14.662 Recitation 6

Autor, Manning, and Smith (2015)

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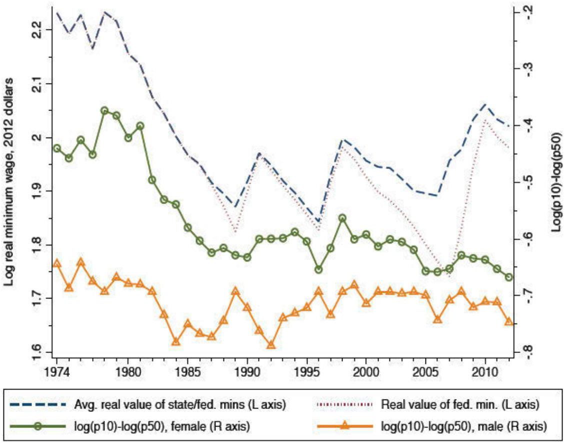
Wage Inequality and the Minimum Wage



- 50 log point fall in real federal minimum wage, 1974-2007
- Contemporaneous rise in 50/10 earnings gap (more for females)

Competing Accounts of the Minimum Wage

- We've encountered the minimum wage as an institution before: recall the DiNardo, Fortin, and Lemiux (1996) density decomposition
  - 40-65% of the rise in 50/10 earnings gap due to falling real min. wage
  - The rest: unions, supply and demand factors
- Lee (1999) reaches quite different conclusion: *more than* the entire rise in 50/10 gap between 1979 and 1988 due to the falling minimum
  - If the minimum hadn't changed, inequality would have fallen, not risen
- Lee's estimating equation:

$$w_{st}^{p} - w_{st}^{50} = \beta_1 (w_{st}^{m} - w_{st}^{50}) + \beta_2 (w_{st}^{m} - w_{st}^{50})^2 + \gamma_t^p + \eta_{st}^{p} \qquad (1)$$

  where w_{st}^{p} is log real wage at percentile p in state s and time t, and w_{st}^{m} is the log minimum wage
  - "Bindingness" of the minimum wage: quadratic in $w_{st}^{m} - w_{st}^{50}$
- Issues with this specification?

Issues with Lee (1999)

- Likely to be permanent differences across states and different trends in wage distribution:

$$\eta^p_{st} = \sigma^p_{s0} + \sigma^p_{s1} \times time_t + \varepsilon^{\sigma,p}_{st}$$
$$w^{50}_{st} = \mu_{s0} + \mu_{s1} \times time_t + \varepsilon^{\mu}_{st}$$

  - OLS estimation of (1) biased if $(\sigma^p_{s0}, \sigma^p_{s1})$ correlated with (μ_{s0}, μ_{s1})
- Transitory fluctuations in distribution, $\varepsilon^{\sigma,p}_{st}$ and ε^{μ}_{st}, likely correlated
  - Even including state FEs and state-specific trends, and even if w^m_{st} randomly set, may have $(w^m_{st} - w^{50}_{st})$ correlated with $\varepsilon^{\sigma,p}_{st}$
- Autor, Manning, and Smith (2015) solution: instrument $(w^m_{st} - w^{50}_{st})$ and $(w^m_{st} - w^{50}_{st})^2$ with w^m_{st}, w^{m2}_{st}, and $w^m_{st} \times \bar{w}^{50}_s$, where $\bar{w}^{50}_s$ is average log median real wage for the state
  - Similar in spirit to Card, Katz, and Krueger (1993)

AMS (2015) vs. Lee (1999)

- AMS (2015) second stage:

$$w_{st}^{p} - w_{st}^{50} = \beta_1 (w_{st}^{m} - w_{st}^{50}) + \beta_2 (w_{st}^{m} - w_{st}^{50})^2 + \gamma_t^{p} + \sigma_{s0}^{p} + \sigma_{s1}^{p} \times time_t + \varepsilon_{st}^{\sigma,p} \quad (2)$$

- Three key differences relative to Lee's analysis:
  - Include state FE's and state-specific trends
  - Instrument effective minimum wage
  - Incorporate additional 21 years of data (1979-2012)
- Also estimate (2) in first differences as a robustness check
- Fixing Lee greatly reduces estimated impact at lower percentiles (eliminates for males), cleans up spurious findings at higher percentiles
  - Get strong first stage for IV from 1991 state legislation; extending to 2012 only improves precision

AMS (2015) Estimates

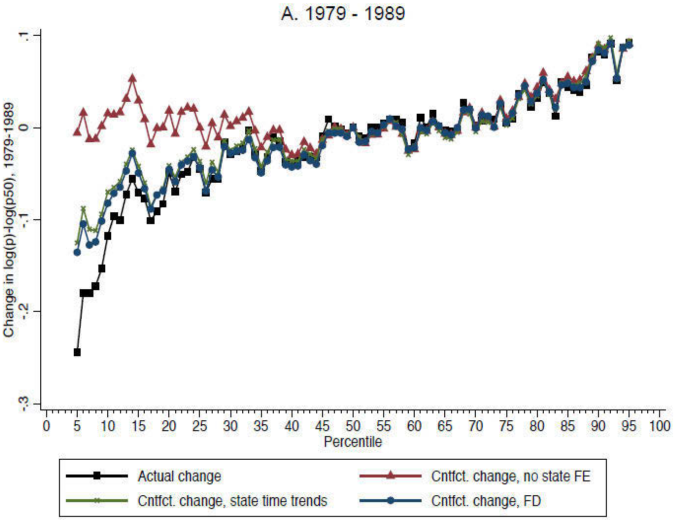
A. Females

	OLS (1)	OLS (2)	2SLS (3)	2SLS (4)	Lee Spec (5)
5	0.44	0.54	0.32	0.39	0.63
	(0.03)	(0.05)	(0.04)	(0.05)	(0.04)
10	0.27	0.46	0.22	0.17	0.52
	(0.03)	(0.03)	(0.05)	(0.03)	(0.03)
20	0.12	0.29	0.10	0.07	0.29
	(0.03)	(0.03)	(0.05)	(0.03)	(0.03)
30	0.07	0.23	0.02	0.04	0.15
	(0.01)	(0.02)	(0.02)	(0.03)	(0.02)
40	0.04	0.17	-0.01	0.03	0.07
	(0.02)	(0.02)	(0.03)	(0.03)	(0.01)
75	0.09	0.24	-0.03	0.01	-0.05
	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)
90	0.15	0.34	-0.02	0.04	-0.04
	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Var. of log wage	0.07	0.04	-0.02	-0.09	-0.20
	(0.04)	(0.05)	(0.08)	(0.07)	(0.03)
Levels / First-Diff	Levels	FD	Levels	FD	Levels
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	No
State trends	Yes	No	Yes	No	No

B. Males

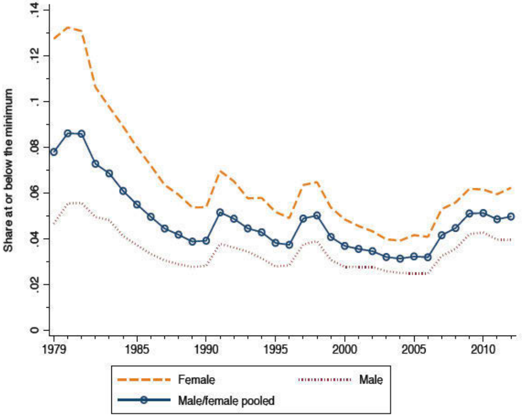
	OLS (1)	OLS (2)	2SLS (3)	2SLS (4)	Lee Spec (5)
5	0.25	0.43	0.17	0.16	0.55
	(0.02)	(0.03)	(0.02)	(0.04)	(0.04)
10	0.12	0.34	0.04	0.05	0.38
	(0.04)	(0.02)	(0.04)	(0.03)	(0.04)
20	0.06	0.24	0.01	0.02	0.21
	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
30	0.05	0.19	0.01	0.00	0.09
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
40	0.06	0.15	0.04	0.02	0.04
	(0.01)	(0.02)	(0.02)	(0.04)	(0.01)
75	0.14	0.24	0.00	0.02	0.09
	(0.02)	(0.02)	(0.02)	(0.02)	(0.04)
90	0.16	0.30	0.02	0.03	0.14
	(0.03)	(0.03)	(0.03)	(0.04)	(0.07)
Var. of log wage	0.03	0.00	-0.07	-0.06	-0.13
	(0.03)	(0.05)	(0.05)	(0.07)	(0.05)
Levels / First-Diff	Levels	FD	Levels	FD	Levels
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	No
State trends	Yes	No	Yes	No	No

Counterfactual Wage Distribution



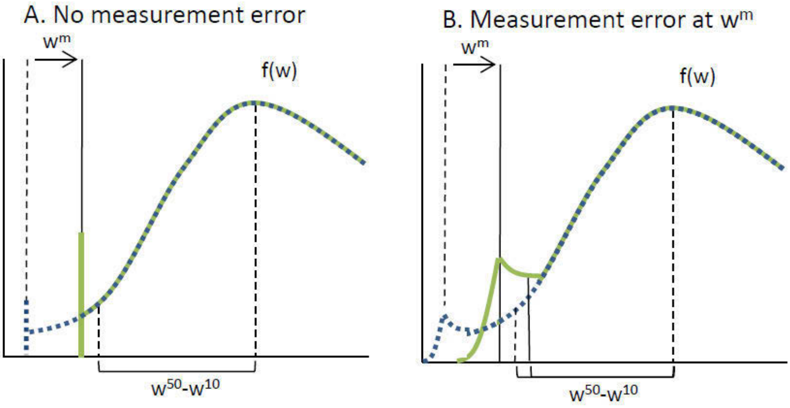
- Declining min. wage explains 30-40% of rise in lower-tail inequality

Minimum Wage Spillovers?



- Why should the minimum wage affect the 50/10 gap at all?
  - Earnings spillovers (e.g. positional income concerns) vs. reporting error

Reporting Error at w^m



- How much reporting error is needed to generate observed effects at higher percentiles (under the null of no spillovers)?

A Model of Reporting Error

- Percentile of latent wage distribution p^*, latent wage $w^*(p^*)$
- True wage at percentile p^*: $w(p^*) = \max(w^m, w^*(p^*))$
- For a worker at p^* we actually observe $w_i = w(p^*) + \varepsilon_i$

Prop: If ε_i is independent of the true wage, the elasticity of wages at an observed percentile p with respect to the minimum equals the fraction of people at p whose true wage equals the minimum

Intuition: If w^m rises by 10 percent, and 10 percent of workers at p are actually at the min, observed wages will rise by 1 percent

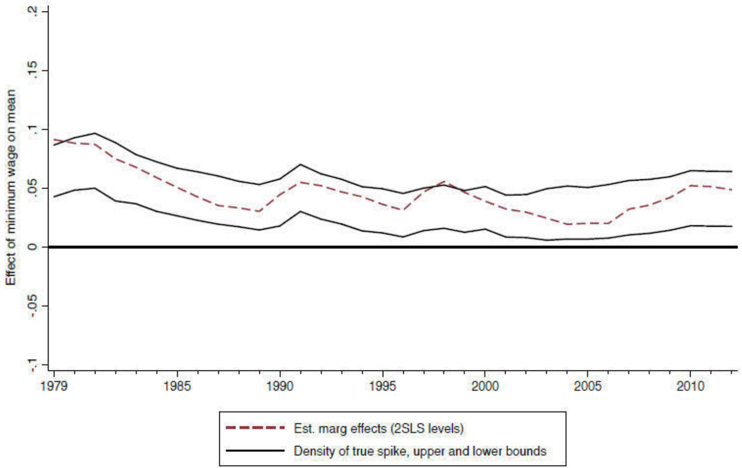
Corollary: The elasticity of mean log wages with respect to the minimum equals the fraction of individuals actually paid the minimum

Intuition: If 10 percent of workers are at the min, a 10 percent rise in the min will increase the *true and observed* mean wage by 1 percent

Testing for Spillovers

- Under the null, effect of log effective minimum on average log real wages equals the true fraction of individuals paid the minimum
  - AMS estimate around 0.025-0.075 for most years, 1979-2012
- To test for the null of spillovers, need a second estimate (which should be the same under the null)
- Starting point: all observations below the minimum must reflect reporting error
  - Use MLE to estimate distribution of error (assumed symmetric)
  - Observed spike at minimum means error has mass γ at $\varepsilon_i = 0$
  - Assume normality conditional on $\varepsilon_i \neq 0$, jointly estimate $(\sigma_\varepsilon^2, \gamma)$
  - Dividing observed spike by γ estimates true spike
- Small twist: can only run this second estimate on a sample for which the effective minimum is reported (omits tipped workers)
  - Bound estimate by letting true spike for tipped workers range $0 \to 1$

Testing for Spillovers: Results



- Estimates consistent with the null of no spillovers

AMS (2015) Takeaways

- A careful re-analysis of earlier findings with today's higher standards for empirical work
  - Clear analysis of identification concerns
  - Defend instrument choice, ensure strong first stage
  - Run lots of robustness checks, show what's driving results
  - Push out frontier with a bit of structure
- Returns to upgrading oten high: AMS just accepted to AEJ: Applied
  - Similar low-hanging upgrading fruit likely out there
  - No doubt helped by strong policy relevancy

Problem Set #2

- Questions?