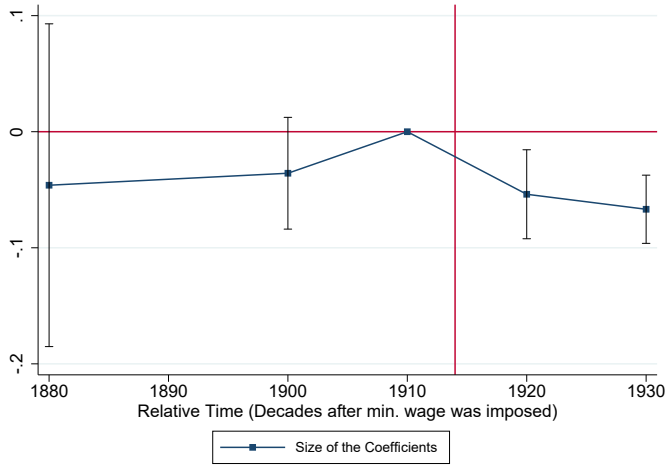
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Baseline w/o non-occupational industries

~Baseline, no missing non. occupational	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
Minimum wage, $10	-0.043***	-0.043***				
(mean min. wage $10.2)	(0.015)	(0.0146)				
1(Minimum wage)			-0.051***	-0.050***		
			(0.013)	(0.0138)		
log (Minimum wage)					-0.016***	-0.016***
inverse hyperbolic sin					(0.005)	-0.0046
R-squared	0.751	0.795	0.751	0.795	0.751	0.795
Observations	322,740	322,740	322,740	322,740	322,740	322,740
County-pair-year FEs	✓	✓	✓	✓	✓	✓
Ind.-county-pair & occup.-county-pair FEs.		✓		✓		✓

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Pre-trends: Female employment



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Alternative empirical specifications

	I	II	III	IV	V	VI	VII	VIII
	Dependent variable: Log employment share (women)							
non-occupational industries	without		with		w/o	w	w/o	w
Minimum wage, $10	-0.021**	-0.013**	-0.041*	-0.045*				
(mean min wage $10.2)	(0.0097)	(0.0057)	(0.0213)	(0.0250)				
1(Minimum wage)					-0.027**	-0.051*		
					(0.013)	(0.026)		
log (Minimum wage)							-0.007***	-0.016*
inverse hyperbolic sin							(0.002)	(0.009)
Ind.-occup.-year FEs.	✓	✓	✓	✓	✓	✓	✓	✓
Ind.-occup.-state FEs.		✓		✓	✓	✓	✓	✓
R-squared	0.902	0.916	0.910	0.923	0.916	0.923	0.916	0.923
Observations	273,883	273,883	322,740	322,740	273,883	322,740	273,883	322,740

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Subsample analysis

Panel A~w/o 1880	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
	Women			Men		
1(Minimum wage)	-0.040***			0.027***		
	(0.011)			(0.005)		
Minimum wage, $		-0.002*			0.002***	
(mean min wage $10.2)		(0.001)			(0.000)	
log (Minimum wage)			-0.011***			0.006***
inverse hyperbolic sin			(0.004)			(0.000)
R-squared	0.737	0.737	0.737	0.649	0.649	0.649
Observations	259,164	259,164	259,164	731,331	731,331	731,331
Panel B~w/o 1930	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
	Women			Men		
1(Minimum wage)	-0.046***			0.038***		
	(0.001)			(0.009)		
Minimum wage, $		-0.003***			0.003***	
(mean min wage $10.2)		(0.001)			(0.000)	
log (Minimum wage)			-0.012***			0.011***
inverse hyperbolic sin			(0.000)			(0.000)
R-squared	0.756	0.756	0.756	0.649	0.649	0.649
Observations	168,736	168,736	168,736	531,778	531,778	531,778
Panel C~w/o 1880 and 1930	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
	Women			Men		
1(Minimum wage)	-0.043***			0.046***		
	(0.001)			(0.004)		
Minimum wage, $		-0.003**			0.004***	
(mean min wage $10.2)		(0.001)			(0.000)	
log (Minimum wage)			-0.012***			0.014***
inverse hyperbolic sin			(0.001)			(0.000)
R-squared	0.753	0.753	0.753	0.642	0.642	0.642
Observations	155,513	155,513	155,513	461,189	461,189	461,189

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Occupational score quartile

	I	II	III
	Dependent variable: Log employment share		
Minimum wage, $10	-0.237*		
	(0.1318)		
Minimum wage, $10	0.080		
x occupational score quartile	(0.0487)		
1(Minimum wage)		-0.223*	
		(0.1239)	
1(Minimum wage)		0.069	
x occupational score quartile		(0.0440)	
log (Minimum wage)			-0.088**
			(0.0409)
log (Minimum wage)			0.029*
x occupational score quartile			(0.0147)
R-squared	0.804	0.804	0.804
Observations	258,471	258,471	258,471

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Women in affected counties-industries do not deferentially migrate out

	I	II	III	IV
	Dependent variable:			
	1(Same state)	1(Same county)	1(Same state)	1(Same county)
Sample:	All	All	CBCP	CBCP
Panel A	0.006	0.003	0.000	-0.002
Minimum wage, $10	(0.010)	(0.012)	(0.024)	(0.027)
(mean min wage $10.2)				
R-squared	0.146	0.141	0.177	0.163
Observations	55,190	55,190	12,835	12,835
Panel B				
1(Minimum wage)	0.008	0.006	0.001	-0.004
	(0.010)	(0.012)	(0.024)	(0.028)
R-squared	0.146	0.141	0.177	0.163
Observations	55,190	55,190	12,835	12,835
Panel C				
log (Minimum wage)	0.002	0.002	-0.0001	-0.001
inverse hyperbolic sin	(0.003)	(0.004)	(0.008)	(0.009)
R-squared	0.146	0.141	0.177	0.163
Observations	55,190	55,190	12,835	12,835
FEs: County in 1910	✓	✓	✓	✓
FEs: Industry in 1910	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓

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County-Level Results

	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
1(Minimum wage)	-0.019	0.132*	-0.376**			
	(0.038)	(0.066)	(0.153)			
1(Minimum wage) x Share women in treated industries in 1910		-0.266***				
		(0.077)				
1(Minimum wage) x HHI in 1910			0.606**			
			(0.225)			
log (Minimum wage)				-0.033**	0.059*	-0.291***
				(0.014)	(0.034)	(0.088)
log (Minimum wage) x Share women in treated industries in 1910					-0.108***	
					(0.032)	
log (Minimum wage) x HHI in 1910						0.437***
						(0.142)
Mean of the interacted variable	-	0.71	0.59	-	0.71	0.59
R-squared	0.797	0.798	0.800	0.797	0.798	0.800
Observations	3,020	3,020	3,020	3,020	3,020	3,020

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Individual-Level Results: Linked Women 1910–1920 ($10)

	I	II	III
	Dependent variable:		
	1(Same industry)	1(LFP)	1(Same industry)
Sample:	All	All	In the LF
Panel A:	-0.041**	-0.028	-0.064**
Minimum wage, $10	(0.019)	(0.018)	(0.026)
(mean min. wage $10.2)			
R-squared	0.178	0.285	0.318
Observations	55,190	55,190	22,064
Panel B:			
Minimum wage, $10 x Married	-0.025*	-0.038*	-0.057
	(0.015)	(0.021)	(0.049)
Minimum wage, $10 x Never married	-0.038**	-0.004	-0.065**
	(0.019)	(0.014)	(0.026)
R-squared	0.215	0.412	0.319
Observations	55,190	55,190	22,064
FEs: County in 1910	✓	✓	✓
FEs: Industry in 1910	✓	✓	✓
Individual controls	✓	✓	✓

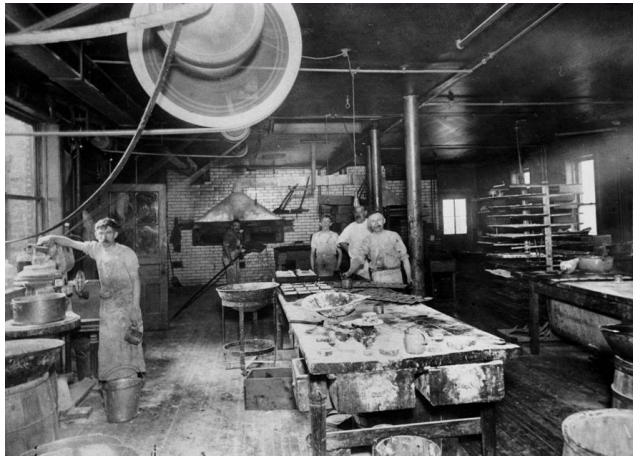
◂ Back to Talk

Individual-Level Results: Linked Women 1910–1920 (Logs)

	I	II	III
	Dependent variable:		
	1(Same industry)	1(LFP)	1(Same industry)
Sample:	All	All	In the LF
Panel A:			
log (Minimum wage)	-0.015**	-0.011*	-0.020**
inverse hyperbolic sin	(0.007)	(0.006)	(0.009)
R-squared	0.178	0.285	0.318
Observations	55,190	55,190	22,064
Panel B:			
log (Minimum wage) x Married	-0.010*	-0.015**	-0.017
	(0.005)	(0.007)	(0.018)
log (Minimum wage) x Never married	-0.013**	-0.002	-0.021**
	(0.007)	(0.005)	(0.009)
R-squared	0.215	0.412	0.318
Observations	55,190	55,190	22,064
FEs: County in 1910	✓	✓	✓
FEs: Industry in 1910	✓	✓	✓
Individual controls	✓	✓	✓

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Lochner v. New York



Lochner's Home Bakery in Utica, NY – 1905

Lochner v. New York



- In 1895 the State of NY passed New York Bakeshop Act
- "No employee shall be required, permitted or suffered to work in a biscuit, bread or cake bakery or confectionery establishment more than sixty hours in one week"
- Joseph Lochner was fined $50 (or 50 days in a county jail) for violating the Act
- After two failed appeals, Lochner took the case to the SCOTUS
- In 1905 the U.S. Supreme Court ruled 5-4 that the Act posed unconstitutional limits to freedom of contract

The Lochner Era

Decisions in state cases involving general protective labor legislation, 1873–1937.

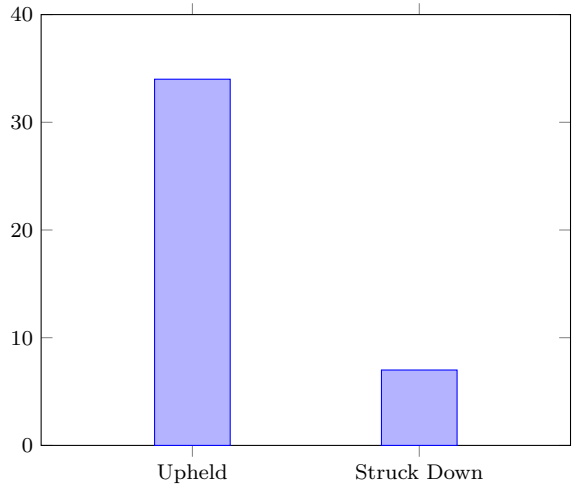


Source: Novkov (2001)

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The Lochner Era

Decisions in state cases involving protective labor legislation **limited to women**, 1873–1937.



Source: Novkov (2001)

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Minimum-Wage Legislation

#	State	Year first law is imposed	Year abolished	# of years active before FLSA	Notes
1	Arizona	1917	1925	8	Overturned by Supreme Court in Murphy v. Sardell.
2	Arkansas	1915	1927	12	Overturned by Supreme Court in Donham v. West Nelson Manuf. Go.
3	California	1913	1925	12	Withdrawn by state in Gainer v. A.B.C. Dorhram.
4	District of Columbia	1918	1923	5	Overturned by Supreme Court on a 5-3 vote in Adkins v. Children's Hospital.
5	Kansas	1915	1925	10	Overturned by Kansas Supreme Court in Topeka Laundry Co. v. Court of Industrial Relations.
6	Massachusetts	1912	-	26	
7	Minnesota	1913	-	25	
8	North Dakota	1919	-	19	
9	Oregon	1913	-	25	
10	Utah	1913	1929	16	Repealed.
11	Washington	1913	-	25	
12	Wisconsin	1913	1924	11	Overturned by federal district court following Adkins vs Children's Hospital

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Contemporary Observers: Economists

John Bates Clark (1913):

We can be sure, without further testing, that raising the prices of goods will, in the absence of counteracting influences, reduce sales; and that raising the rates of wages will, of itself and in the absence of any new demand for labor, lessen the number of workers employed.

Note that Clark's position in terms of policy was elaborate:

1. He was in favor of mandatory arbitration of labor disputes
2. He supported minimum wage laws with public 'emergency employment' for displaced workers

Frank William Taussig (1916):

Higher wages for the unskilled women are likely to lead to more or less replacement by men, skilled or unskilled.

Leo Wolman (1924):

No valid distinction, on economic grounds, can be drawn between wages and other conditions of employment, which have been subject of legal regulation.

Contemporary Observers: Employers

Merchants and Manufacturers Massachusetts (1916):

[Exhibit 1] The owner [...] of one of the largest stores in Massachusetts, situated in Boston, personally stated to the writer a few weeks prior to the going into effect of the Minimum Wage Decree in his store that on one floor alone he should discharge fifty-five girls, solely because of the law.

[Exhibit 5: A letter from another large Boston department store, 1916] "We have severed connection with about fifty employees since the Minimum Wage went into effect. You are correct in assuming that the reason for our severing connection with the fifty employees mentioned was the Minimum Wage law itself."

Border-County Balance Table

	I		II		III		IV	
	All-County Sample		Contiguous Border County-Pair Sample		Differences (Between Full and CBCP Sample)		Differences (Between Counties in Pair)	
	Mean	s.d.	Mean	s.d.	Mean	P-value	Mean	P-value
County Controls (1920):								
Population	118,437	(300,947)	139,626	(393,022)	21,189	[0.613]	1,792	[0.679]
# prime age adults	70,930	(187,088)	84,282	(243,564)	13,352	[0.606]	598	[0.822]
Ratio of employed women to employed men	1.052	(7.631)	1.088	(8.138)	0.036	[0.375]	-0.004	[0.463]
Share Black	0.018	(0.009)	0.019	(0.010)	0.001	[0.160]	-0.001	[0.339]
Share literate	0.733	(0.076)	0.744	(0.066)	0.011	[0.175]	-0.001	[0.741]
Share rural	0.604	(0.317)	0.589	(0.328)	-0.015	[0.645]	0.009	[0.389]
Share women	0.006	(0.003)	0.006	(0.003)	0.000	[0.304]	-0.000	[0.232]
Labor-force participation	27.4	(447.5)	29.0	(554.8)	1.55	[0.688]	0.243	[0.170]
# of counties	3,065		701					
# of county(-pair)-ind.-occ. observations	1,470,617		329,176					

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Long-Term Effects

- Did gender-specific minimum-wage laws, existing for up to 26 years before the introduction of the FLSA in 1938, discourage women from participating in the labor force?

$$LFP_{c(s),1940} = \alpha + \beta \cdot MinWageLegacy_s + LFP_{c(s),1910} + \Delta LFP_{c(s),1900-10} + \epsilon_{cs}, \tag{12}$$

- Cannot control for state fixed effects: cross-section
- Control for population, pre-treatment labor-force participation $LFP_{c(s),1910}$ and pre-treatment trend in the dependent variable $\Delta LFP_{c(s),1900-10}$

Long-Term Effects

Panel A	I	II	III	IV	V	VI
	Dependent variable: Labor-force participation in 1940					
	Women	Men	Women	Men	Women	Men
State had min. wage laws for	-0.021**	-0.001	-0.020*	-0.001	-0.020*	-0.001
at least 10 years	(0.010)	(0.003)	(0.010)	(0.003)	(0.010)	(0.003)
Labor-force participation (1910)			X	X	X	X
Δ Labor-force participation (1900-1910)					X	X
R-squared	0.092	0.001	0.100	0.002	0.103	0.003
Observations	3,099	3,099	2,946	2,946	2,818	2,818

Panel B	I	II	III	IV	V	VI
	Dependent variable: Labor-force participation in 1940					
	Women	Men	Women	Men	Women	Men
Log # years under min. wage. laws	-0.006*	-0.000	-0.005*	-0.000	-0.006*	-0.000
	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)
Labor-force participation (1910)			X	X	X	X
Δ Labor-force participation (1900-1910)					X	X
R-squared	0.090	0.001	0.098	0.002	0.101	0.003
Observations	3,099	3,099	2,946	2,946	2,818	2,818

Long-Term Effects

- Women in states with minimum wages are less likely to participate in the labor force
- No correlation for women that migrated to the twelve minimum-wage states from states that did not have minimum-wage legislation

	I	II	III	IV
	Dependent variable: 1(Woman in labor force)			
Sample	All		Migrants from non-min.-wage states	
State had min. wage laws for at least 10 years	-0.025***		-0.010	
	(0.007)		(0.011)	
Log # years under min. wage. laws		-0.001**		-0.000
		(0.000)		(0.001)
R-squared	0.25	0.25	0.24	0.24
Observations	36,706,502	36,706,502	29,924,279	29,924,279

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Gender-Specific MW Laws Increased Male Employment (Locality-Industry)

	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
Sample	Adult men		Minor men		Minor women	
Panel A:						
Minimum wage, $10	0.015***	0.011***	0.034**	0.029***	-0.061**	-0.054**
(mean min. wage $10.2)	(0.001)	(0.0011)	(0.015)	(0.0039)	(0.025)	(0.0233)
R-squared	0.696	0.751	0.833	0.878	0.824	0.880
Observations	802,535	802,535	129,359	129,359	63,785	63,785
Panel B:						
1(Minimum wage)	0.018***	0.012***	0.035***	0.025***	-0.060*	-0.038
	(0.001)	(0.0010)	(0.001)	(0.0012)	(0.032)	(0.0302)
R-squared	0.696	0.751	0.833	0.878	0.824	0.880
Observations	802,535	802,535	129,359	129,359	63,785	63,785
Panel C:						
log (Minimum wage)	0.005***	0.003***	0.013***	0.010***	-0.021**	-0.015
inverse hyperbolic sin	(0.000)	(0.0004)	(0.003)	(0.0007)	(0.009)	(0.0092)
R-squared	0.696	0.751	0.833	0.878	0.824	0.880
Observations	802,535	802,535	129,359	129,359	63,785	63,785
County-pair-year FEs	✓	✓	✓	✓	✓	✓
Ind.-county-pair & occup.-county-pair FEs.		✓		✓		✓

◂ Back to Talk

Gender-Specific MW Laws Increased Male Employment (Locality)

	I	II	III	IV	V	VI	VII	VIII	IX
	Dependent variable: Log employment share (men)								
Average minimum wage, $	0.001	-0.006	0.009***						
(mean av. min. wage $6)	(0.004)	(0.006)	(0.003)						
Average minimum wage, $		0.019**							
x Share women in treated industries in 1910		(0.007)							
Average minimum wage, $			-0.070***						
x HHI in 1910			(0.021)						
1(Minimum wage)				-0.010	-0.049**	0.042*			
				(0.027)	(0.023)	(0.023)			
1(Minimum wage)					0.159***				
x Share women in treated industries in 1910					(0.056)				
1(Minimum wage)						-0.323***			
x HHI in 1910						(0.073)			
log (Minimum wage)							0.001	-0.010	0.020***
							(0.009)	(0.009)	(0.006)
log (Minimum wage)								0.033**	
x Share women in treated industries in 1910								(0.015)	
log (Minimum wage)									-0.147***
x HHI in 1910									(0.036)
Mean of the interacted variable	-	0.71	0.28	-	0.71	0.28	-	0.71	0.28
R-squared	0.822	0.822	0.824	0.822	0.822	0.824	0.822	0.822	0.824
Observations	3,042	3,042	3,042	3,042	3,042	3,042	3,042	3,042	3,042

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Gender Elasticity of Substitution

Nested CES framework:

$$Y_i = AK_i^{\alpha_i} L_i^{1-\alpha_i}, \tag{13}$$

$$L_i = \left[(\theta_{w_i} W_i)^{\frac{\sigma_i - 1}{\sigma_i}} + (\theta_{m_i} M_i)^{\frac{\sigma_i - 1}{\sigma_i}} \right]^{\frac{\sigma_i}{\sigma_i - 1}}. \tag{14}$$

From FOCs:

$$\log\left(\frac{W_i}{M_i}\right) = (1-\sigma_i)\log\left(\frac{\theta_{m_i}}{\theta_{w_i}}\right) - \sigma_i \log\left(\frac{\omega_{w_i}}{\omega_{m_i}}\right). \tag{15}$$

We estimate:

$$\log\left(\frac{\#EmployedWomen_{ic(s)t}}{\#EmployedMen_{ic(s)t}}\right) = \beta \cdot \mathbb{1}\text{Minimum wage}_{ist} + \mu_{st} + \Psi_{p(c)t} + \Phi_{is} + \Phi_{it} + \epsilon_{ip(c)t}. \tag{16}$$

Gender Elasticity of Substitution

Nested CES framework:

$$Y_i = AK_i^{\alpha_i} L_i^{1-\alpha_i}, \tag{13}$$

$$L_i = \left[(\theta_{w_i} W_i)^{\frac{\sigma_i - 1}{\sigma_i}} + (\theta_{m_i} M_i)^{\frac{\sigma_i - 1}{\sigma_i}} \right]^{\frac{\sigma_i}{\sigma_i - 1}}. \tag{14}$$

From FOCs:

$$\log\left(\frac{W_i}{M_i}\right) = (1 - \sigma_i) \log\left(\frac{\theta_{m_i}}{\theta_{w_i}}\right) - \sigma_i \log\left(\frac{\omega_{w_i}}{\omega_{m_i}}\right). \tag{15}$$

We estimate:

$$\log\left(\frac{\#EmployedWomen_{ic(s)t}}{\#EmployedMen_{ic(s)t}}\right) = \beta \cdot \mathbb{1}\text{Minimum wage}_{ist} + \mu_{st} + \Psi_{p(c)t} + \Phi_{is} + \Phi_{it} + \epsilon_{ip(c)t}. \tag{16}$$

Gender Elasticity of Substitution

Nested CES framework:

$$Y_i = AK_i^{\alpha_i} L_i^{1-\alpha_i}, \tag{13}$$

$$L_i = \left[(\theta_{w_i} W_i)^{\frac{\sigma_i - 1}{\sigma_i}} + (\theta_{m_i} M_i)^{\frac{\sigma_i - 1}{\sigma_i}} \right]^{\frac{\sigma_i}{\sigma_i - 1}}. \tag{14}$$

From FOCs:

$$\log\left(\frac{W_i}{M_i}\right) = (1-\sigma_i)\log\left(\frac{\theta_{m_i}}{\theta_{w_i}}\right) - \sigma_i \log\left(\frac{\omega_{w_i}}{\omega_{m_i}}\right). \tag{15}$$

We estimate:

$$\log\left(\frac{\#EmployedWomen_{ic(s)t}}{\#EmployedMen_{ic(s)t}}\right) = \beta \cdot \mathbb{1}\text{Minimum wage}_{ist} + \mu_{st} + \Psi_{p(c)t} + \Phi_{is} + \Phi_{it} + \epsilon_{ip(c)t}. \tag{16}$$

Gender Elasticity of Substitution

Minimum-wage laws decrease the ratio of female-to-male labor demand by 4.7%

	I	II	III
	Dependent variable: Log (emp. women/emp. men)		
National share of women in industry *i*, %	[0;100]	[25;75]	<25 & >75
1(Minimum wage)	-0.047***	-0.075**	-0.037**
	(0.017)	(0.031)	(0.014)
Δ		-0.038**	
s.e.		(0.018)	
R-squared	0.76	0.53	0.81
Observations	167,717	58,039	109,678

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Gender Elasticity of Substitution

From the longitudinal data in Oregon we know that wages for women increased on average by 6.8 percentage points . . .

I	II	III	IV	V
#	Wage growth (1913-1914)	Comments	Sex	Source	σ
1	4%	Boots and Shoes (cutting department)	Men	"Wages and hours of labor in the boot and shoe industry: 1907-1918," BLS bulletin, No.260, 1919, Table 1	1.68
2	5%	Boots and Shoes (lasting department)	Men		2.61
3	2.5%	Boots and Shoes (fitting and stitchingt)	Men		1.09
4	2.3%	Clothing (bushelers and tailors)	Men	"Wages and hours of labor in the men's clothing industry: 1911-1924," BLS bulletin, No.387, 1925, Table 1	1.05
5	2.7%	Clothing (cutters, cloth, hand and machine)	Men		1.16
6	6.1%	Clothing (hand sewers, coat)	Men		6.94
7	4%	Bakers (Portland, OR, all)	All	"Union scale of wages and hours of labor, May 1,1915," BLS, No.194, 1916 and "Union scale of wages and hours of labor, May 15,1913," BLS, No.143, 1914	1.68
8	6%	Printing (Portland, OR, all)	All		5.87

$$\underbrace{\hat{\beta}}_{\text{Reg. estimate}} = \sigma \cdot \underbrace{\left[-\Delta \log\left(\frac{\omega_w}{\omega_m}\right)\right]}_{\text{From BLS}} \implies \sigma > 1$$

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Substitution is Driven by the Replacement of Women in Low-Rank Occupations with Men in Middle- or High-Rank Occupations

	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
Sample	Women			Men		
Panel A:						
Minimum wage, $10	-0.045*			-0.052		
x occupational score≤25	(0.0247)			(0.0473)		
Minimum wage, $10	-0.006			0.020***		
x occupational score>25	(0.0197)			(0.0019)		
1(Minimum wage)		-0.059*			-0.063	
x occupational score≤25		(0.0296)			(0.0561)	
1(Minimum wage)		-0.025			0.015***	
x occupational score>25		(0.0159)			(0.0016)	
log (Minimum wage)			-0.019*			-0.023
x occupational score≤25			(0.0096)			(0.0182)
log (Minimum wage)			-0.005			0.005***
x occupational score>25			(0.0056)			(0.0007)
R-squared	0.803	0.803	0.803	0.722	0.722	0.722
Observations	232,681	232,681	232,681	736,331	736,331	736,331

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Substitution is Driven by the Replacement of Women in Low-Rank Occupations with Men in Middle- or High-Rank Occupations

	I	II	III	IV	V	VI
	Dependent variable: Log employment share					
Sample	Women			Men		
Panel B:						
Minimum wage, $10	-0.237*			-0.211		
	(0.1318)			(0.1381)		
Minimum wage, $10	0.080			0.068		
x occupational score quartile	(0.0487)			(0.0411)		
1(Minimum wage)		-0.223*			-0.241*	
		(0.1239)			(0.1364)	
1(Minimum wage)		0.069			0.075*	
x occupational score quartile		(0.0440)			(0.0409)	
log (Minimum wage)			-0.088**			-0.090*
			(0.0409)			(0.0445)
log (Minimum wage)			0.029*			0.028**
x occupational score quartile			(0.0147)			(0.0133)
R-squared	0.804	0.804	0.804	0.723	0.723	0.723
Observations	232,681	232,681	232,681	736,331	736,331	736,331

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