

Labor Economics

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Minimum Wages

Minimum Wages: What are We Talking About?

- Unlike other institutions, MW acts on minima. It sets a wage floor.
- The first minimum wage was introduced in the United States in 1938 and paid 25 cents per hour. In 2007 the federal minimum wage was \$5.85, in nominal terms 23 times larger, but, in real terms, only 1.4 times larger than 70 years ago.

- **Types of minimum wages:**

- 1 National, government-legislated (possible consultation with trade unions and employers' associations).
- 2 National, outcome of collective bargaining agreements and extended to all workers.
- 3 Industry-level minimum resulting from industry-level collective bargaining and extended to all workers in that industry.

Within-country variation

- 1 Not easy to collect info - not always a unique minimum wage
- 2 Cross-industry when set at the industry level - cross regional when large differences in cost-of-living
- 3 Age dependent: different minimum for **youngsters**
- 4 Some countries: acknowledging on the job training, returns to experience & family status
- 5 Austria: "Kollektivvertrag" different by industry and job tenure, only small number of persons not covered at all, much lower for apprentices
- 6 Germany: new coalition decided on MW

Measures

- Ratio of the Minimum Wage to the Median (or average) Wage
- Coverage of the minimum wage: share of workers occupying jobs eligible for the MW
- Kaitz Index: minimum wage as a proportion of the average wage adjusted by the industry-level coverage of the MW
- Fraction affected: workers with a wage between the old and the new minimum wage
- Spike at the minimum wage (share of workers paid exactly the minimum wage)

TABLE 2.1 Minimum wages in OECD countries

	Ratio MW to median wage (%)			Monthly MW, 2010 (euros) (4)	Taxonomy		Percentage earning MW (2005) (7)	Youth subminimum (8)
	1990 (1)	2010 (2)	Difference (3)		System ^a (5)	Type ^b (6)		
Australia	63	54	−9	1,670	N-S	1	—	Yes
Belgium	56	52	−4	1,388	N	2	—	Yes
Canada	38	44	6	1,187	P	1	—	Limited
Czech Republic	—	35	—	311	N	1	2.0	Yes
Denmark	—	—	—	—	S	3	—	Yes
Estonia	—	41	—	278	N	1	4.8	No
France	52	60	8	1,344	N	1	16.8	Limited
Germany	—	—	0	—	S	3	—	Some
Greece	57	49	−8	863	N	2	—	No
Hungary	44	47	3	257	N	1	8.0	No
Ireland	—	52	—	1,462	N	1	3.3	Yes
Italy	—	—	—	—	S	3	—	Some
Japan	30	37	7	1,069	R	1	—	Limited
Korea	30	41	11	605	N	1	—	Yes
Luxembourg	37	42	5	1,725	N	1	11.0	Yes
Mexico ^c	31	19	−12	—	R	1	—	No
Netherlands	56	47	−9	1,416	N	1	2.2	Yes
New Zealand	52	59	7	1,196	N	1	—	Yes
Poland	17	45	28	318	N	1	2.9	No
Portugal	53	56	3	554	N	1	4.7	No
Slovak Republic	—	46	—	308	N	1	1.7	Yes
Slovenia	—	58	—	734	N	1	2.8	No
Spain	47	44	−3	739	N	1	0.8	No
Sweden	—	—	—	—	S	3	—	Yes
Turkey	46	67	21	—	N	1	—	Yes
United Kingdom	—	46	—	1,169	N	1	1.8	Yes
United States	36	39	3	949	N-S	1	1.3	Limited

Sources: Dolton and Bondibene (2011); OECD Minimum Wage Database.

Note: MW = minimum wage; — = not available.

a. System: N = national; N-S = national-state; S = sectoral collective agreement; R = regional; P = provincial.

b. Type: 1 = national, government legislated; 2 = national, bargaining; 3 = industry level, bargaining (see main text).

Evolutions

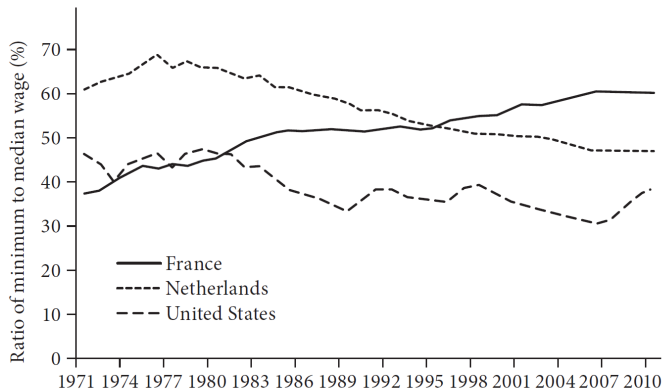


FIGURE 2.1 Ratio of minimum to median wage, 1971–2010

Source: OECD minimum wage database.

► Collective Bargaining vs. Government Legislation

Problems with these Measures

- *Spillover effects*: Increase of the minimum wage may raise the average wage leaving the MW/AveWa ratio unchanged. Also increase of MW may reduce wages in the uncovered segment (absorbing more low-skill workers)
- Gross measure, but taxation is progressive
- Earnings should not include bonuses and overtime premiums (measurement issue)

A Competitive Labor Market

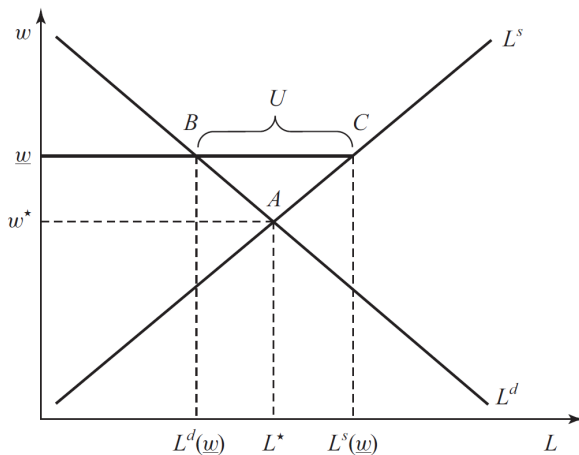
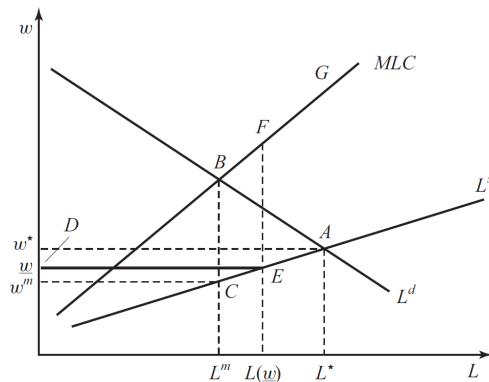


FIGURE 2.2 The minimum wage in a competitive labor market

Pure monopsonist



L^s labor supply
 L^d labor demand
 MLC marginal labor cost
 \underline{w} minimum wage
 w^m monopsony wage
 w^* competitive wage

FIGURE 2.3 Monopsony and the minimum wage

Pure monopsonist

- Monopsonist has to pay all workers the same wage
- Maximizes profits by setting $MLC = L^d$ (value of marginal product)
- B: L^m, w^m
- Minimum wage changes MLC-Curve

Pure monopsonist

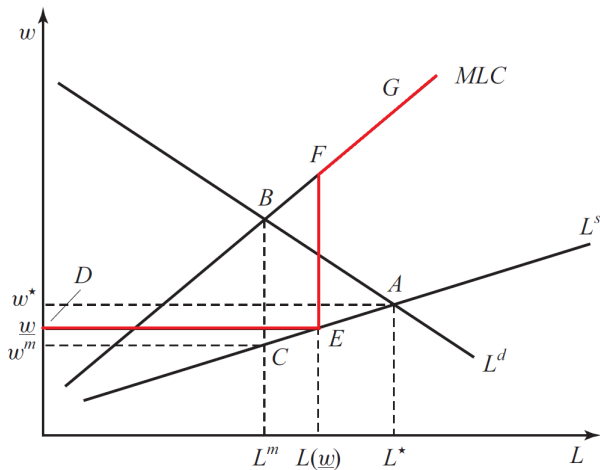


FIGURE 2.3 Monopsony and the minimum wage

Market power – monopsony

- Classical example: mining company in remote area
- Not realistic nowadays
- Modern monopsony: many employers, but few vacancies to apply for
- Wage posting: a higher wage attracts more applicants

The degree of monopsony power

Let $y(L)$ be the value of the marginal product of labor and $L^s = G(w)$ the aggregate labor supply. Total labor costs C are wL . For marginal labor costs $\frac{dC}{dL} = w + \frac{dw}{dL}L = w(1 + \frac{dw}{w} \frac{L}{dL})$ so marginal labor costs $\frac{dC}{dL} = w(1 + \varepsilon)$, where ε is the inverse elasticity of labor supply. At the monopsony equilibrium:

$$y(L^m) = w^m(1 + \varepsilon), \quad (1)$$

The wedge measures the degree of monopsonistic power of the firm.

$$\frac{y(L^m) - w^m}{w^m} = \varepsilon, \quad (2)$$

is decreasing with the wage elasticity of labor supply: when labor supply is infinitely elastic, ε tends to zero and hence monopsonistic power is zero.

Monopsonistic competition

- Search costs and labor market frictions can lead to (restricted) monopsony power of firms
- $L_i^s = f(B_i, w_i/w) * L^s(w)$
 - Labor supply for firm i
 - B_i : firm-specific shock
 - $L(w)$ aggregate labor supply for industry
 - w_i/w relative wage, firm i offers
 - at perfect competition f is perfectly elastic w.r.t. relative wage
- Similar to Dixit/Stiglitz model of monopolistic competition

MW may increase productivity

- Supply side: productivity of a worker depends on the investment in human capital.
- A minimum wage induces workers to acquire education in order not to be crowded out.
- If a firm has to pay a higher minimum wage anyway, they may want to upgrade the job by more training
- Similar effect may arise on the demand side: minimum wage increases the number of vacancies for high-productivity jobs issued by employers (they may substitute low-productivity jobs which are not profitable anymore).
- BUT:
- Labor supply vs. education: incentives for education lower, because low-educated get higher wage

Dual Labor Markets

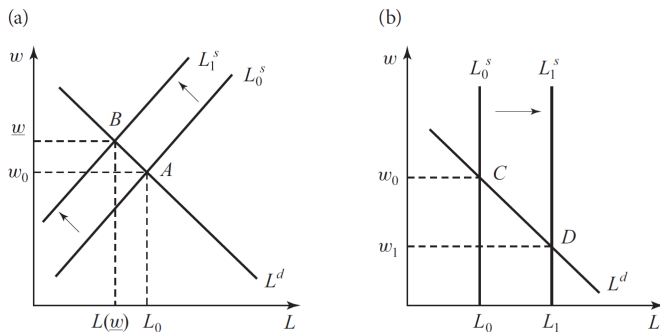


FIGURE 2.4 A dual labor market and the minimum wage: (a) formal sector; (b) informal sector

Large literature on job losses due to MW

- Dolado and Teuling (1996) cross-country study: negative effects on youth employment
- USA, elasticity of teenage employment w.r.t. MW -0.1- -0.3
- Lower in Europe
- Dolton (2011), OECD countries, negative for teenagers, no effect for adults

A controversial study: Card & Krueger (1994)

“Natural experiment”

- Impact of increases in the minimum wage in New Jersey (treatment group) in April 1992 from \$4.25 to \$5.05: increase by 80 cents.
- Control group: Pennsylvania, where the minimum wage remained at \$4.25 throughout this period.
- New Jersey and Pennsylvania are bordering states with similar economic structures
- Data on employment in 410 fast-foods in the two states in March 1992 (before the MW hike) and in December (after).

A controversial study: Card & Krueger (1994)

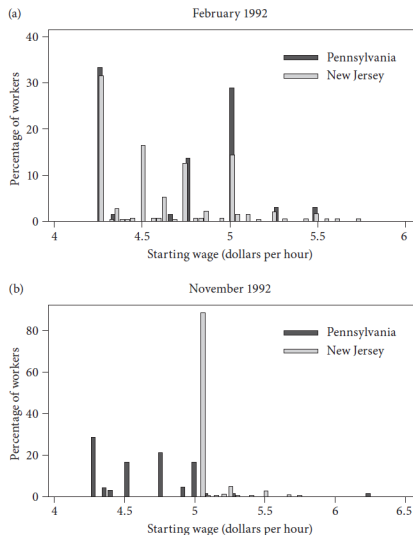


FIGURE 2.5 The wage distribution (a) before and (b) after an increase in the minimum wage

Employment effects – a simple approach

Number of full-time equivalents working in a full-time restaurant:

	Employment	
	New Jersey	Pennsylvania
March 1992	20.4	23.3
December 1992	21.0	21.2
Difference	+0.6	-2.1
Difference-in-differences	2.7	

Monopsony effects – what about prices?

Price of a full meal in \$:

	Price	
	New Jersey	Pennsylvania
March 1992	3.35	3.04
December 1992	3.41	3.03
Difference	0.06	-0.07
Difference-in-differences	0.07	

Other studies

- Another “natural experiment”
 - Effect of the introduction of a MW in the UK April 1999
 - Comparison of employment outcomes of individuals just **below** the MW and higher up the wage distribution (1st difference) before and after (2nd difference) the introduction of the minimum wage.
 - No adverse effects (adult and youth, men and women)
- Other studies: generally negative effects on employment, notably among youngsters.

Effects on profitability in the UK

	Low (average wage)		Profit margin	
	Low-wage firm	Nonlow-wage firm	Low-wage firm	Nonlow-wage firm
Pre-NMW	2.149	2.775	0.128	0.070
Post-NMW	2.378	2.893	0.089	0.058
Difference	0.229	0.118	-0.039	-0.012
Difference-in-differences	0.111		-0.027	

Note: NMW = national minimum wage; Profit margin = ratio of profits to sales.

Studies based on workers histories

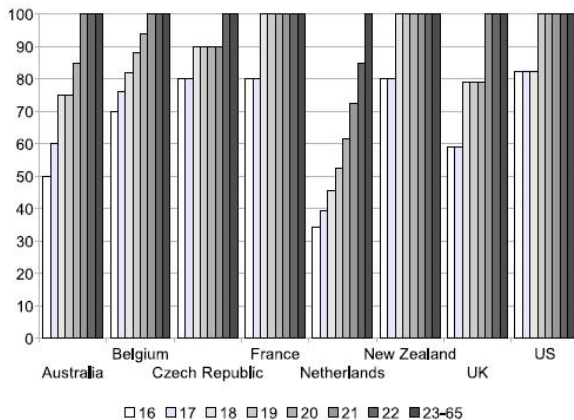
- Since the late 1990s, work combining data on workers and firms (matched employee-employer micro data)
- Focus on the economy as a whole and on the effects on employment and hours
- Increase in MW by 1% in France reduces probability of men (women) keeping a job at the MW by 1% (1.3%)
- Increase by 50% of MW in Portugal reduced hirings but increased job retention

Policy issues

- Should the minimum wage be reduced or increased?
- Should there be a youth minimum wage?

Should there be a youth minimum wage?

Youth Minimum Wage as a percentage of the adult minimum wage by age



Unemployment Rates of Prime Age Workers and Young Workers (2010)

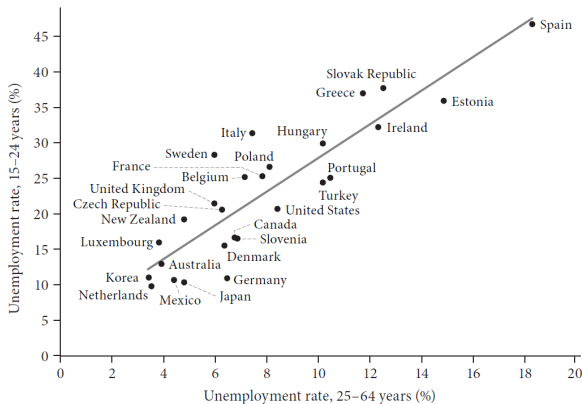


FIGURE 2.7 Unemployment rates of prime-aged workers and young workers, 2010

Source: OECD (2011b).

Hyslop and Stillman (2007): New Zealand

	Minimum wage (percentage of adult wage)		
	Treatment group		Control group
	Aged 16–17	Aged 18–19	
Before March 5, 2001	60	60	100
From March 5, 2001	70	100	100
From March 18, 2002	80	100	100
Increase 2000–2003 (%)	50	87	13

Effects on youth Employment

Indicator	Treatment group		Control group Aged 20–25
	Aged 16–17	Aged 18–19	
Employment rate (%)			
Before	41.3	53.8	64.0
After	43.2	56.2	65.4
Difference	1.9	2.4	1.4
Difference-in-differences	0.5	1.0	
Weekly working hours			
Before	16.4	27.4	34.8
After	19.0	28.2	33.8
Difference	2.4	0.8	−1.0
Difference-in-differences	3.4	1.8	

It seems labor supply of youth increased, educational attainment decreased and unemployment increased as well.

Why Does a MW exist?

- 1 Efficiency: remedies market failures, e.g. deriving from excessive monopsonistic power
- 2 Equity: reduces earnings inequality by supporting incomes of low-earning workers, for example, low-skilled workers.

Who profits from MW?

- Distributional issue: those, who hold on to job, profit; others not.
- If wage elasticity of labor demand > -1 , \Rightarrow income share of min. wage earners increases, when MW rises.
- Who are MW earners?
 - regular workers, students, marginally attached workers?
- If labor turnover is high, employment costs (losses) are better distributed among population.
-
- MW generally seen as social policy, but not employment policy

Review Questions

- 1 Why are there so few workers earning the minimum wage?
- 2 Why are minimum wages age dependent?
- 3 When does a minimum wage increase employment?
- 4 How does a minimum wage affect poverty?

Exercise:

Suppose that w is the wage and L is employment. The supply curve of low wage workers is given by $w = 10 + 2L$. The demand curve is given by $w = 70 - 2L$.

- (a) What are the equilibrium levels of wage, employment, and unemployment?
- (b) What happens to employment and unemployment if a minimum wage of 40 euros is introduced?
- (c) What happens to employment and unemployment if a minimum wage of 60 euros is introduced?

Minimum Wage and Monopsony

The pure monopsonist chooses the employment level that maximizes profits:

$$\pi^m = \frac{AL^{1-\eta}}{1-\eta} - wL, \quad (3)$$

subject to being on the labor supply curve $w = L^\varepsilon$, Therefore

$\pi^m = \frac{AL^{1-\eta}}{1-\eta} - L^{1+\varepsilon}$. Deriving the first-order condition and substituting:

$$L^m = \left[\frac{A}{1+\varepsilon} \right]^{\frac{1}{\varepsilon+\eta}} < A^{\frac{1}{\varepsilon+\eta}} = L^* \quad (4)$$

and

$$w^m = \left[\frac{A}{1+\varepsilon} \right]^{\frac{\varepsilon}{\varepsilon+\eta}} < A^{\frac{\varepsilon}{\varepsilon+\eta}} = w^*; \quad (5)$$

Bargaining or Government Setting?

With **bargaining** the socially optimal wage will deviate by a mark-up factor ($\mu = 1 + t$), where t is the wedge between L^s and L^d , that is a function of labor demand and supply elasticities, as well as distributional weights of employers and workers:

$$\mu = \frac{(1 - \eta) + \beta(\eta + \varepsilon)}{(1 - \eta)(1 + \varepsilon)} \quad (6)$$

Government legislation: the outcome depends on the weights the government attaches to workers and employers. Assume that the Government maximizes a Nash-Bernoulli social welfare function line, the mark-up imposed by the Government over the reservation wage is:

$$\mu^G = \frac{(1 - \eta) + \beta^G(\eta + \varepsilon)}{(1 - \eta)(1 + \varepsilon)} \quad (7)$$

where β^G represents the distribution weight that the government attaches to wage-earners and $1 - \beta^G$ is a measure of the electoral power of employers and profit-earners .

Efficiency Wages

The profits of the firm are equal to

$$\pi = f(e(w)L) - wL$$

The firm has two degrees of freedom, wage and employment, so there are two first-order conditions:

$$\frac{\partial \pi}{\partial L} = 0 \rightarrow f' e(w) - w = 0 \rightarrow f' e(w) = \frac{w}{e(w)} \quad (8)$$

$$\frac{\partial \pi}{\partial w} = 0 \rightarrow f' e(w)L - L = 0 \rightarrow f' e(w) = \frac{\partial w}{\partial e(w)} \quad (9)$$

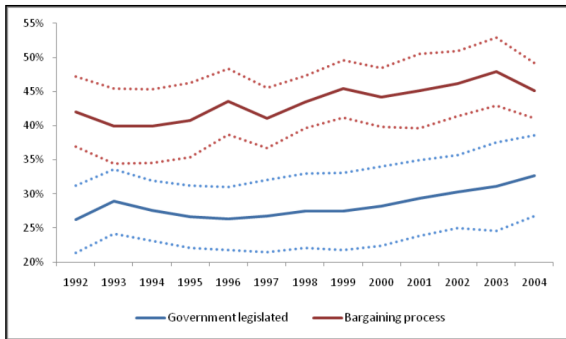
Combining these two first-order conditions we find that

$$\frac{\frac{\partial e(w)}{e(w)}}{\frac{\partial w}{w}} = 1 \text{ “Solow condition”} \quad (10)$$

ADDITIONAL MATERIAL:

Collective Bargaining vs. Government Legislation

Figure 1: Minimum wage to average wage ratio



◀ Evolutions

Difference-in-Differences estimators

- If the employment L in state i is determined by an equation of this type:

$$L_i = \alpha \underline{w}_i + X_i \gamma$$

where \underline{w}_i is the level of the minimum wage and X_i contains all the other variables which influence L_i .

- If we have two observations which refer to two dates for the same State, so:

$$\Delta L_i = L_{i2} - L_{i1} = \alpha(\underline{w}_{i2} - \underline{w}_{i1}) + (X_{i2} - X_{i1})\gamma$$

Difference-in-Differences estimators (2)

- If we also have data for another state j which is identical to i in each characteristic except for w , which is not changed, so:

$$\Delta L_i = (X_{i2} - X_{i1})\gamma$$

then:

$$\Delta L_i - \Delta L_j = \alpha(\underline{w}_{i2} - \underline{w}_{j1})$$

- In our case, if we think that New Jersey and Pennsylvania are similar enough, we can obtain an estimation of α by simply calculating the difference of the difference.