Employment & the Minimum Wage

ECON0004: Introductory Econometrics & Microeconomics

UCL

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Based on: Lecture notes (Lecture 8); Card & Krueger (1994) *Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania*, AER 84(4).

Outline

Does a Higher Minimum Wage Destroy Jobs?

The minimum wage is one of the most debated labour-market policies. The question seems simple, but the answer has shifted dramatically over 50 years of empirical research.

The empirical programme has three stages:

1. Early US time-series evidence (1970s–80s)
2. Reappraisal of early evidence after 1980
3. Quasi-experimental (micro-based) evidence — Card & Krueger (1994)

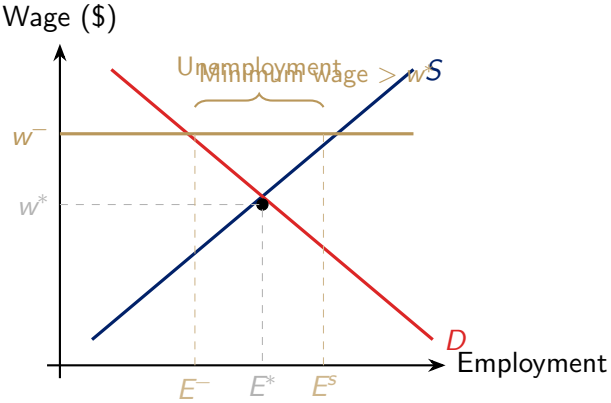
Each stage sharpened our understanding of both the effect and the methodology required to identify it.

Connection to Lecture 5: The DiD estimator introduced in Lecture 5 is the key tool in Stage 3. Card & Krueger (1994) is its most cited application.

Competitive Labour Market: Theory

In a perfectly competitive labour market:

- Firms are wage-takers; labour demand slopes down
- Workers are competitive; labour supply slopes up
- Equilibrium wage w^* clears the market at employment E^*



Theory: Predicted Effects of a Minimum Wage

A minimum wage $w^- > w^*$ acts as a **price floor**:

- Labour **demand** falls: firms move up their demand curve, hiring fewer workers (from E^* to E^-)
- Labour **supply** rises: higher wage attracts more workers into the market (from E^* to E^s)
- Gap $E^s - E^-$ = excess labour supply = **unemployment**

> **Standard competitive prediction:** Minimum wages *reduce* employment. The question is how large the effect is.

Caveat: This prediction depends critically on the assumption of *perfect competition*. In a monopsonistic labour market, the prediction can reverse — a minimum wage can *increase* employment.

Stage 1: Time-Series Regression

Regression Model (Stage 1)

$$Y_t = \alpha + \beta \cdot \text{MinWage}_t + \gamma D_t + \delta X_t + \varepsilon_t$$

- Y_t — teen employment/population ratio
- D_t — aggregate demand (time trend or quarter dummies)
- X_t — controls (labour supply, school enrolment)

General findings: A 10% increase in the minimum wage reduces teen employment by 1–3%. Effect negative and statistically significant.

> Early consensus: minimum wages **reduce teen employment**, consistent with the competitive model.

Stage 2: Reappraisal of Early Evidence

What changed?

The early studies used data up to 1980, when the US federal minimum wage was near its historical high (in real terms). After 1980, the minimum wage declined in real terms.

When data were extended beyond 1980:

- Estimated effects became **much smaller** in magnitude
- Many estimates were **statistically insignificant**
- Lack of strong empirical evidence for employment reductions

OVB interpretation: Unobserved demand and supply shifts that correlate with minimum wage policy contaminate $\hat{\beta}$. The time-series regression picks up macroeconomic fluctuations, not just the minimum wage effect. This is an **omitted variable bias** problem (recall Lecture 5).

Socratic question: US minimum wages tend to rise when the economy is doing well (more political support). How does this create a bias in Stage 1?

Stage 3: Motivation for a Quasi-Experiment

The OVB problem in Stage 2 arises because national business-cycle conditions affect both the minimum wage and employment simultaneously.

Ideal experiment: randomly assign some states a higher minimum wage; others serve as controls. Infeasible in practice.

> **Card & Krueger's insight:** Use neighbouring states as a **natural control group**. If two adjacent states face similar economic conditions, differences in employment trends after a minimum-wage change in one state can be attributed to the policy — not to macro shocks.

Card & Krueger (1994): Context

Natural experiment:

- April 1992: New Jersey (NJ) minimum wage rises from \$4.25 to \$5.05
- Pennsylvania (PA) minimum wage stays at \$4.25
- NJ and PA share similar economic conditions, industries, and demographics

Data:

- Survey of fast-food restaurants in both states
- **Before:** February 1992 (before NJ increase)
- **After:** November 1992 (after NJ increase)
- Outcome: percentage employment rate in

Why fast food? Fast-food restaurants are major employers of minimum-wage workers. Consistent industry definitions across states allow clean comparisons.

- **Treatment:** NJ (MW increased)
- **Control:** PA (MW unchanged)

Single Before-After Estimate: NJ Only

NJ results (percentage employment rate in fast food):

	Before (Feb 1992)	After (Nov 1992)
New Jersey	20.4%	21.0%
Change (%)	+0.6	

The naive before-after estimate suggests employment *increased* by 0.6%.

Problem with single before-after estimate: Any change in national economic conditions between February and November 1992 would affect NJ employment regardless of the minimum wage. The 0.6% change conflates the **policy effect** with **time trends**.

The DiD Solution: Adding Pennsylvania

Pennsylvania's employment *fell* over the same period:

	Before	After	Change
New Jersey (Treatment)	20.4%	21.0%	+0.6
Pennsylvania (Control)	23.3%	21.3%	−2.0
DiD			**+2.6**

$$\widehat{DiD} = \Delta\text{Treatment} - \Delta\text{Control} = 0.6 - (-2.0) = \mathbf{+2.6\%}$$

PA's −2.0 drop reflects common macroeconomic conditions (time trend). Subtracting it isolates the NJ minimum wage effect. The DiD estimate of +2.6% **contradicts** the competitive model's prediction of employment falls.

Socratic question: Card & Krueger find employment *rose* after the minimum wage increase. Does this prove the competitive model is wrong, or could there be other explanations?

DiD Assumptions in the Card & Krueger Context

The DiD estimate is valid under three assumptions:

1. Common (Parallel) Trend

Absent the NJ minimum-wage increase, employment in NJ and PA would have followed the *same trend*. Both states face the same business-cycle shocks.

2. No Compositional Change

Workers in PA do not move to NJ for the higher minimum wage; firms do not relocate to PA to avoid the higher minimum wage. Group composition is stable.

3. No General Equilibrium Effects

The NJ minimum wage increase does not affect PA wages or employment (no spillovers to the control group).

DiD Regression Formulation

Stack all restaurant observations ($i =$ restaurant, $t =$ period):

$$y_{it} = \beta_0 + \beta_1 T_i + \beta_2 \text{Post}_t + \beta_3 (T_i \times \text{Post}_t) + \varepsilon_{it}$$

Variable	Meaning in Card & Krueger
$T_i \in \{0, 1\}$	$1 =$ NJ (treatment), $0 =$ PA (control)
$\text{Post}_t \in \{0, 1\}$	$1 =$ November (after), $0 =$ February (before)
$T_i \times \text{Post}_t$	Interaction (NJ and after)
$\hat{\beta}_1$	Pre-existing level difference (NJ vs. PA)
$\hat{\beta}_2$	Common time trend
$\hat{\beta}_3$	**DiD estimator: causal effect of MW increase**

$\hat{\beta}_3$ equals the $+2.6\%$ from the table. The regression framework also gives standard errors and allows additional covariates.

Lecture 8 Summary

1. **Competitive theory** predicts minimum wages reduce employment (price floor above equilibrium). Employment falls from E^* to E^-.
2. **Stage 1 (time-series):** 10% MW rise $\Rightarrow$ 1–3% fall in teen employment. But OVB from unobserved demand/supply shifts contaminates the estimate.
3. **Stage 2 (reappraisal):** Extending data beyond 1980 shrinks effects; many become statistically insignificant. OVB diagnosis confirmed.
4. **Card & Krueger (1994):** NJ/PA quasi-experiment. DiD $= +2.6\%$ employment change — **contradicts** the competitive model.
5. **DiD assumptions:** Common trend, no compositional change, no general equilibrium effects. These are testable using pre-period data.
6. **Conclusion:** The evidence does not strongly support the competitive model's prediction. Monopsony or other labour-market imperfections may explain why minimum wages do not reduce employment. In a monopsonistic labour market, the firm sets the wage below the competitive equilibrium; a binding minimum wage transfers rents to workers and can raise both wages and employment simultaneously.