

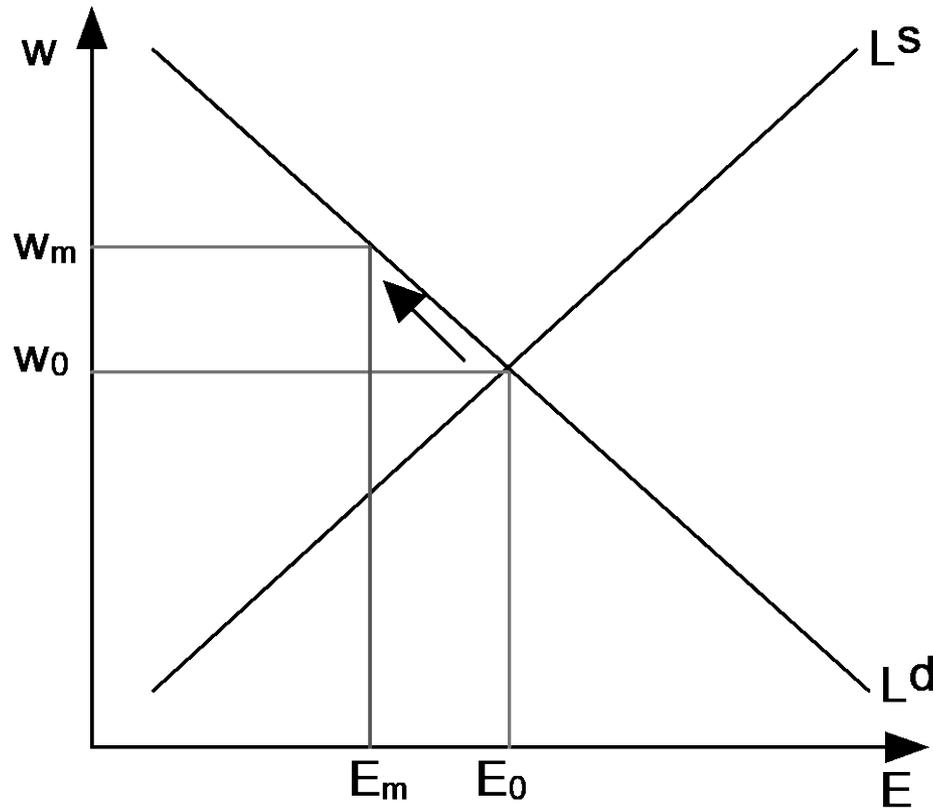
**Difference-in-Difference case study**  
**Minimum Wages and Employment:**  
**New Jersey/Pennsylvania Comparison**

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# Economic Effects of Minimum Wages

- Economic effects of minimum wages and evidence on minimum wages and employment
- The controversy on ‘conventional wisdom’ versus micro based ‘revisionist’ approach
- Effect on employment/unemployment has been central issue in debate about economic effects of minimum wages.
- Standard textbook model of labour demand produces one of the clearest predictions in labour economics - minimum wages price workers out of jobs by forcing employers up their labour demand curve.

# Standard Textbook Model



# Standard Textbook Model

- Basic model rests upon several assumptions: complete coverage; homogeneous labour; competitive labour market; short run and long run impact the same.
- Clear prediction: the minimum wage increase results in reduced employment - the proportional reduction in employment ( $\ln E_m - \ln E_0$ ) equals the proportionate wage increase ( $\ln W_m - \ln W_0$ ) times the elasticity of demand  $\eta$ .
- Can develop more sophisticated models, but with assumption of perfect competition produce same qualitative predictions.

# Evidence from D-i-D estimator

- What is best conceptual way to evaluate economic effect of minimum wage?
- ‘Before and after’ micro work more closely approximates the theoretical approaches that talk about labour markets with and without minimum wage floors – sometimes referred to as ‘revisionist’ approach.
- Most famous piece is Card and Krueger’s (1994) New Jersey / Pennsylvania comparison

# New Jersey/Pennsylvania Comparison (Card and Krueger, 1994)

- Can be viewed as case study of fast food industry.
- Surveyed fast food restaurants in New Jersey and Pennsylvania in February-March and November-December 1992.
- In April 1992 the New Jersey minimum wage went up from the federal minimum level of \$4.25 to \$5.05 but the minimum in Pennsylvania remained at \$4.25.

# New Jersey/Pennsylvania Comparison (Continued)

- Two treatment versus control ‘experiments’:
  - a) T = New Jersey restaurants,  
C = Pennsylvania restaurants
  - b) T = low wage New Jersey restaurants,  
C = high wage New Jersey restaurants

TABLE 2—MEANS OF KEY VARIABLES

Variable	Stores in:		<i>t</i> <sup>a</sup>
	NJ	PA	
1. <i>Distribution of Store Types (percentages):</i>			
a. Burger King	41.1	44.3	-0.5
b. KFC	20.5	15.2	1.2
c. Roy Rogers	24.8	21.5	0.6
d. Wendy's	13.6	19.0	-1.1
e. Company-owned	34.1	35.4	-0.2
2. <i>Means in Wave 1:</i>			
a. FTE employment	20.4 (0.51)	23.3 (1.35)	-2.0
b. Percentage full-time employees	32.8 (1.3)	35.0 (2.7)	-0.7
c. Starting wage	4.61 (0.02)	4.63 (0.04)	-0.4
d. Wage = \$4.25 (percentage)	30.5 (2.5)	32.9 (5.3)	-0.4
e. Price of full meal	3.35 (0.04)	3.04 (0.07)	4.0
f. Hours open (weekday)	14.4 (0.2)	14.5 (0.3)	-0.3
g. Recruiting bonus	23.6 (2.3)	29.1 (5.1)	-1.0
3. <i>Means in Wave 2:</i>			
a. FTE employment	21.0 (0.52)	21.2 (0.94)	-0.2
b. Percentage full-time employees	35.9 (1.4)	30.4 (2.8)	1.8
c. Starting wage	5.08 (0.01)	4.62 (0.04)	10.8
d. Wage = \$4.25 (percentage)	0.0	25.3 (4.9)	—
e. Wage = \$5.05 (percentage)	85.2 (2.0)	1.3 (1.3)	36.1
f. Price of full meal	3.41 (0.04)	3.03 (0.07)	5.0
g. Hours open (weekday)	14.4 (0.2)	14.7 (0.3)	-0.8
h. Recruiting bonus	20.3 (2.3)	23.4 (4.9)	-0.6

Notes: See text for definitions. Standard errors are given in parentheses.

# New Jersey/Pennsylvania Comparison (Continued)

- Results:
  - i) Substantial impact on wage structure: February 1992 – 33 percent of NJ and 34 percent of Penn restaurants had starting wage \$4.25; November 1992 – 90 percent of NJ restaurants had starting wage \$5.05 and 30 percent of Penn restaurants had starting wage \$4.25.
  - ii) But no negative effect on employment (if anything positive)

# Identification of Employment Effects

$$\Delta E_i = a + bX_i + cNJ_i + e_i$$

$$\Delta E_i = a' + b'X_i + c'GAP_i + e'_i$$

Where  $GAP = 0$  for P stores and NJ stores with  $W_{1i} \geq \$5.05$  and  $= (5.05 - W_{1i}) / W_{1i}$  for other NJ stores/

# New Jersey/Pennsylvania Comparison (Cont.)

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

Variable	Stores by state			Stores in New Jersey <sup>a</sup>			Differences within NJ <sup>b</sup>	
	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 <sup>c</sup>	– 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 <sup>d</sup>	– 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.

<sup>a</sup>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 ( $N = 73$ ).

<sup>b</sup>Difference in employment between low-wage (\$4.25 per hour) and high-wage ( $\geq$  \$5.00 per hour) stores; and difference in employment between midrange (\$4.26–\$4.99 per hour) and high-wage stores.

<sup>c</sup>Subset of stores with available employment data in wave 1 and wave 2.

<sup>d</sup>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.

# Employment Models

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 <sup>a</sup>	—	—	15.65 (6.08)	14.92 (6.21)	11.91 (7.39)
3. Controls for chain and ownership <sup>b</sup>	no	yes	no	yes	yes
4. Controls for region <sup>c</sup>	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 <sup>d</sup>	—	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).

<sup>a</sup>Proportional increase in starting wage necessary to raise starting wage to new minimum rate. For stores in Pennsylvania the wage gap is 0.

<sup>b</sup>Three dummy variables for chain type and whether or not the store is company-owned are included.

<sup>c</sup>Dummy variables for two regions of New Jersey and two regions of eastern Pennsylvania are included.

<sup>d</sup>Probability value of joint  $F$  test for exclusion of all control variables.

# Summary

Economics of minimum wages is interesting area to illustrate:

- i) How basic first order principles of economics can be evaluated.
- ii) How economics can link closely to issues of public policy.
- iii) How evidence based policy formation can be useful.