Minimum Wage

Outline

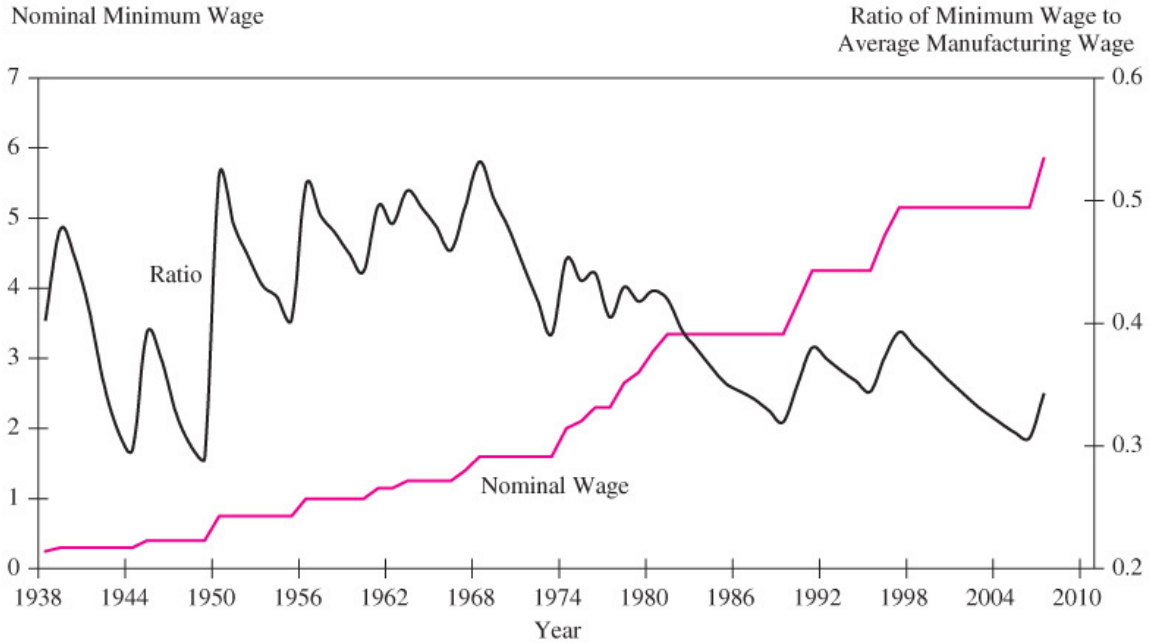
- Institutional details.
- The effect of the minimum wage on the labor market.
- Traditional empirical approaches.
- Card and Krueger (AER 1994): results and critique.
- Payroll taxation

The Minimum Wage

- Traditional policy tool aimed at supporting low-income families and reducing poverty.
- In the US, introduced in 1938, initially covered only limited segments of the labor market.
- Minimum wage has been adjusted at irregular intervals, coverage almost universal.
- Today: federal minimum wage is \$7.25 per hour (with exceptions for teenagers, full-time students, etc...). But several states have their own minimum wage legislation.

FIGURE 3-18 **Minimum Wages in the United States, 1938–2007**

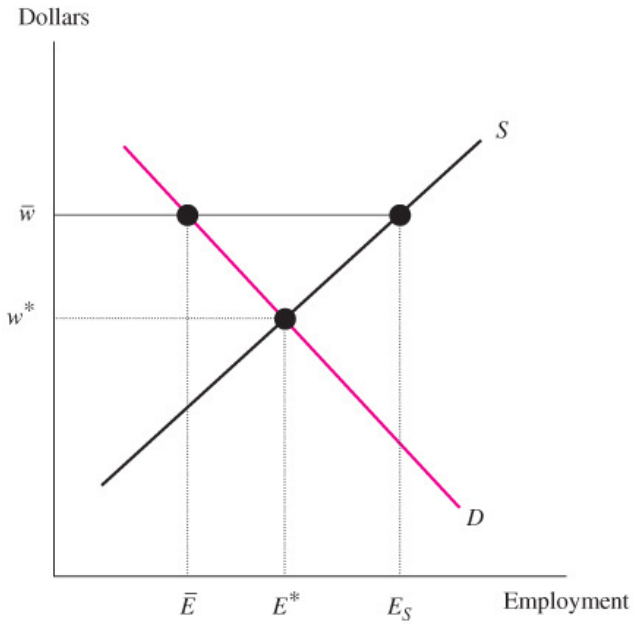
Source: U.S. Bureau of the Census, *Statistical Abstract of the United States,* Washington, DC: Government Printing Office, various issues; U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1970,* Washington, DC: Government Printing Office, 1975; and U.S. Bureau of Labor Statistics, *Employment and Earnings,* Washington, DC: Government Printing Office, January 2006.



The impact of the minimum wage on the labor market

- Textbook model:

FIGURE 3-19 **The Impact of the Minimum Wage on Employment**
A minimum wage set at $\overline{w}$ forces employees to cut employment (from E^* to $\overline{E}$). The higher wage also encourages ($E_S - E^*$) additional workers to enter the market. The minimum wage, therefore, creates unemployment.



- Basic model predicts that the minimum wage (or an increase in the minimum wage) will lower employment of affected workers.

- Caveats:
  - low enforcement.
  - if some workers are not covered, the effect of the minimum wage will be attenuated, because some workers will migrate to the uncovered sector.
  - If employers have market power (monopsonistic labor markets), effect of the minimum wage can actually be positive.

Monopsony

- Competitive firm: can hire any amount of workers at the given wage rate w.
- Monopsony: only buyer of labor in the market, faces an upward sloping supply of labor, it must pay higher wages to attract more workers.

- Examples:
  - One-company town (coal mine in remote location)
  - Any firm whose workers have moving costs.
  - Efficiency wages to prevent shirking.

Non-discriminating monopsonist

- Firm's optimization problem (one factor of production):

$$\max \Pi = pf(L) - w(L) L$$

- $w'(L) > 0$: upward sloping supply function of firm's labor.
- First order conditions:

$$\begin{aligned} pf'(L) - w'(L) L - w(L) &= 0 \\ MRP_L &= w(L) + w'(L) L \end{aligned}$$

- Relative to competitive firm, monopsony sets L such that MRP_L is equal to wage plus a positive term (the marginal cost MC).

FIGURE 4-20 **The Hiring Decision of a Nondiscriminating Monopsonist**

A nondiscriminating monopsonist pays the same wage to all workers. The marginal cost of hiring exceeds the wage, and the marginal cost curve lies above the supply curve. Profit maximization occurs at point A; the monopsonist hires E_M workers and pays them a wage of w_M.

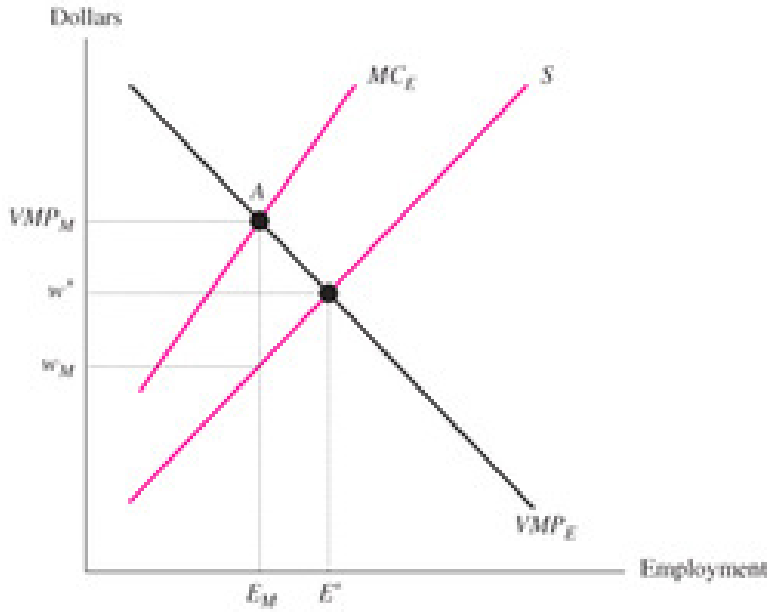
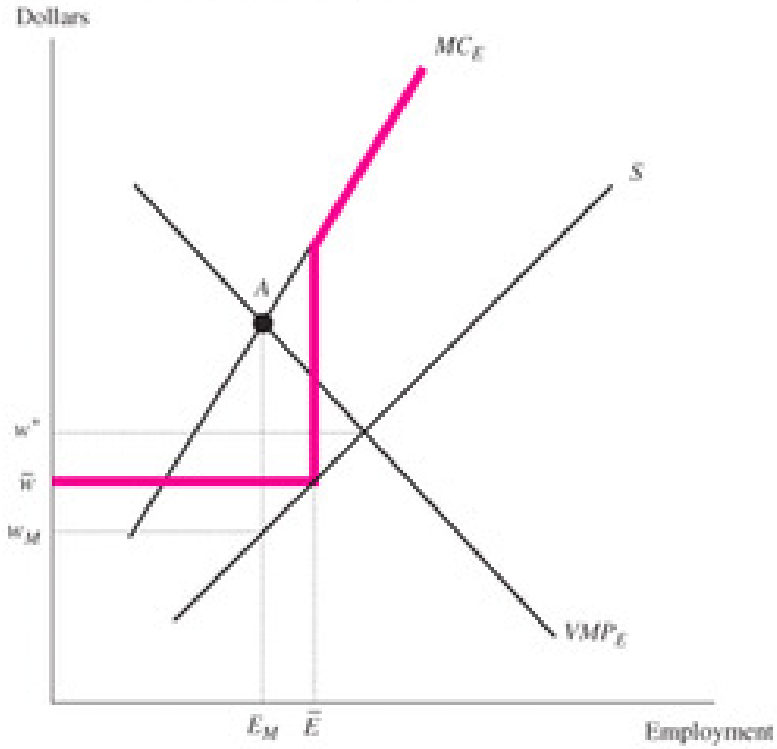


FIGURE 4-21 **The Impact of the Minimum Wage on a Nondiscriminating Monopsonist**

The minimum wage may increase both wages and employment when imposed on a monopsonist. A minimum wage set at $\overline{w}$ increases employment to $\overline{E}$.



Empirical questions

- Does the minimum wage affect employment?
- Does it alleviate poverty?
- Does it affect wage inequality?
- Do total earnings (hours$\times$wage) rise?
- Who is affected by the policy? Low-wage heads of household, or teenagers from middle-income families?

Empirical approaches

- Time-series approach. Regress employment rates on some measure of the minimum wage.
  - Which employment rate? Teenagers, high-school dropouts, others?
  - Which minimum wage? Real minimum wage? Ratio of nominal minimum to average wage in manufacturing?
  - How to control for other factors that may affect low-skill employment?

- "Consensus" estimate of the time-series approach (Brown et al., JEL 1982): 10% increase in minimum wage lowers employment by about 1-3 percent.

- Kennan (1995): time series estimates are unreliable.
  - It may be like looking for a needle in the haystack. Month-to-month variation in employment is too large to be able to detect statistically significant effects.
  - Estimates are sensitive to exact econometric specification, sample period, definition of variables.

- Panel data approach: use also variation in the minimum wage across states:

$$\ln E_{jt} = \beta_0 + \beta_1 \ln (MW)_{jt} + \beta_2 X_{jt} + c_j + u_{jt}$$

- Exploit variation in minimum wage both across states and over time. More observations.
- Can control for time-invariant state-level unobservables that may affect both employment and the minimum wage (c_j).

- Caveats:
  - This still doesn't guarantee that the variation in the minimum wage is exogenous: Example: what if state legislatures raise the minimum wage in good economic times, when fear of unemployment is low?
  - Same specification issues as in time-series analysis (definition of variables, choice of control variables, sample period, etc.).

Card and Krueger (AER, 1994)

- Most famous (and controversial) of the new studies of the minimum wage effect.
- Case study of the minimum wage hike in New Jersey, April 1992.
- Basic idea: use differences-in-differences, compare outcomes (employment in fast food industry) in NJ to those in eastern Pennsylvania, where there was no minimum wage hike.
- Similar approach had been used previously to study the effect of minimum wage hikes in Texas and California.
- Very surprising results...

- Differences in differences:

	Before (0)	After (1)	Difference
NJ (t)	$Y_{t,0}$	$Y_{t,1}$	$Y_{t,1} - Y_{t,0}$
PA (c)	$Y_{c,0}$	$Y_{c,1}$	$Y_{c1} - Y_{c,0}$
Diff	$Y_{t,0} - Y_{c,0}$	$Y_{t,1} - Y_{c,1}$	DD $= (Y_{t,1} - Y_{t,0}) - (Y_{c1} - Y_{c,0})$

- One could compare the before after difference in NJ, but may be contaminated by aggregate shocks that are correlated with minimum wage hike.
- Alternatively, compare NJ-PA *after* the minimum wage hike, but may be contaminated by level differences between NJ and PA.
- Diff in diff: change in PA controls for aggregate change in economic conditions.
  - The difference between the before-after change in NJ and in PA is the *causal effect* of the minimum wage hike.

- Experimental design apparently quite clean, there are no major differences between NJ and eastern PA.
- Key identifying assumption: there are no differential trends in labor market conditions between NJ and eastern PA.
- Relatively plausible in this setting:
  - relatively short time period examined (January 1992-December 1992)
  - similarities in the economic structure of NJ and eastern PA.

Card and Krueger

- In April 1992, New Jersey raised its minimum wage from \$4.25 to \$5.05.
- Minimum wage in PA stayed constant at \$4.25.
- What CK did: surveyed fast food restaurants in NJ and eastern PA, asked managers about number of full-time and part-time employees, in January 1992 and in December 1992.

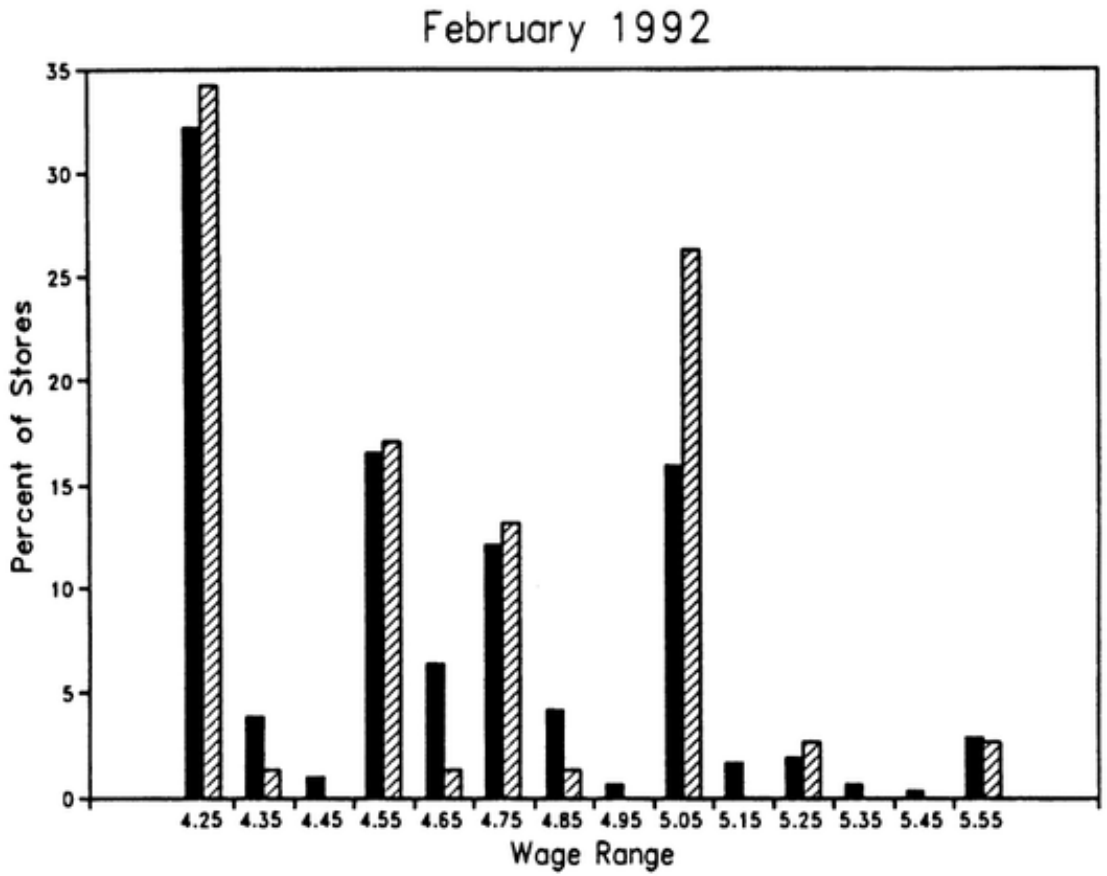
TABLE 1—SAMPLE DESIGN AND RESPONSE RATES

	All	Stores in: NJ	PA
Wave 1, February 15–March 4, 1992:			
Number of stores in sample frame:[a]	473	364	109
Number of refusals:	63	33	30
Number interviewed:	410	331	79
Response rate (percentage):	86.7	90.9	72.5
Wave 2, November 5–December 31, 1992:			
Number of stores in sample frame:	410	331	79
Number closed:	6	5	1
Number under rennovation:	2	2	0
Number temporarily closed:[b]	2	2	0
Number of refusals:	1	1	0
Number interviewed:[c]	399	321	78

[a]Stores with working phone numbers only; 29 stores in original sample frame had disconnected phone numbers.

[b]Includes one store closed because of highway construction and one store closed because of a fire.

[c]Includes 371 phone interviews and 28 personal interviews of stores that refused an initial request for a phone interview.


February 1992
Percent of Stores
35
30
25
20
15
10
5
0
4.25
4.35
4.45
4.55
4.65
4.75
4.85
4.95
5.05
5.15
5.25
5.35
5.45
5.55
Wage Range

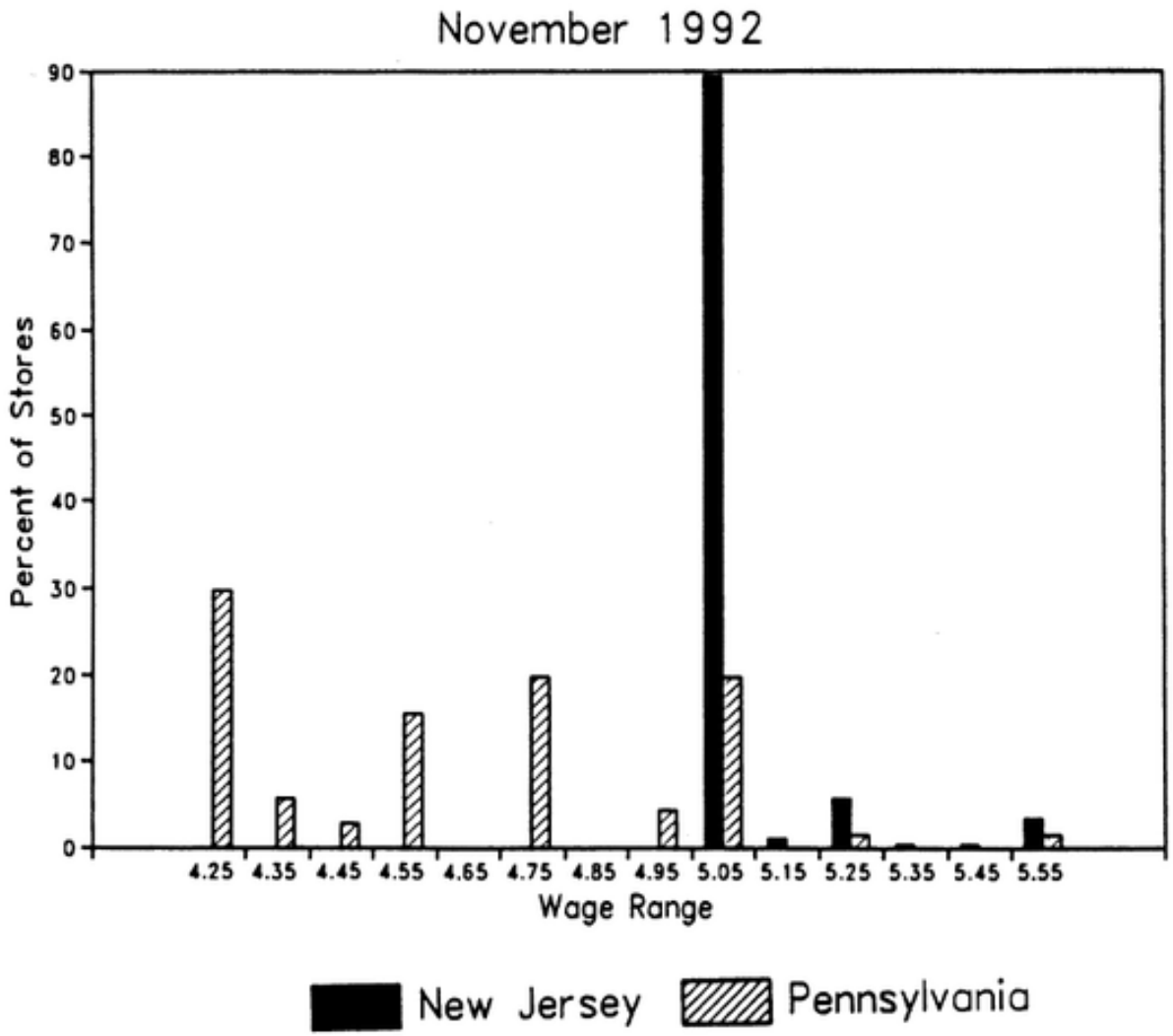

November 1992
Percent of Stores
90
80
70
60
50
40
30
20
10
0
4.25
4.35
4.45
4.55
4.65
4.75
4.85
4.95
5.05
5.15
5.25
5.35
5.45
5.55
Wage Range
New Jersey
Pennsylvania

TABLE 3—AVERAGE EMPLOYMENT PER STORE BEFORE AND AFTER THE RISE IN NEW JERSEY MINIMUM WAGE

Variable	Stores by state			Stores in New Jersey[a]			Differences within NJ[b]	
	PA (i)	NJ (ii)	Difference, NJ − PA (iii)	Wage = $4.25 (iv)	Wage = $4.26–$4.99 (v)	Wage ≥ $5.00 (vi)	Low–high (vii)	Midrange–high (viii)
1. FTE employment before, all available observations	23.33 (1.35)	20.44 (0.51)	−2.89 (1.44)	19.56 (0.77)	20.08 (0.84)	22.25 (1.14)	−2.69 (1.37)	−2.17 (1.41)
2. FTE employment after, all available observations	21.17 (0.94)	21.03 (0.52)	−0.14 (1.07)	20.88 (1.01)	20.96 (0.76)	20.21 (1.03)	0.67 (1.44)	0.75 (1.27)
3. Change in mean FTE employment	−2.16 (1.25)	0.59 (0.54)	2.76 (1.36)	1.32 (0.95)	0.87 (0.84)	−2.04 (1.14)	3.36 (1.48)	2.91 (1.41)
4. Change in mean FTE employment, balanced sample of stores[c]	−2.28 (1.25)	0.47 (0.48)	2.75 (1.34)	1.21 (0.82)	0.71 (0.69)	−2.16 (1.01)	3.36 (1.30)	2.87 (1.22)
5. Change in mean FTE employment, setting FTE at temporarily closed stores to 0[d]	−2.28 (1.25)	0.23 (0.49)	2.51 (1.35)	0.90 (0.87)	0.49 (0.69)	−2.39 (1.02)	3.29 (1.34)	2.88 (1.23)

Notes: Standard errors are shown in parentheses. The sample consists of all stores with available data on employment. FTE (full-time-equivalent) employment counts each part-time worker as half a full-time worker. Employment at six closed stores is set to zero. Employment at four temporarily closed stores is treated as missing.

[a]Stores in New Jersey were classified by whether starting wage in wave 1 equals $4.25 per hour ($N = 101$), is between $4.26 and $4.99 per hour ($N = 140$), or is $5.00 per hour or higher ($N = 73$).

[b]Difference in employment between low-wage ($4.25 per hour) and high-wage (≥ $5.00 per hour) stores; and difference in employment between midrange ($4.26–$4.99 per hour) and high-wage stores.

[c]Subset of stores with available employment data in wave 1 and wave 2.

[d]In this row only, wave-2 employment at four temporarily closed stores is set to 0. Employment changes are based on the subset of stores with available employment data in wave 1 and wave 2.

TABLE 4—REDUCED-FORM MODELS FOR CHANGE IN EMPLOYMENT

Independent variable	Model (i)	(ii)	(iii)	(iv)	(v)
1. New Jersey dummy	2.33 (1.19)	2.30 (1.20)	—	—	—
2. Initial wage gap[a]	—	—	15.65 (6.08)	14.92 (6.21)	11.91 (7.39)
3. Controls for chain and ownership[b]	no	yes	no	yes	yes
4. Controls for region[c]	no	no	no	no	yes
5. Standard error of regression	8.79	8.78	8.76	8.76	8.75
6. Probability value for controls[d]	—	0.34	—	0.44	0.40

Notes: Standard errors are given in parentheses. The sample consists of 357 stores with available data on employment and starting wages in waves 1 and 2. The dependent variable in all models is change in FTE employment. The mean and standard deviation of the dependent variable are −0.237 and 8.825, respectively. All models include an unrestricted constant (not reported).

[a]Proportional increase in starting wage necessary to raise starting wage to new minimum rate. For stores in Pennsylvania the wage gap is 0.

[b]Three dummy variables for chain type and whether or not the store is company-owned are included.

[c]Dummy variables for two regions of New Jersey and two regions of eastern Pennsylvania are included.

[d]Probability value of joint F test for exclusion of all control variables.

- Findings: minimum wage hike did not decrease employment in NJ relative to PA.
- In fact, it appears that it may have even raised employment in the fast food industry.
- Results robust to several specification checks (treatment of stores that drop from the sample, substitution between full-time and part-time labor, etc.)
- CK discuss several possible interpretations, none is entirely consistent with the empirical evidence.

- Neumark-Wascher (AER 2001) reanalyze the CK data obtaining actual payroll data (instead of survey data).
- Their conclusion: minimum wage hike did adversely affect employment in NJ.
- CK respond: sample used by Neumark-Wascher is biased, almost everything driven by a few outliers. Conclusion: minimum wage had zero effect on employment (but not positive).
- More recent survey by Neumark and Wascher concludes that, despite CK result, most estimates (and most credible estimates) of the minimum wage effect are still negative, maybe not as large as previously thought ($\eta = -0.1$).