5. Wage setting

KAT.TAL.322 Advanced Course in Labour Economics
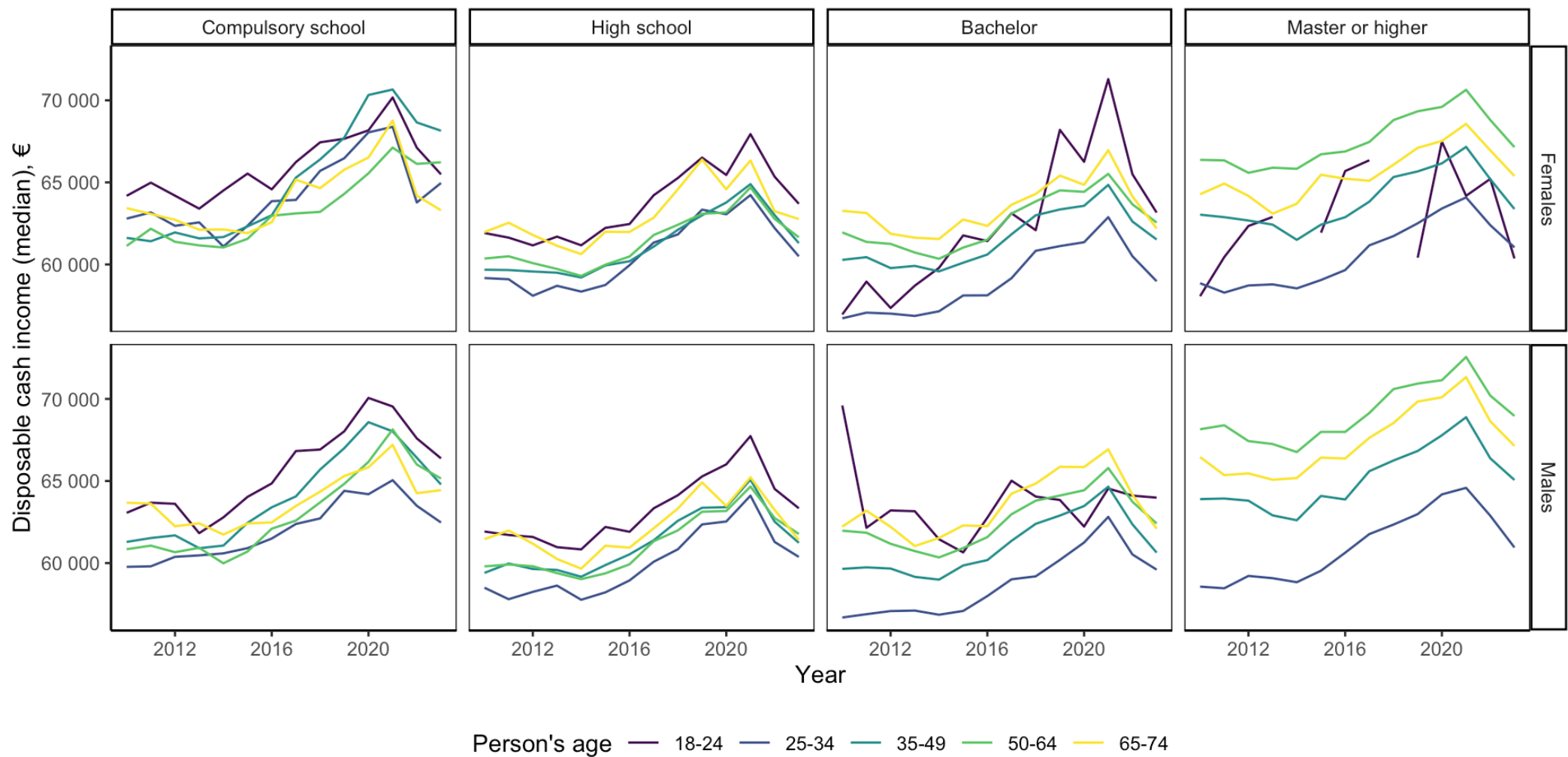
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September 8, 2025

- Why do wages differ between workers?
  - → Compensating differentials
  - → Bargaining power of firms and workers
  - → Imperfect information about productivities and jobs
- Relative contributions of different sources to overall wage inequality

Today

- Stylised facts

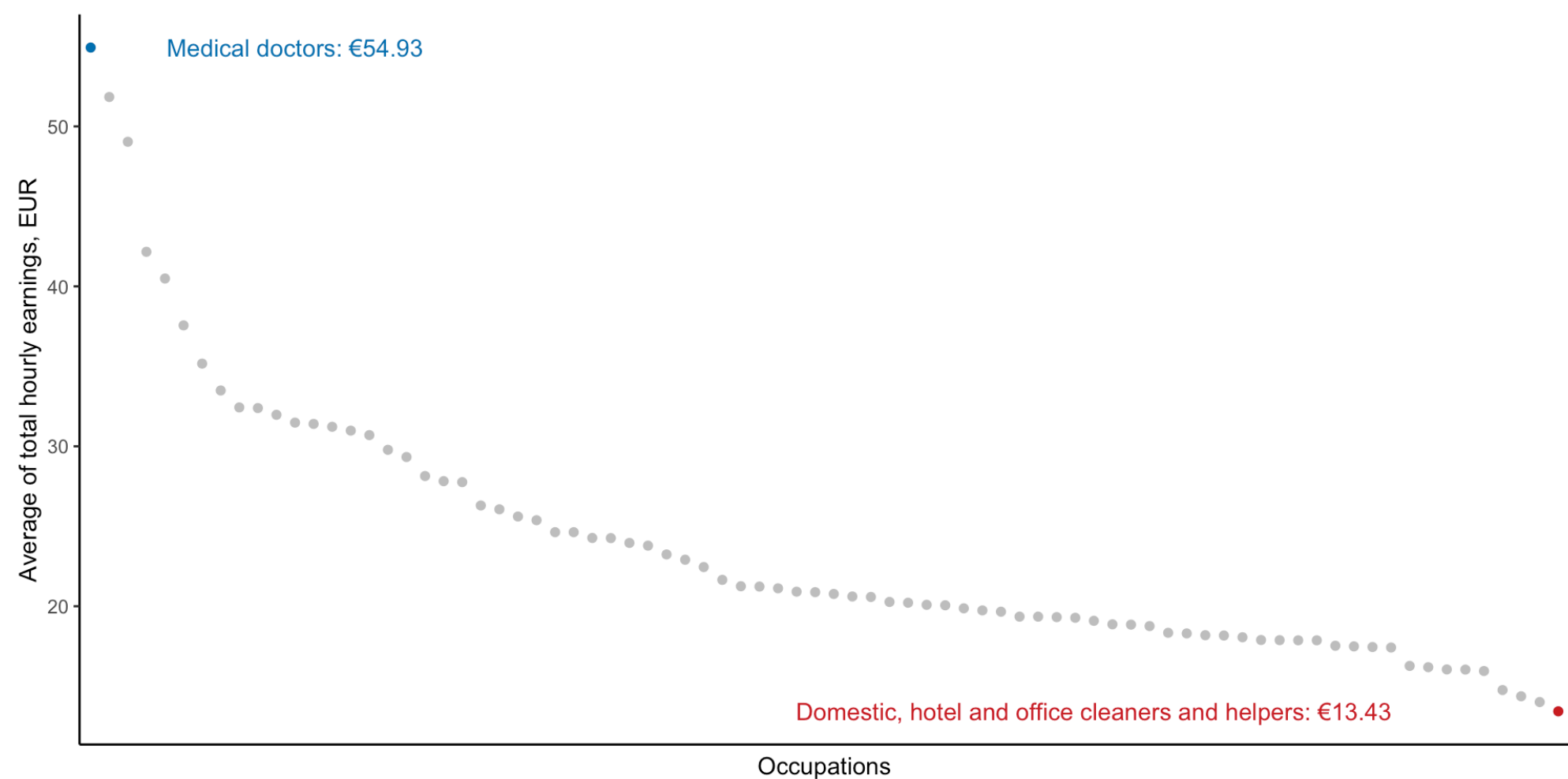- Perfect competition

- Imperfect competition

- Empirical evidence

Stylised facts

Wage dispersion

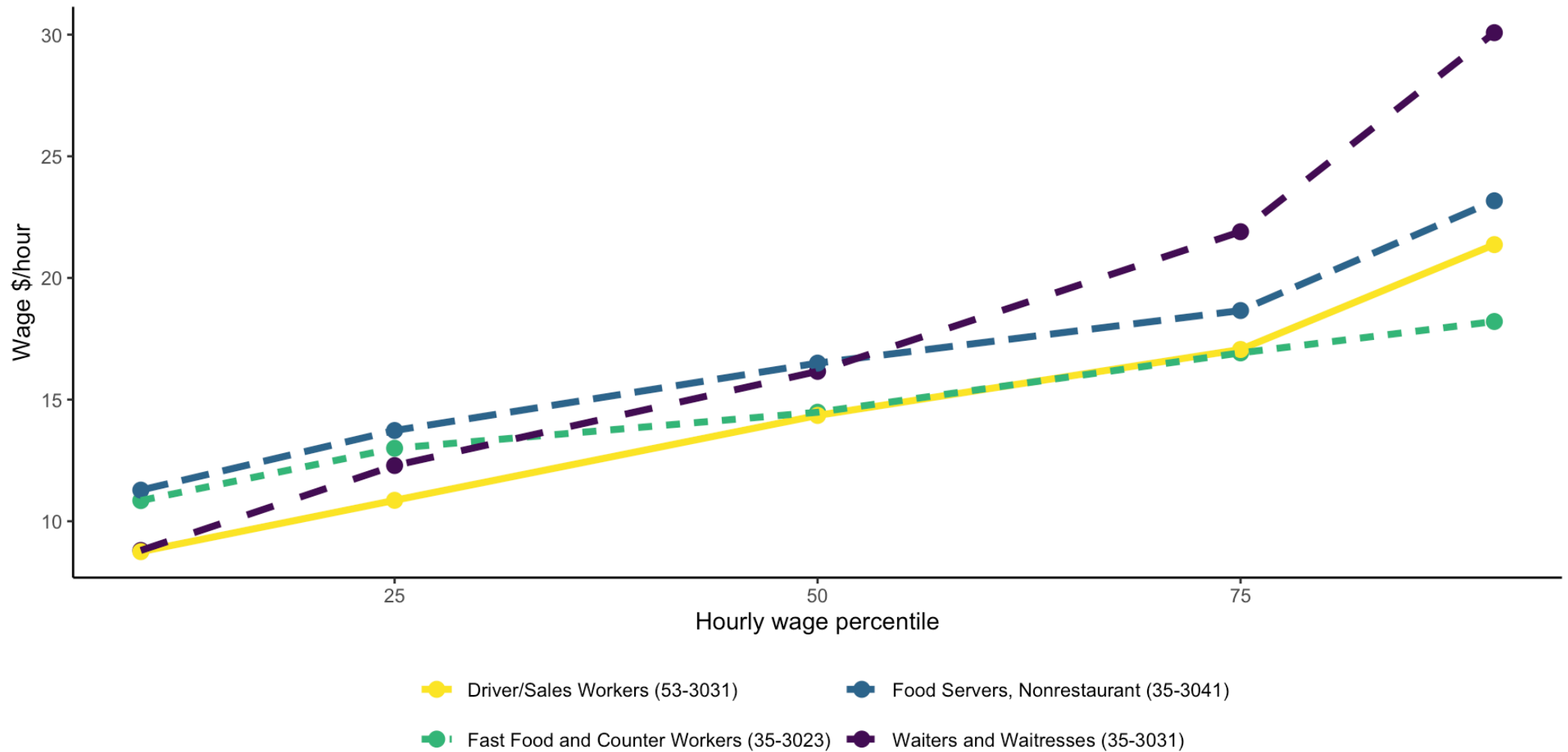Source: Statistics Finland

Variation by occupation

Medical doctors: €54.93

Domestic, hotel and office cleaners and helpers: €13.43

Average of total hourly earnings, EUR

Occupations

Source: Statistics Finland

Market imperfections?

Source: Occupational Employment and Wage Statistics (US)
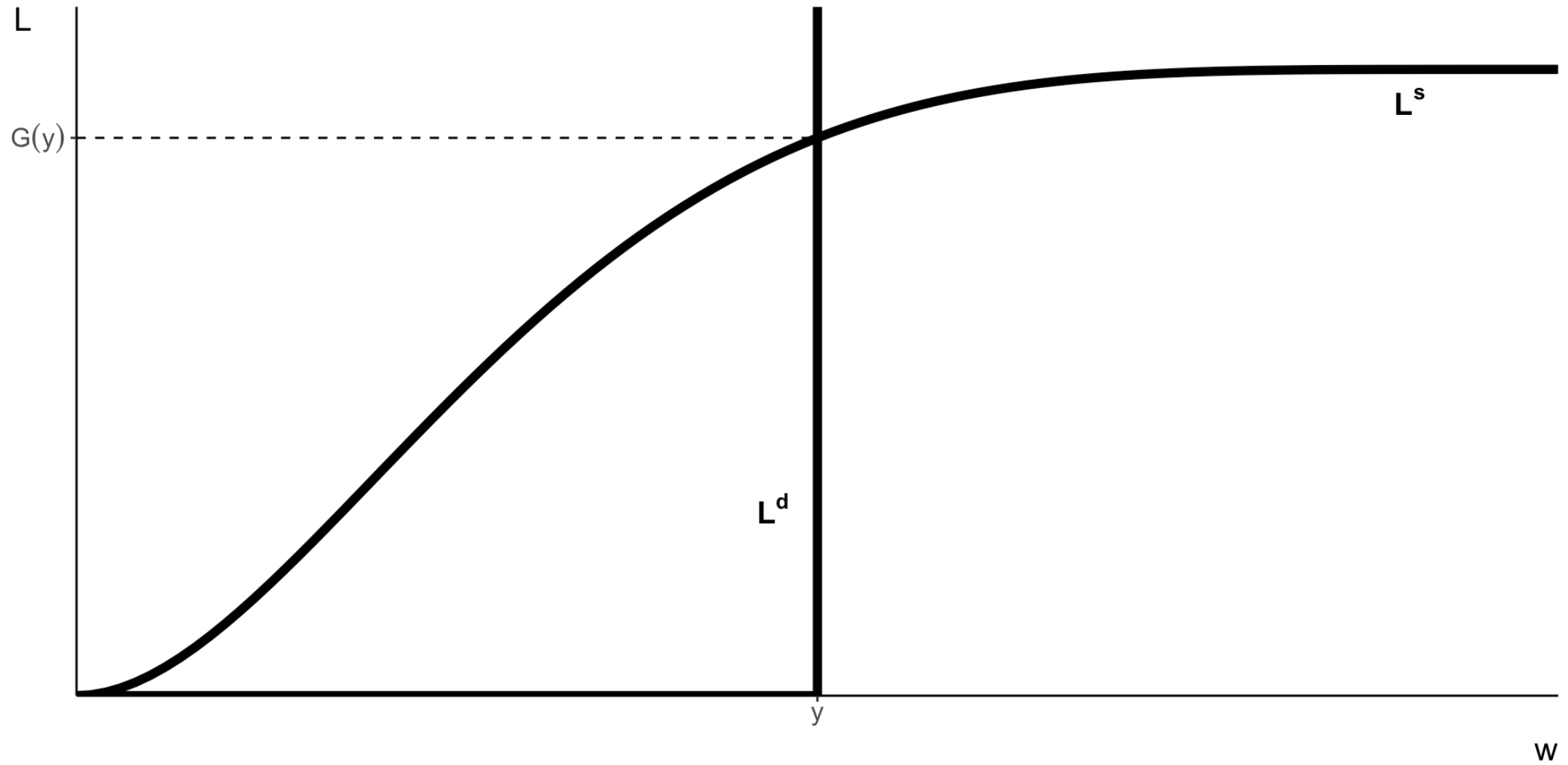
Perfect competition

Jobs of equal difficulty

- Production function $F(L) : F_L(L) = y$

- Workers supply $h = 1$ unit of labour and receive wage w if hired

- Linear worker utility $U(R,e,\theta) = R - e\theta$

  → $R = w$ if employed; $R = 0$ otherwise

  → e difficulty of jobs, $e = 1$ is constant

  → $\theta \geq 0$ heterogeneous disutility ($G_\theta(\cdot)$ CDF)

- Equilibrium

$$
L^d = \begin{cases} +\infty & \text{if } w < y \\ [0,+\infty) & \text{if } w = y \\ 0 & \text{if } w > y \end{cases}
$$

$$
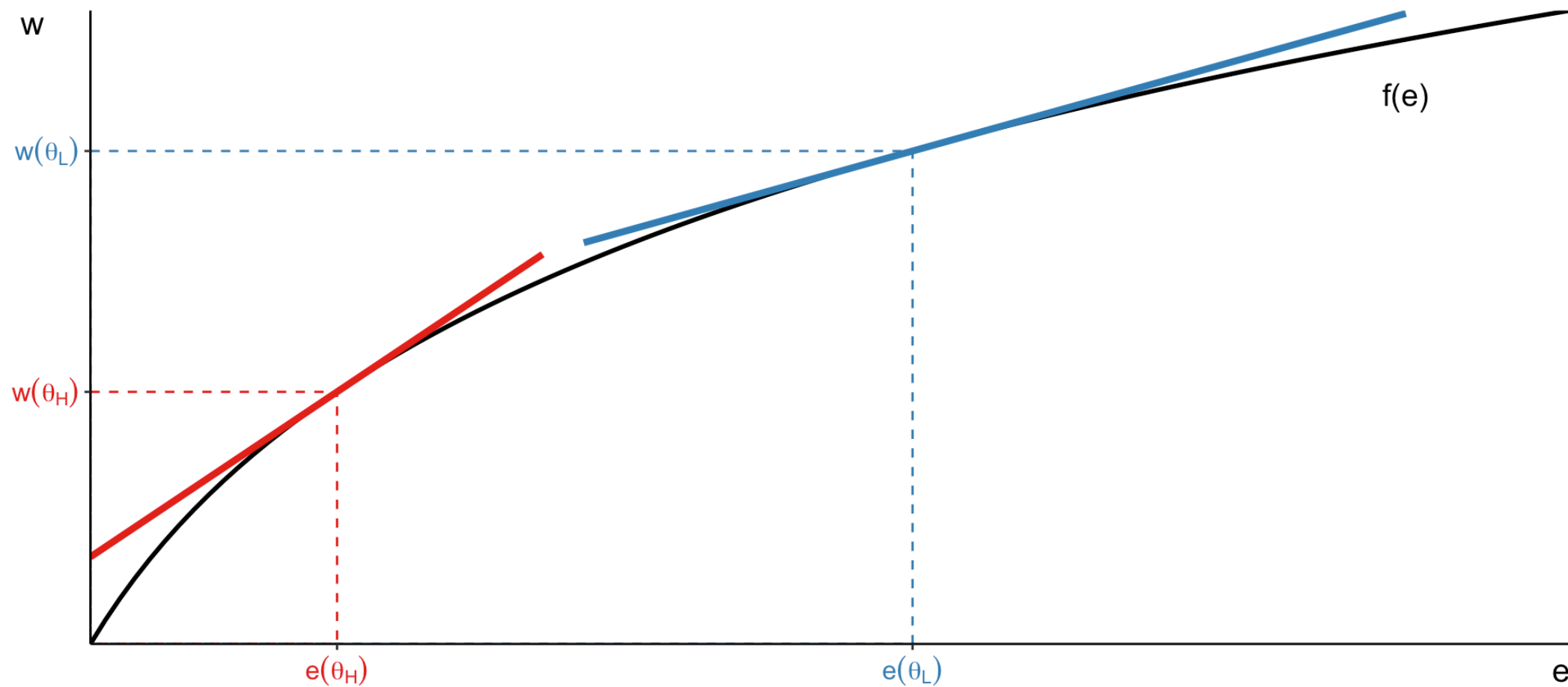L^s = G(w)
$$

Jobs of equal difficulty

Jobs of varying difficulty

- Continuum of jobs with varying difficulty $e > 0$

- Productivity $y = f(e)$ such that $f'(e) > 0, f''(e) < 0, f(0) = 0$

- e also corresponds to effort worker puts in if employed

- **Compensating wage differentials**: $w'(e) > 0$

$$L^d = \begin{cases} +\infty & \text{if } w(e) < f(e) \\ [0, +\infty) & \text{if } w(e) = f(e) \\ 0 & \text{if } w(e) > f(e) \end{cases}$$

$$L^s = \begin{cases} 1 & \text{if } f'(e) = \theta \cap f(e) - e\theta \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

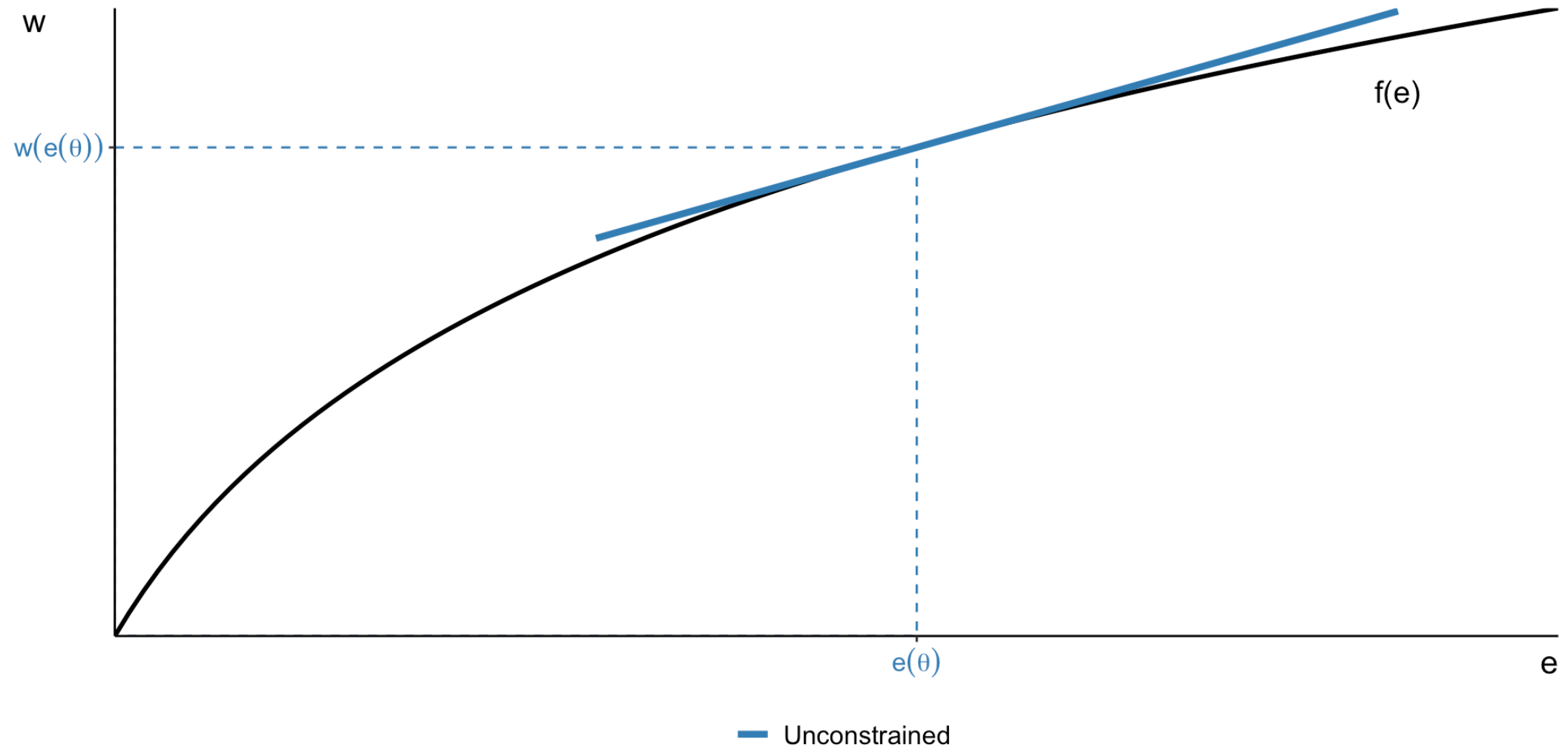# Jobs of varying difficulty

Indifference curves of worker types ▬ θ_H ▬ θ_L
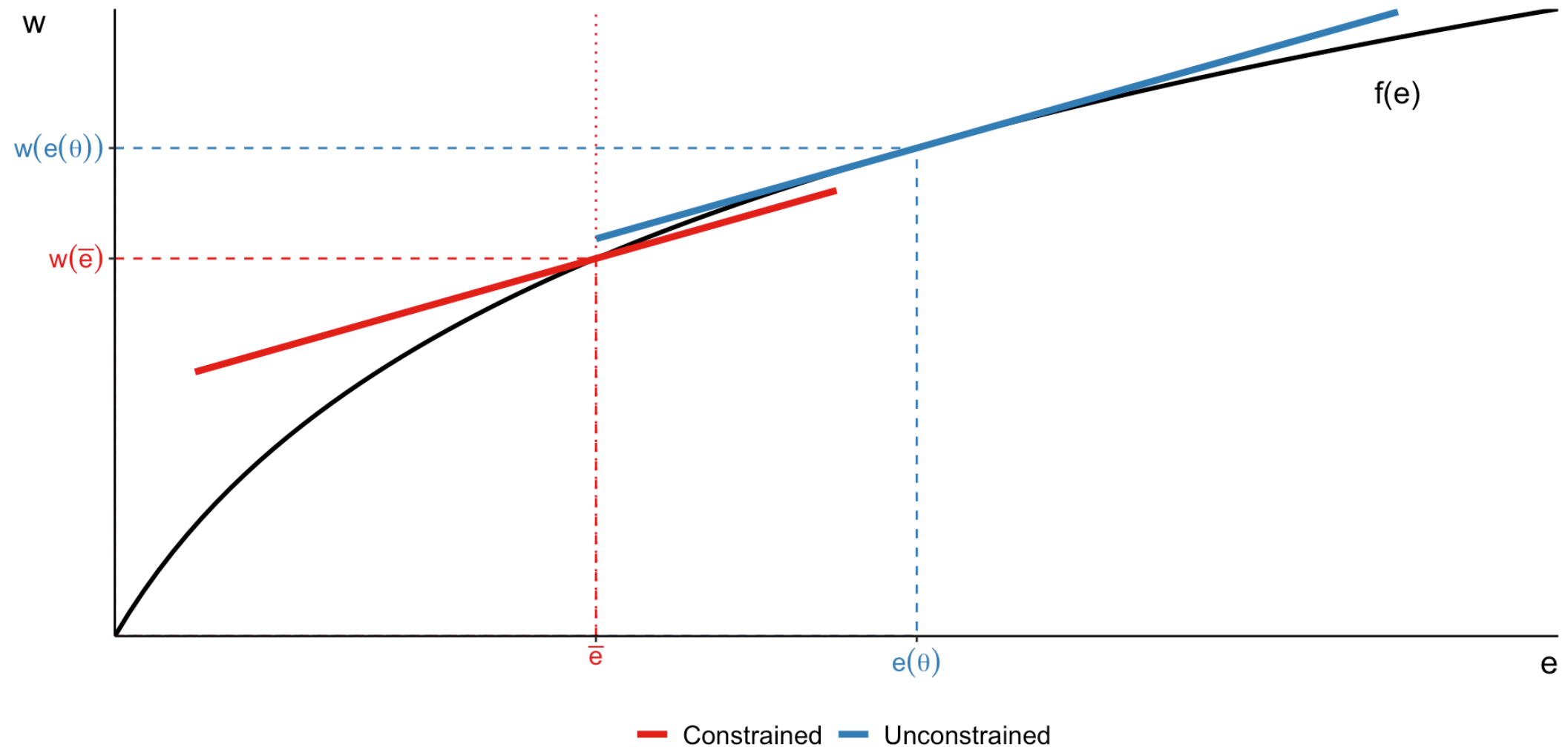
Workplace safety regulation

At baseline worker of type θ chooses optimal effort $e(\theta)$ and earns $w(e(\theta))$

Workplace safety regulation

Limit on job difficulty $\bar{e}$ forces worker type θ on a lower indifference curve

Constrained — Unconstrained

Perfect competition: summary

- Even under perfect competition, wages and labour supply decisions of workers depend on

  → abilities of workers: more productive workers earn higher wages

  → characteristics of jobs: more difficult jobs offer higher wages

- Efficient allocation of resources

  → part of the population may choose not to work because jobs are not attractive enough

Imperfect competition

Barriers to entry: monopsonistic employer

Start from baseline model

- Continuum of workers θ with utility $U(R, e, \theta) = R - e\theta$, $e = 1$

- Monopsonistic employer $\max_w \pi(w) \equiv \max_w L^s(w)(y - w)$

Equilibrium wage $w^M = y \frac{\eta_w^L(w^M)}{1 + \eta_w^L(w^M)}$ where $\eta_w^L(w^M) = \frac{w^M}{L^s(w^M)} \frac{dL^s(w^M)}{dw}$

Equilibrium employment $L^s(w^M) = G(w^M)$

Barriers to entry: monopsonistic employer
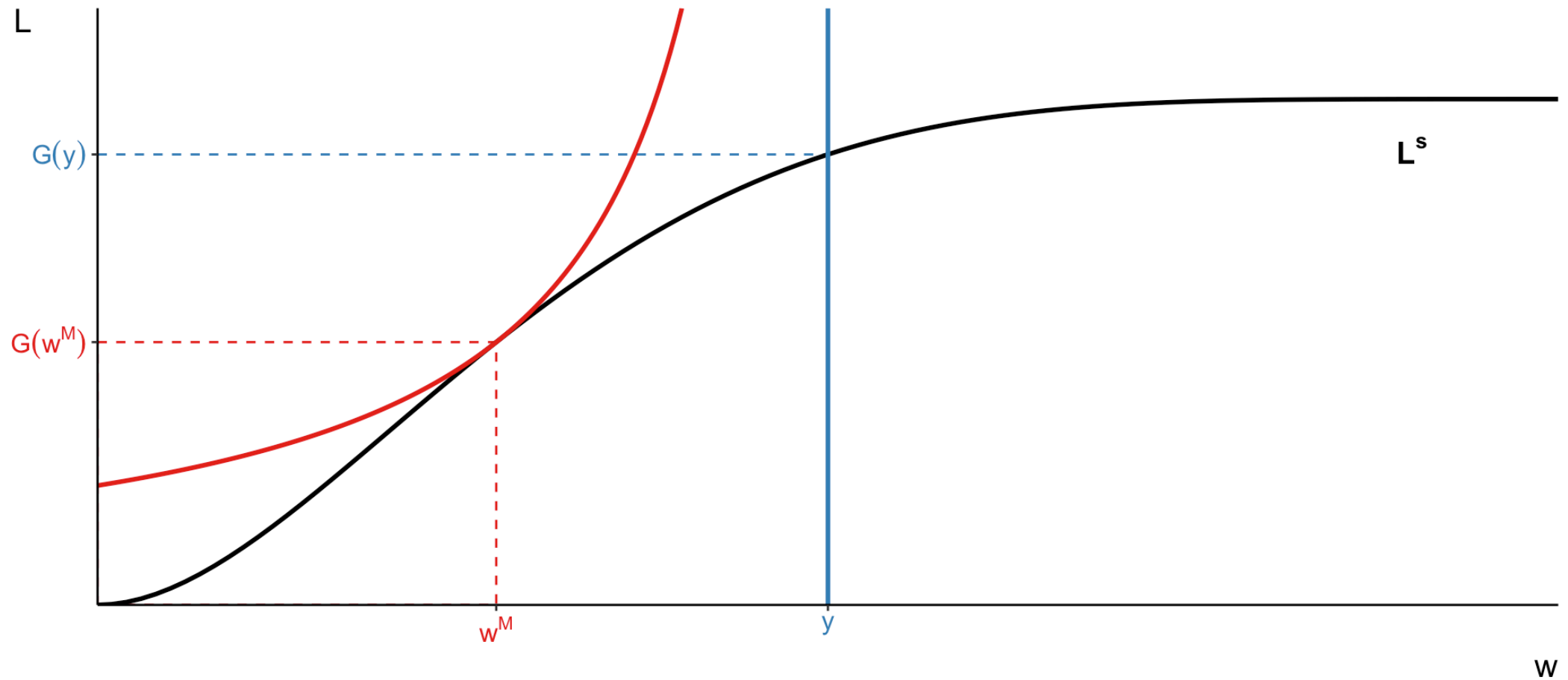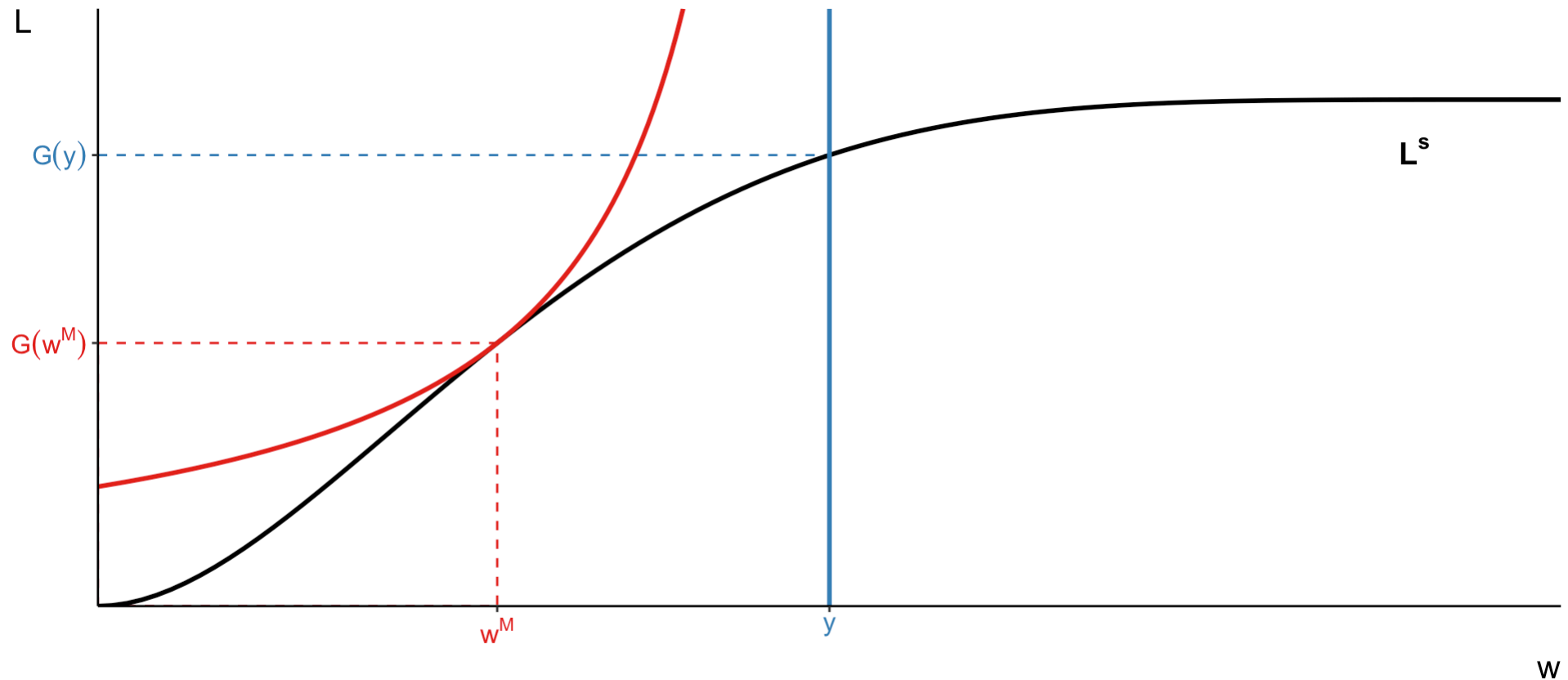

Isoprofit lines under — Monopsony — Perfect competition
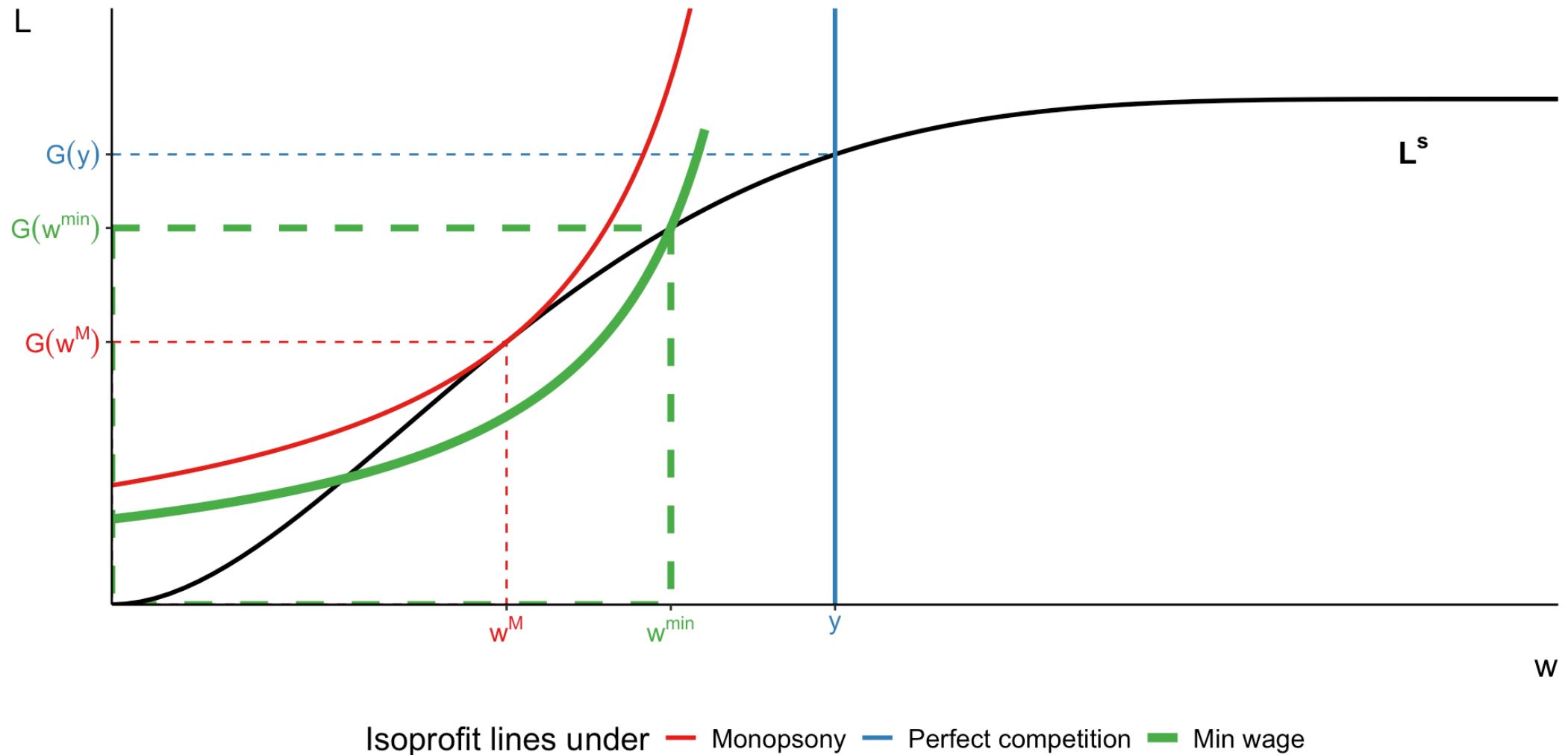
Monopsonistic employer and minimum wage

What happens if government mandates min wage $w^M < w^{\min} < y$?

Isoprofit lines under — Monopsony — Perfect competition

Monopsonistic employer and minimum wage

Equilibrium employment and wages both rise!

Isoprofit lines under ── Monopsony ── Perfect competition ━━ Min wage

Imperfect information and adverse selection

- Workers are now described by their ability $h > 0$ with CDF $G(\cdot)$

  → produce h units of good

  → enjoy leisure utility $d(h)$ such that $d'(h) > 0$ and $d(h) < h$

- Workers enjoy utility $U(R, d) = \begin{cases} w(h) & \text{if hired} \\ d(h) & \text{otherwise} \end{cases}$

- Firms now offer identical jobs $e = 1$ and $\max_L \mathbb{E}\left[(h - w(h))L\right]$

- Firms do not observe true h of workers (only see the distribution $G(\cdot)$)

Imperfect information and adverse selection

Equilibrium is described by a pair $(w^\star, h^\star)$ such that

- all workers with $h < h^\star = d^{-1}(w^\star)$ decide to work

- firms hire all workers ready to work at $w^\star = \mathbb{E}\left(h | w^\star\right)$

We can graphically illustrate the equilibrium by plotting $d^{-1}(w)$ and $\mathbb{E}(h|w)$ on the next slide

Imperfect information and adverse selection
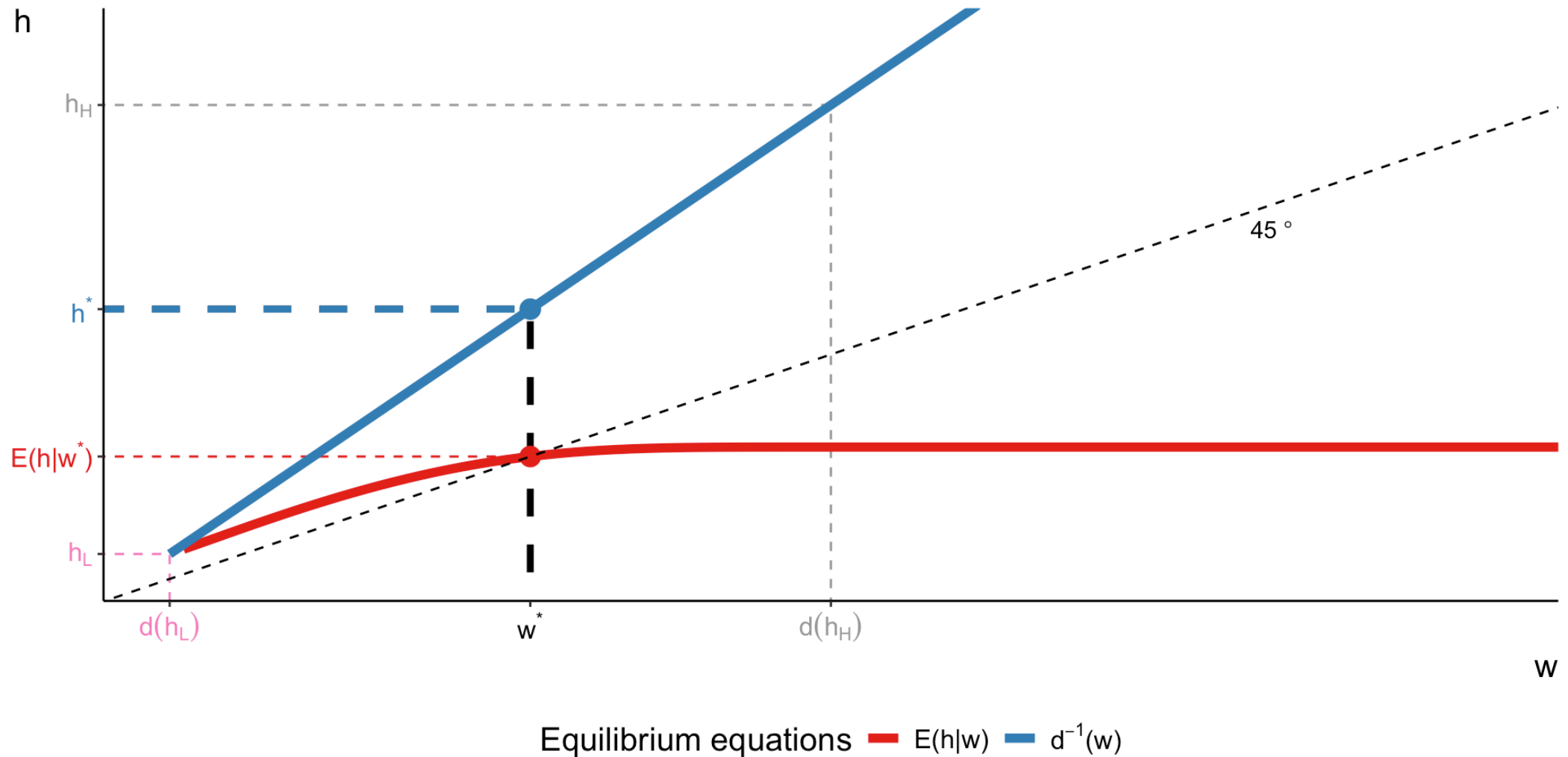
Imperfect competition: summary

Wages no longer reflect productivity differences alone

- monopsonistic employer: equilibrium wages and employment ↓
    → innovation and mobility costs (**Cahuc 2004**, ch 5.2)

    → trade unions (**Cahuc 2004**, ch 7)

- Workers and firms may have incomplete information about each other
- In the example, where firms do not know true worker productivities
    → $w^\star$ may be too high for some workers and too low for others

    → adverse selection: most productive workers stay unemployed

- Last lecture, workers have imperfect information about jobs
    → with on-the-job search and endogenous wages, $w > y$ for senior workers

Empirical evidence

Estimates of compensating differentials

Regression of wage w on job difficulty e

$$\ln w_i = \mathbf{x}_i \boldsymbol{\beta} + \mathbf{e}_{J(i)} \boldsymbol{\alpha} + \varepsilon$$

- $\mathbf{x}_i$ - observed worker characteristics

- $\mathbf{e}_{J(i)}$ - observed job characteristics of worker i
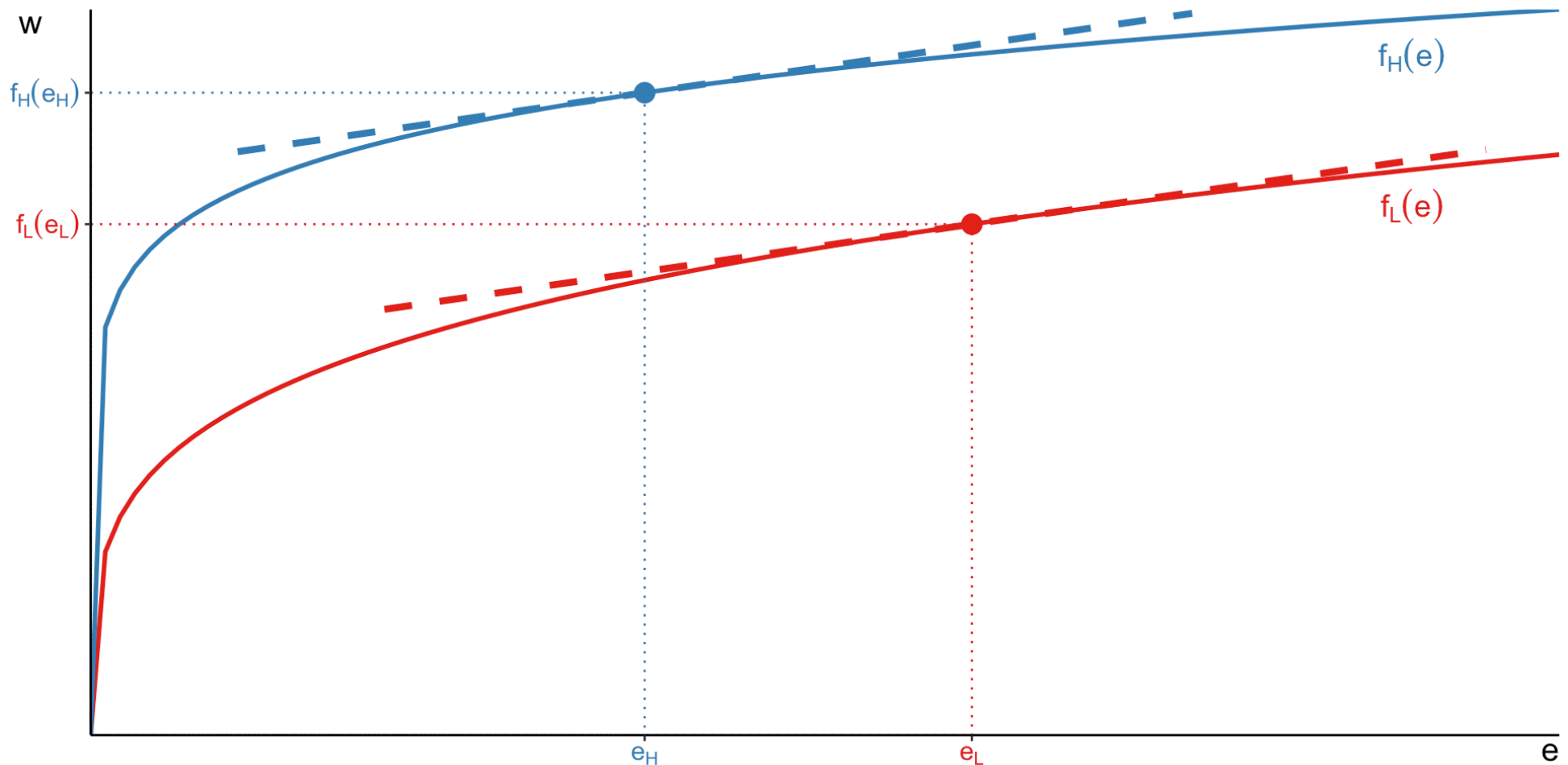
Early estimates biased by

- unobserved heterogeneity in productivity
- unobserved heterogeneity in preferences

Estimates of compensating differentials

Unobserved heterogeneity in productivity

Consider again model with varying e and two workers with $f_H(e), f_L(e)$

Estimates of compensating differentials

*Hwang, Reed, and Hubbard (**1992**)*

	Thaler and Rosen (1976)	Hwang et al. (1992)
Age	3.890	4.500
	(0.800)	
Age ²	-0.048	-0.096
	(0.009)	
Education	3.400	4.870
	(0.550)	
Risk	0.035	0.302
	(0.021)	
R2	0.41	0.31
Price of life saved (in years of wage)	26.54	227.67
Mean weekly wage	132.65	132.65

Estimates of compensating differentials

Bonhomme and Jolivet (2009)

Job search frictions: even small costs enough MWP ≠ wage differentials

	Finland	
	MWP	**Wage differentials**
Type of work	0.016	0.107
	(0.180)	(0.040)
Working conditions	0.070	0.004
	(0.080)	(0.030)
Working times	-0.016	0.048
	(0.070)	(0.040)
Distance to work	0.162	-0.031
	(0.060)	(0.040)
Job security	0.537	0.068
	(0.220)	(0.040)

Estimates of compensating differentials

*Lamadon, Mogstad, and Setzler (**2022**)*

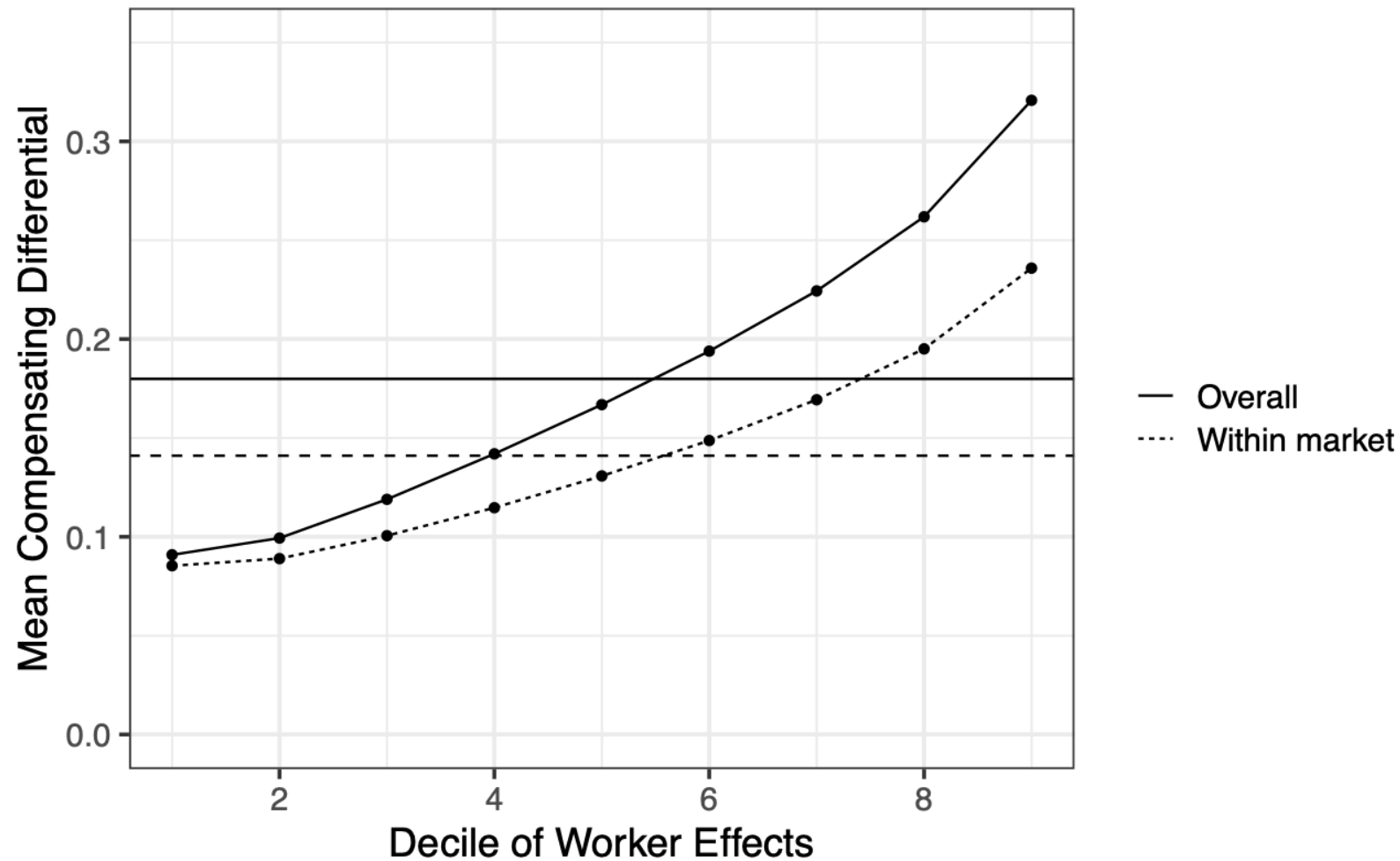Figure A.6. : Compensating differentials

Determinants of wage inequality

Taber and Vejlin (2020)

Estimate importance of four channels of wage heterogeneity:

- **Roy model**: comparative advantage in skill for job

- **Job search** model: search and mobility costs

- **Compensating differentials** model: preferences for non-wage attributes

- **Human capital** model: boost productivity while working

Determinants of wage inequality

*Taber and Vejlin (**2020**)*

A	Variance
Total	0.104
No learning by doing	0.096
No monopsony	0.093
No premarket skill variation across jobs	0.05
No premarket skill variation at all	0.008
No search frictions	0.007

B	Variance
Total	0.104
No learning by doing	0.096
No monopsony	0.093
No search frictions	0.086
No premarket skill variation across jobs	0.049
No premarket skill variation at all	0.007

C	Variance
Total	0.104
No learning by doing	0.096
No monopsony	0.093
No nonpecuniary aspects of jobs	0.087
No premarket skill variation across jobs	0.048
No premarket skill variation at all	0.006

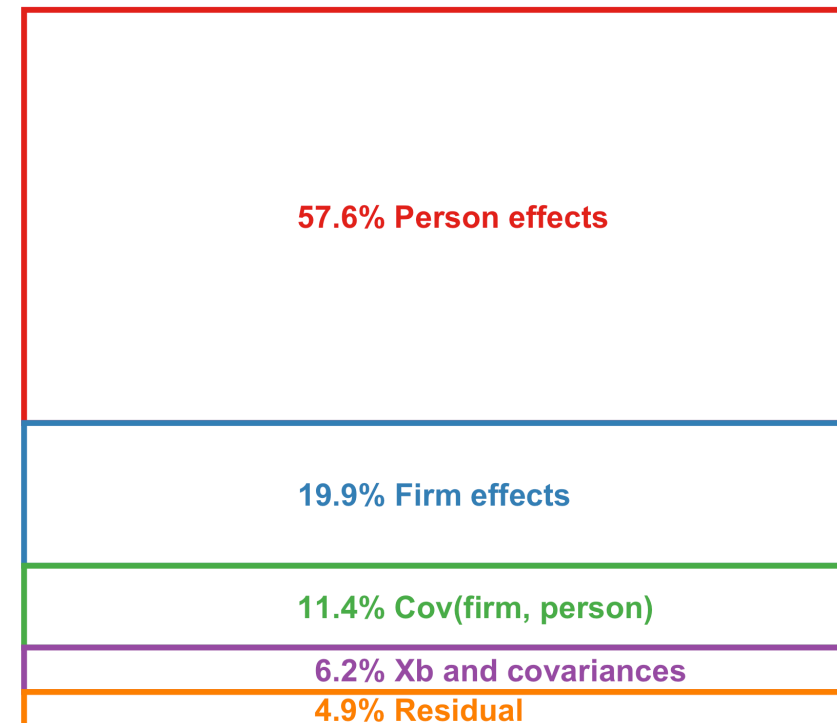| D	Variance
Total	0.104
No learning by doing	0.096
No monopsony	0.093
No nonpecuniary aspects of jobs	0.087
No search frictions	0.061
No premarket skill variation across jobs	0.047

Determinants of wage inequality

Firm-specific wage premiums

Firms may pay different wages to otherwise identical workers

$$Y_{it} = \beta_0 + \boldsymbol{\beta}_1 \mathbf{X}_i + \theta_i + \psi_{J(i)} + \varepsilon_{it}$$

- Card, Cardoso, and Kline (2016): ~20% of wage inequality due to firm premium

- Song et al. (2019): completely explained by sorting and segregation of workers

- Bonhomme et al. (2023): bias-corrected contribution 5-13%

57.6% Person effects

19.9% Firm effects

11.4% Cov(firm, person)

6.2% Xb and covariances

4.9% Residual

Summary

- Wage dispersion can be related to

  → individual heterogeneity in productivity/job tastes

  → heterogeneity in job conditions

  → monopsonistic employers forcing wage ↓ for some workers

  → seniority premium with incomplete information and labour market costs

- Incomplete information can also drive most productive workers out

- Differentiating between different channels in data can be challenging

Next lecture: Human Capital on 10 Sep

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