The Economics of Imperfect Labor Markets

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Nov 2018

Chapter 5. Regulation of working hours

Regulation of working hours: What are we talking about?

- May 1, 1886 day of strikes in the US for the introduction of eight-hours working day
- “8 hours” products
- May 1 $\rightarrow$ Labor Day
- Working hours per week declining
- Working weeks per year declining
- Part-time labor
- Take-up of short-time work schemes

Measures

- Intensive margin of labor supply – working hours (per week)
- Legal “restrictions”
  - Normal working week
  - Maximum number of overtime hours
  - Overtime premiums
  - Sometimes specified over calendar time period
- Bargained “normal” hours
- Share of part-time work in total employment

Cross-country comparison

- In many countries: normal working week is 40 hours
- Wide variation in maximum weekly overtime hours: 2 (Spain), 15 (Netherlands)
- Also wide variation in maximum total working hours
- Overtime premiums mostly 25-50%, sometimes 100%
- Normal weekly hours set by collective bargaining often substantially lower than legal maximum

Cross-country information on working hours

	Legal maxima on working hours			Bargained normal hours	Premium overtime (%)
	Normal	Overtime	Maximum		
Austria	40	5	50	36-40	50
Denmark	37	none	48	37	50
France	39	9	48	39	25
Germany	48	12	60	35-39	25
Italy	48	12	60	36-40	10
Netherlands	45	15	60	36-40	
Spain	40	2	47	38-40	
UK	none	none	none	34-40	
US	40	none	none	35-40	50

STW Eligibility and Entitlement Conditions for STW scheme

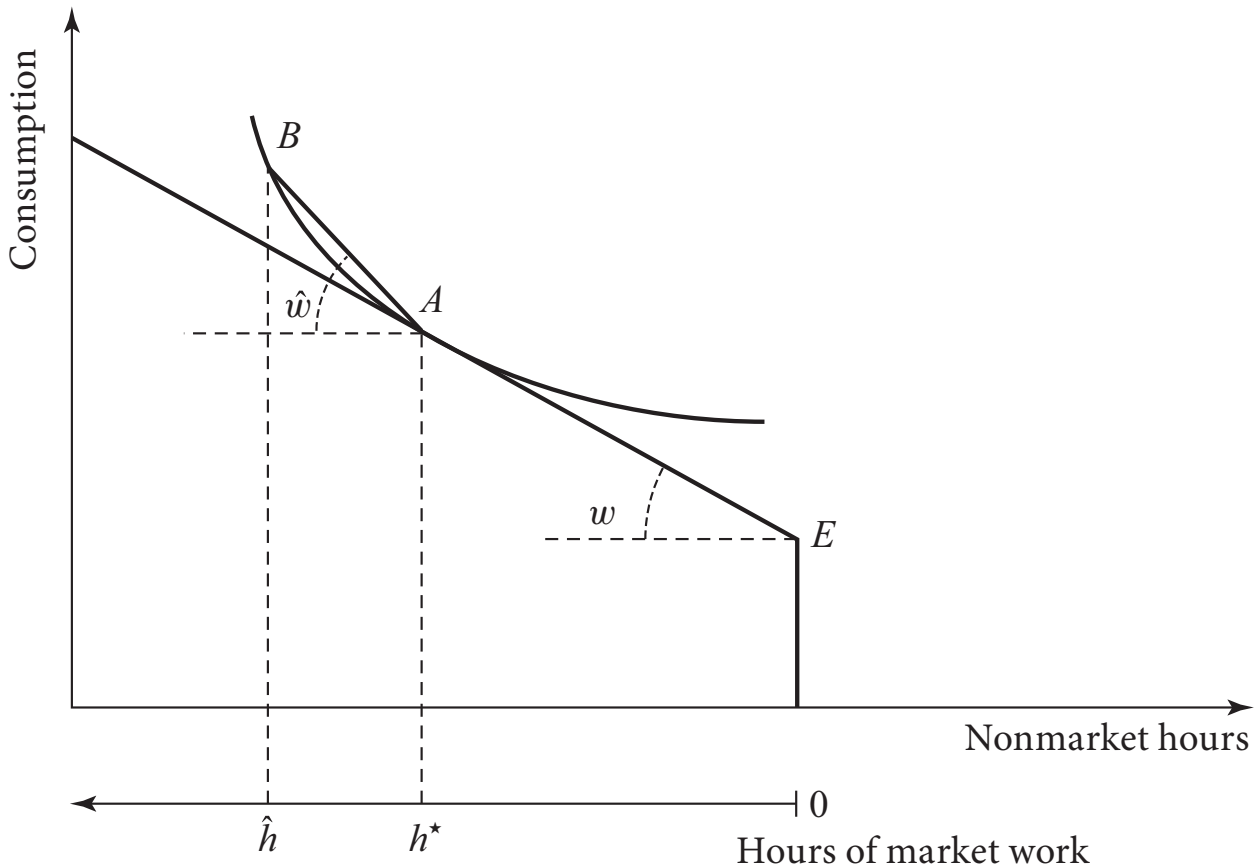
	Eligibility Conditions		Entitlement Conditions			
Country	Justification of economic need	Social Partner Agrt.	Compulsory Training	No Dismissal	Job Search Requir. for Employee	Recovery Plan
Austria	Yes	Yes	No	Yes	No	No
Belgium	Yes	BC: No WC: Yes (or business plan)	No	No	No	BC: No WC: Yes
Canada	Yes	Yes	No	No	No	No
Czech Republic	Yes	Yes	Yes	No	No	No
Denmark	No	Yes	No	No	Yes	No
Finland	Yes	Consultation	No	No	Yes	No
France	Yes	Yes	No	Yes	No	No
Germany	Yes	Yes	No	No	Yes	No
Hungary	Yes	No	Yes	Yes	No	No
Ireland	No	No	No	No	Yes	No
Italy	Yes	CIGO: No; CIGS:Consul.	No	No	No	Yes
Japan	Yes	Yes	No	No	No	No
Luxembourg	Yes	Yes	No	No		Yes
Netherlands	No	Yes	Yes	Yes	No	No
Norway	Yes	No	No	No	Yes	No
Poland	Yes	Yes	No	Yes	No	Yes
Portugal			Yes	No		No
Slovak Republic	Yes	Yes	No	No	No	No
Spain	Yes	No	No	No	Yes	Yes
Switzerland	Yes	Individual Agreement	No	No	No	No

▸ Short-Time Work(STW) throughout the Great Recession
▸ Intensive vs. extensive margin

Perfect Labor Market: Labor Supply

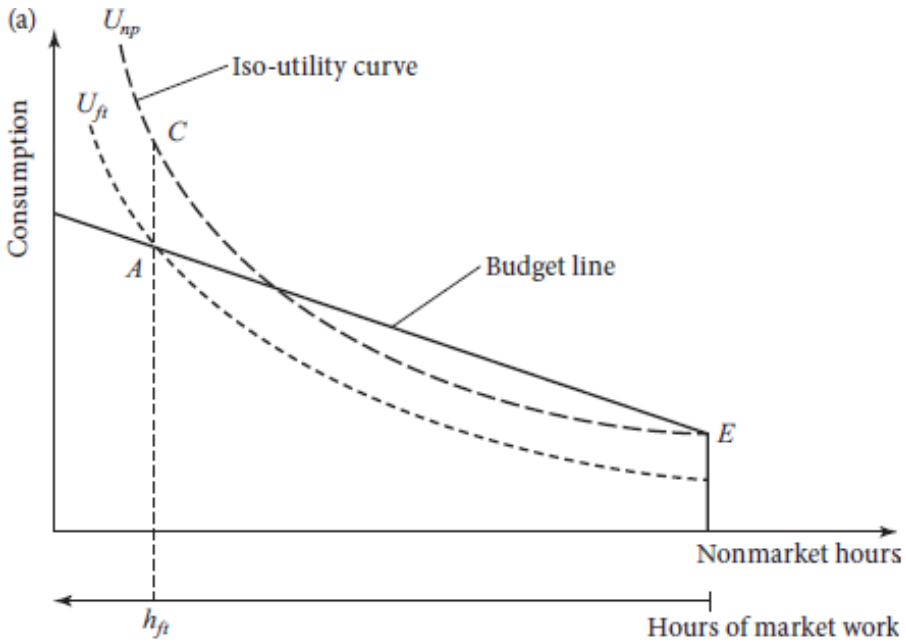
- Supply side: choice of number of hours on the basis of the hourly wage rate and preferences for leisure and income
- Working hours per day, working days per week, workweeks per year, working years over lifetime
- Choice of working hours often restricted to a limited set, most commonly full-time, part-time and no-time
- Demand side: cost-minimization taking into account of technologies to substitute workers (L) and hours per worker (h)

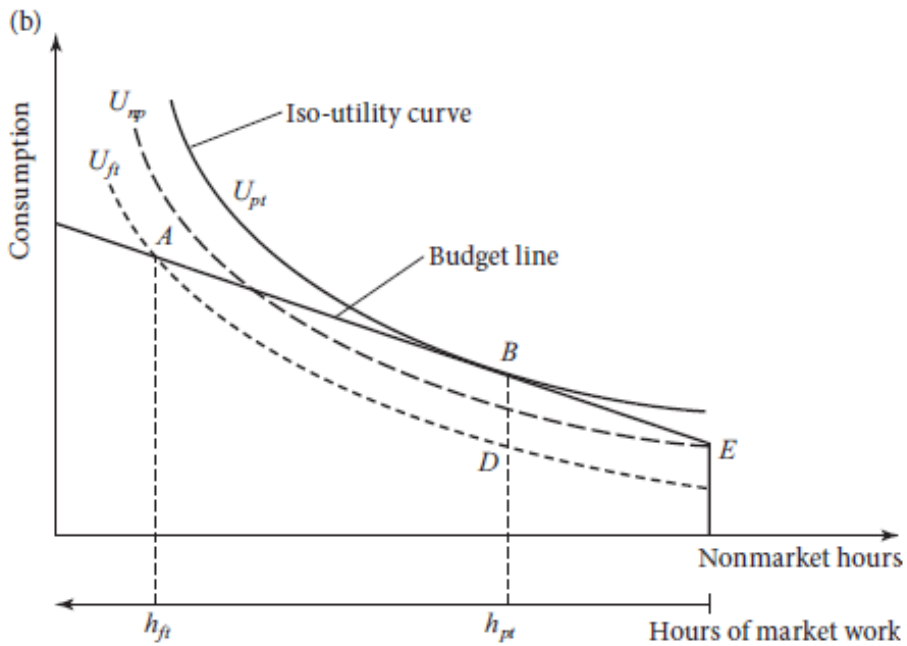
Choice of Hours of Work and the Overtime Premium



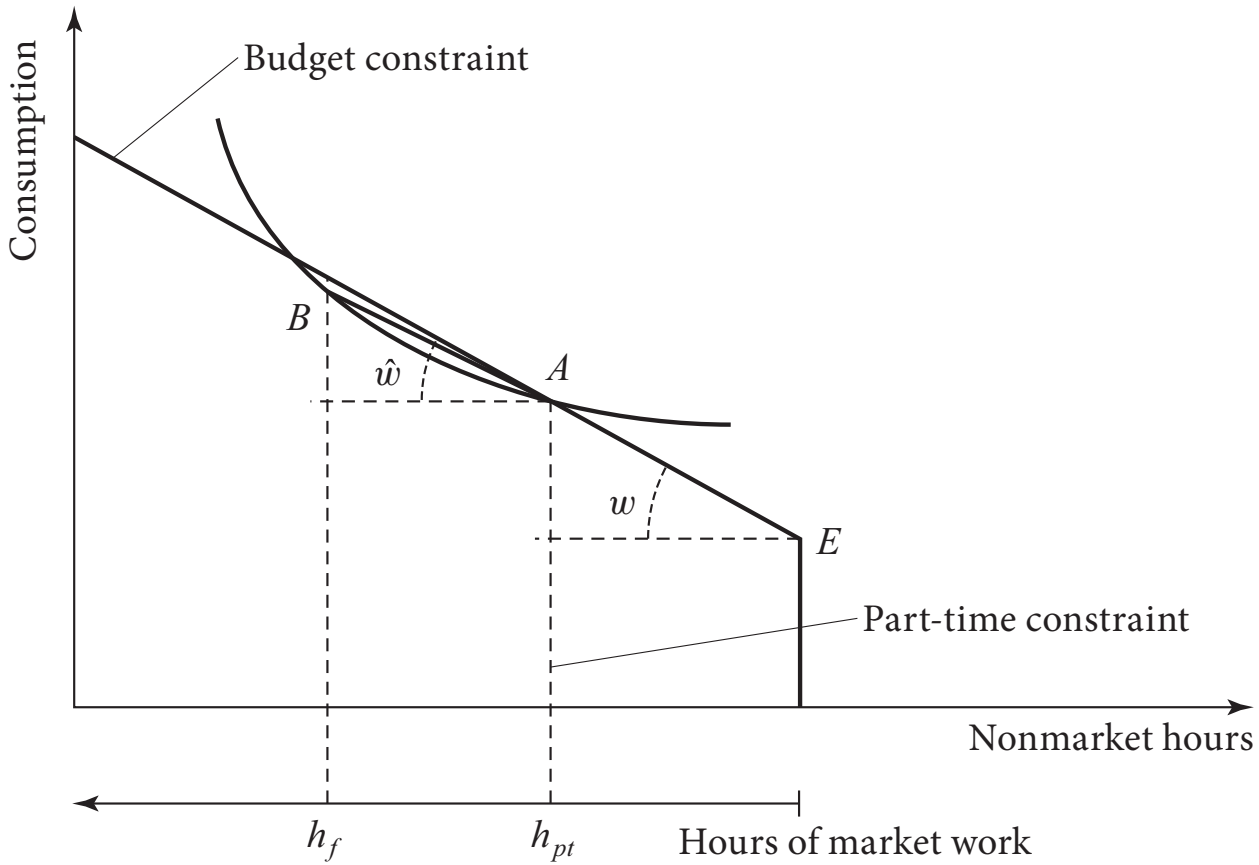
Choice of Hours of Work

Only Full-Time Jobs Available, Choice Is Nonparticipation (a, Left); Introducing Part-Time Work, Choice is Participation (b, Right)





Involuntary part-time work



GE (wage effects) of part-time work

- If only full-time jobs are available, introduction of part-time jobs increases labor supply
- Outward shift of labor supply curve lowers wages and reduces full-time employment
- Wage effects may explain why unions often oppose part-time?
- Introduction of part-time jobs may also shift the labor demand curve
- Recent study for Austria (Boeheim et al., 2014) shows that hourly wage in part-time not lower as compared to full-time jobs

Imperfect Labor Market - Labor Demand

- Shorter working hours $\rightarrow$ less unemployment?
- Lump of labor fallacy : total amount of labor is not fixed
- Iso-labour curve shifts inward: total hours of work reduced with the introduction of shorter working hours
  - Hourly wage rises
  - Fixed costs per worker
  - Capital costs may rise if operating hours fall
  - Non-productive hours constant per worker
  - But: productivity per hour may rise due to less fatigue

Isolabour and isocost of labour curve

Suppose that output, y, is produced using only labour which requires some combination of workers, L, and hours of work, h. In particular, consider a multiplicatively separable production function

$$y = Lh^{\alpha}, \ \textit{where}\ 0 < \alpha \leq 1$$

$\Rightarrow$ Isolabor curve ... same effective labor input

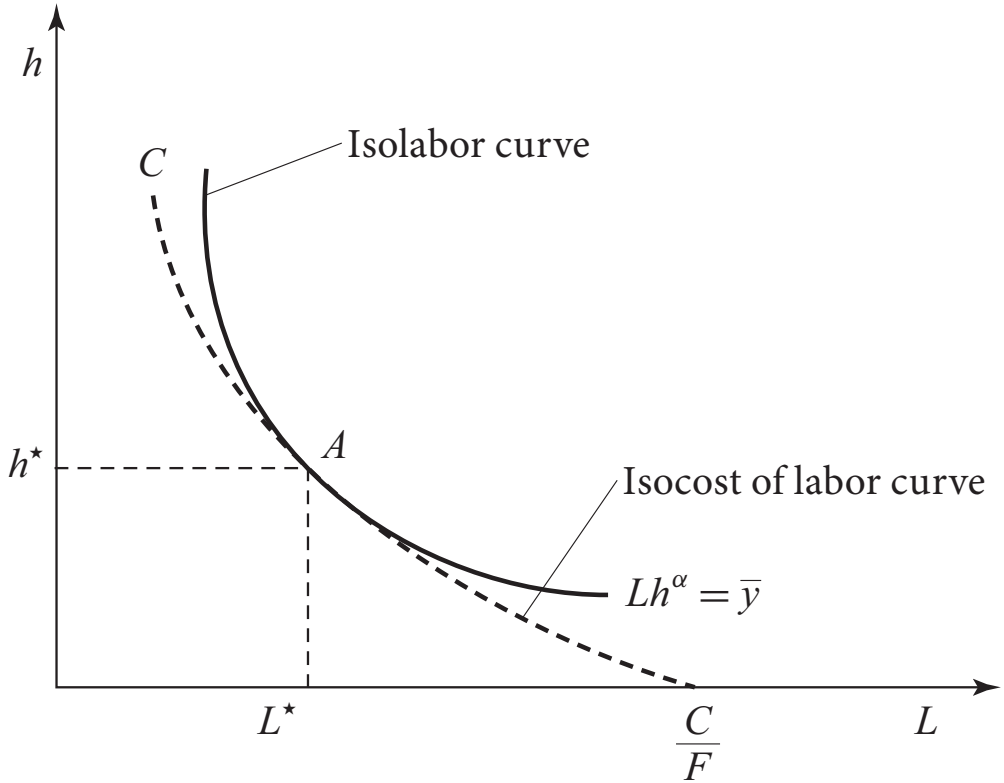
Labour costs include variable costs (the hourly wage is w) and recurrent fixed costs per worker, F, i.e.:

$$C = L(F + wh)$$

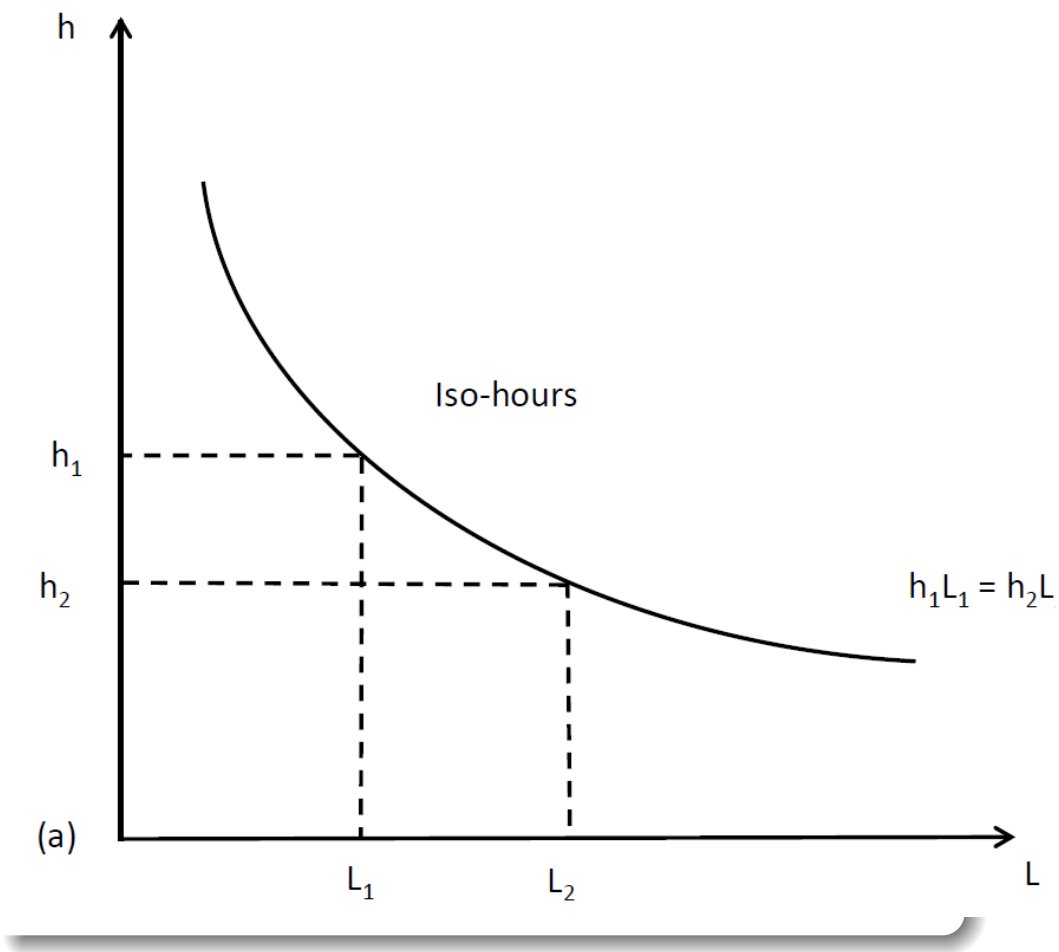
$\Rightarrow$ Isocost curve

Cost-minimizing choice

Per any given output level (budget), it is chosen the lowest isocost (the highest isolabour curve) (here assuming that $\alpha = 1$):

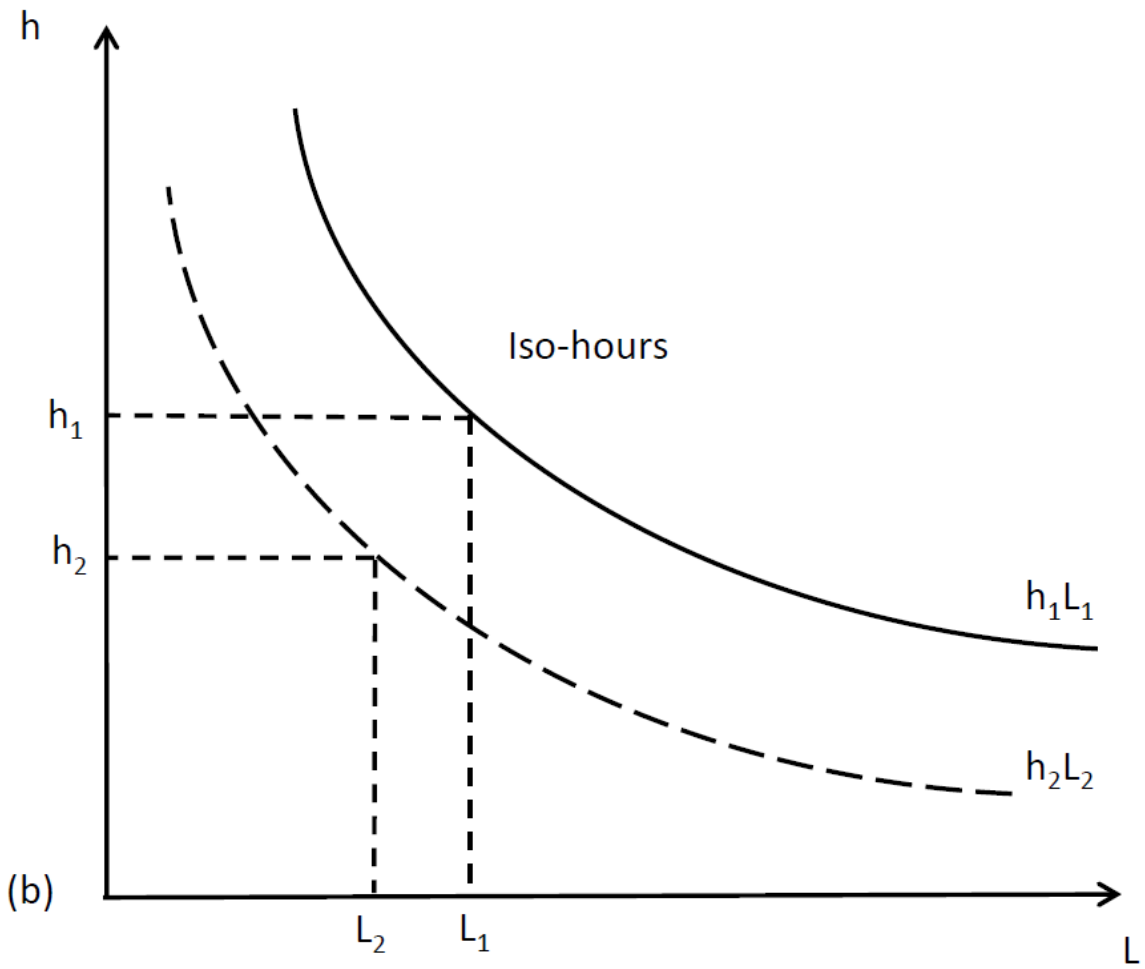


Isolabor, Isocost and Iso-hours curve



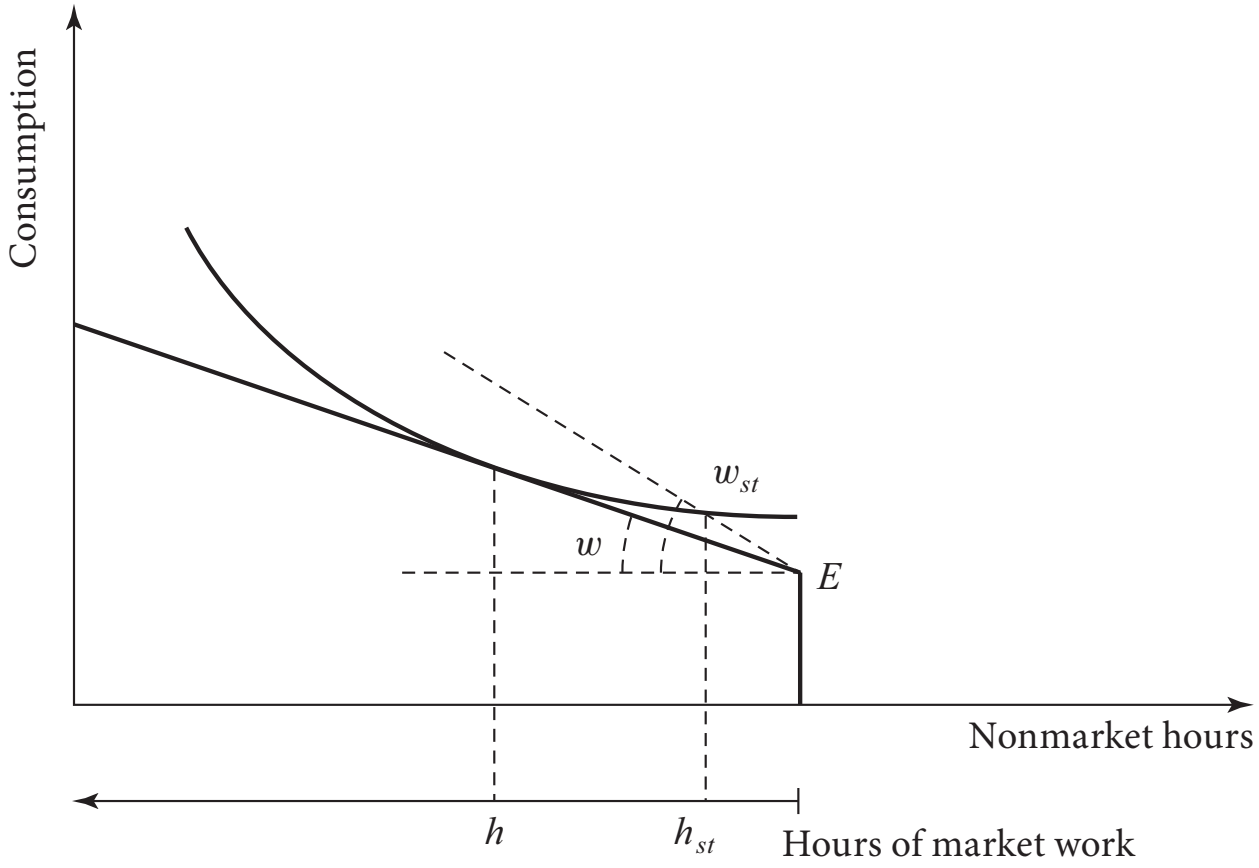
- $\alpha = 1$, F=0
- Isolabor and Isocost curve overlap
- Iso hours

Effects of statutory changes in h



Short Time Work

compensating the worker for the reduction in working time

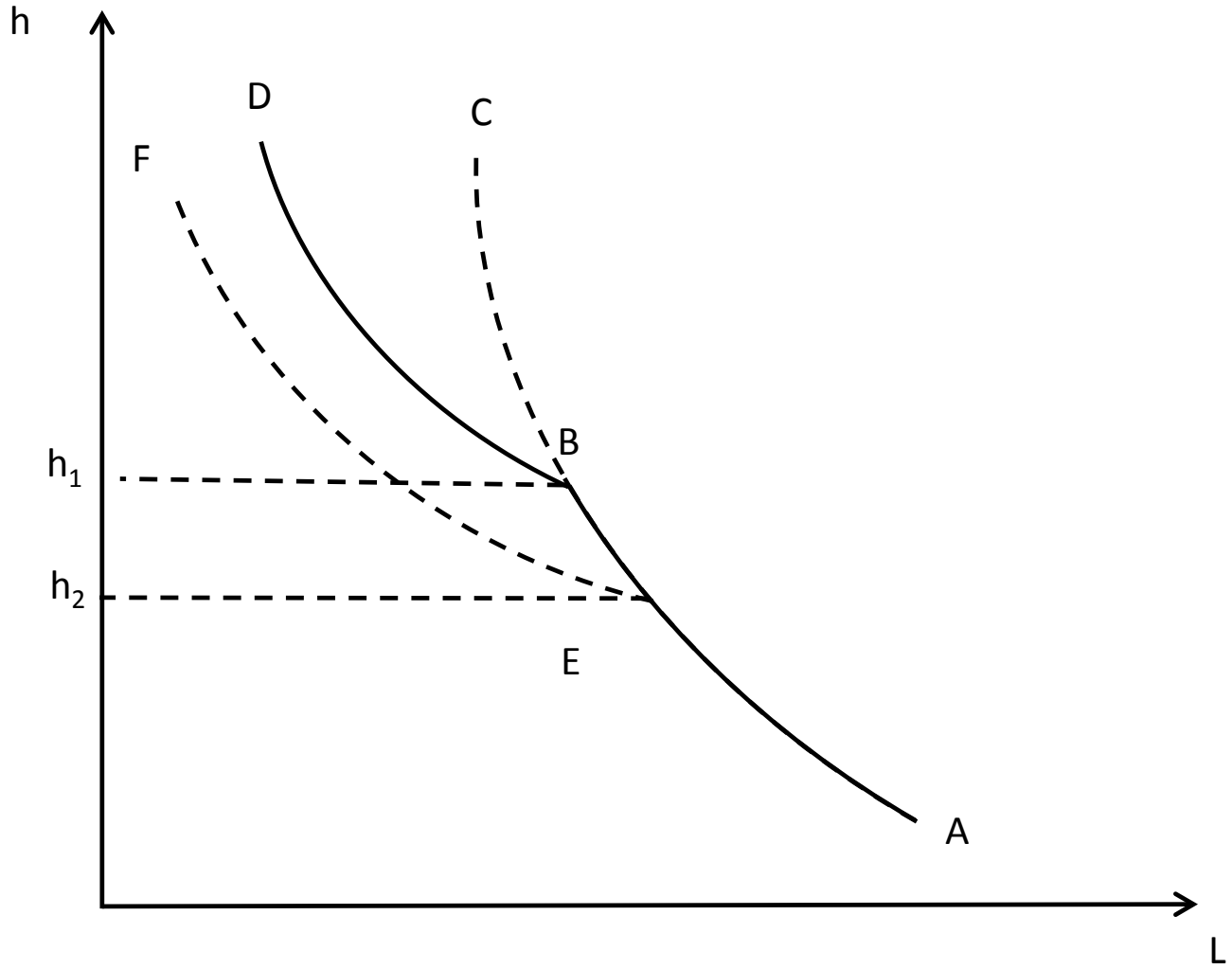


▸ Demand and STW

Overtime premium - Reduction in standard hours

- If overtime hours pay a higher wage: isocost of labor curve with a kink
  - kink at regular working hours: due to higher wage substituting hours by workers gets more difficult
- Effects of changes in normal hours depend on where the firm is located
  - if initial hours left to B, then reduction in hours causes employment to fall
  - if initial hours exactly at B: employment may rise
- Monthly or weekly wages may be rigid in which case hourly wages increase as a consequence of reductions in h

A isocost of labor with overtime work



Empirical evidence - hours of work

- Substantial decline in hours of work between 1950 and 2005
- Large cross-country differences in annual working hours in 2005: 1409 (Netherlands), 1790 (US)
- Anatomy of typical workweek:
  - Weekly hours: 31.8 (Netherlands), 38.8 (Spain)
  - Workweeks per year: 38.4 (Netherlands), 42.2 (Spain)

Working hours

	Average annual hours		Average	Anatomy of annual hours, 2010	
	1950	2005	annual change	Hours per week	Weeks per year
Austria	2,405	1,663	-12,4	38	41
Denmark	2,145	1,536	−10.1	34	38
France	2,098	1,439	−11.0	38	39
Germany	2,387	1,408	−16.3	36	41
Italy	2,469	1,778	−11.5	38	41
Spain	1,960	1,674	−4.8	39	41
United Kingdom	2,201	1,650	−9.2	36	41
United States	1,909	1,695	−3.6	—	46

Mandatory reduction of working hours in France

- François Mitterrand - 1982:
  - Workweek 40 to 39 hours
  - Without loss in workers' pay (weekly pay)
  - Intention to reduce to 35 hours in 1985 (not implemented because of economic situation)
- Mandatory nominal (weekly) wage rigidity for current minimum wage workers: newly hired workers 2.5% cheaper
- Crépon and Kramarz (2002): use 39 hours April 1982 as control group, 40 hours as treatment group

Crépon and Kramarz (2002)

	Probability to lose job (%):		
	1982-84 before	1985-87 after	Diff.
40 hours	16.5	11.9	4.6
39 hours	12.6	12.1	0.5
Diff.	3.9	-0.2	4.1

- Group with 40 hours - 1982 was affected by reduction, others not
- So: 4.1% job loss on average due to reduction in working hours
- For low-wage workers for whom the reduction in hours was associated with monthly pay rigidity: 8.4% points
- Quite high as the reduction in working hours was only 2.5% (1 hour from 40)

35 hours week – Estevão and Sá (2008)

- France: 1998 workweek to 35 hours:
  - February 2000: large firms ($>$ 19 workers)
  - January 2002: small firms ($<$ 20 workers)
- Additional policies: also measures to reduce labor costs:
  - Small firms: overtime premiums reduced
  - Rebates to social security contributions
  - More flexible accounting of overtime work (annual in stead of weekly)
- Argument = reduction in labor costs & increase in productivity: no need to cut monthly wages

Experimental design – Estevão and Sá (2008)

- Treatment group: large firms (20-49 workers)
- Control group (up to 2002): small firms
- Study wage effects (hourly, monthly), employment (level, inflow, outflow), dual job holdings, job satisfaction
- Working $\leq$ 35 hours (%)

	Small firms	Large firms	Difference
1997	25.5	24.6	−0.9
1998	26.3	25.9	−0.4
1999	27.1	27.6	0.5
2000	31.4	43.6	11.2
2001	34.3	52.1	17.8
2002	57.3	64.4	7.1

Effects – dif-in-dif estimates (differences to 1997 levels)

Difference in differences estimate:

	from employment to unemployment		share of workers with multiple jobs (%)		Hourly wage (%)		Monthly wage (%)	
Year	Men	Women	Men	Women	Men	Women	Men	Women
1998	0.8	0.1	0.1	−1.1	0.9	−0.4	0.2	−0.4
1999	3.9	−0.5	−0.1	0	2.1	−1.7	0.6	0.2
2000	2.7	0.6	0.7	−0.03	3.4	1.3	0.5	−0.4
2001	1.0	2.1	−0.1	−0.2	3.7	2.0	1.1	−0.8
2002	1.4	−1.2	0.04	−0.03	3.0	0.0	0.3	0.1

- Hardly any effect on dual jobs
- More turnover/ transition to unemployment
- No employment effects
- Less satisfaction about hours (except for high income women)

Part-time jobs (%)

Part-time jobs (%)

	PT employment		Involuntary PT		PT preferring FT		FT preferring PT	
	Men	Women	Men	Women	Men	Women	Men	Women
Austria	5.9	32.8	11.9	7.3	—	—	—	—
Denmark	14.3	25.4	10.4	12.8	69	8	7	21
France	5.7	22.4	26.6	28.4	69	35	11	25
Germany	8.1	38.3	20.8	12.9	52	12	5	10
Italy	6.2	32.6	44.8	39.6	83	42	22	32
Netherlands	17.1	61.6	6.7	5.0	25	7	13	23
Spain	5.6	22.6	67.5	54.9	36	37	8	14
United Kingdom	10.5	38.1	27.0	12.2	72	22	3	9
United States	8.4	17.1	13.7	10.3	—	—	—	—

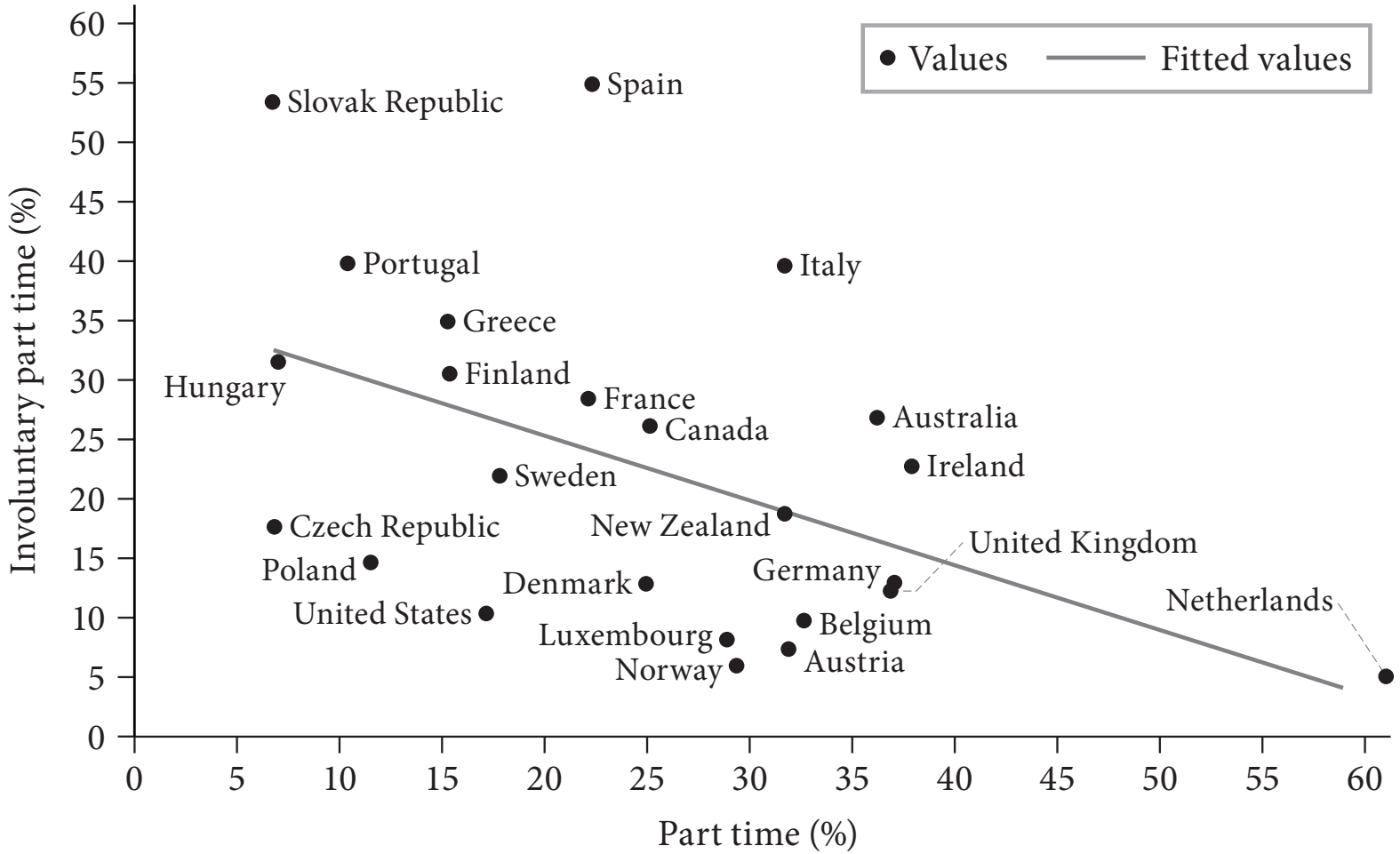
Cultural attitudes towards part-time jobs

Old discussion – see Sundstrøm (1991)

- Negative view: trap leading to marginalization of women
- Positive view: provide opportunity for continuous employment for those women for whom full time work is not possible

▸ Changes in employment rate 1997-2007

Involuntary part-time work



Policy issue 1: Should governments regulate working hours?

- Efficiency reasons:
  - If employers have monopsony power – working time reduction (over a small range) $\rightarrow$ increase in employment
  - Negative externalities without regulation – “rat race”
- Employment is not a lump-of-labor that can be redistributed at no costs
- Difficult to find strong arguments in favor of government intervention

Policy issue 2: Should governments stimulate part-time labor?

- Cross-country differences due to differences in institutional arrangements and union resistance
- Growth of part-time jobs may stimulate full-time employment (Netherlands)
- Part-time jobs may facilitate combination of work and care

Policy issue 3: Should governments use STW during recessions?

- Only if recessions are relatively large
- Otherwise STW may backfire reducing reallocation and creating structural unemployment
- Important to work on design features of STW
  - dead weight losses: firms and workers profit from generous subsidies

Overlaps with other institutions

- Collective bargaining and unions – tradeoffs wages & hours
- Family policies – balancing work and family life
- Employment protection legislation – adjustment costs
- Unemployment benefits – substitute for STW

Why does regulation of working hours exist?

- Hours of work is rarely the outcome of a market process
- Market failures: conflicting preferences of workers and employers, institutional restrictions
- Unions only represent interests of their workers
- Governments may influence hours of work for social reasons (family life) or because they want to influence composition of unemployment (early retirement schemes)

Why STW?

- Other institutions (UB and EPL), provide insurance against job loss, but do not operate on intensive margin
- STW encourages hours reduction by
  1. increasing cost savings of reducing working time (employer)
  2. minimizing the fall in take-home pay (employee)
- Reduced response of hourly wages to hours adjustment as workers are compensated for falls in hours:

Review Questions

1. Under what conditions does work sharing lead to an increase in employment, and how plausible are these conditions?
2. Why do firms employ part-time workers instead of full-time workers?
3. How does overtime work affect the trade-off between hours and workers?
4. Why do overtime premiums exist?
5. What happens if the standard working week is reduced in a situation where workers work overtime?
6. When is short-time work appropriate?

Exercise

1. Illustrate the hours-workers trade-off.
2. What happens when there is an overtime premium? Suppose now that there is no choice in terms of hours.
3. Show graphically what happens to the reservation wage of a single individual in this case.
4. How does this reservation wage change when part-time jobs are introduced?
5. Can this explain why unions oppose the introduction of part-time jobs?

Intensive and Extensive Margins (I)

The total labor costs of the firm is:

$$C = (wh + \omega w(h - \overline{h})d + F)L,$$

where $F > 0$ are the fixed costs of wokers, w is the hourly wage, h is the actual weekly working hours, ω is the hourly overtime premium, $\overline{h}$ is the standard workweek, d is a binary variable that has a value of 1 if $h \geq \overline{h}$ and a value of 0 otherwise, and L is the number of workers in the firm.

The production function is:

$$y = Lh^{\alpha},$$

where $\alpha \leq 1$.

Intensive and Extensive Margins (II)

For any given level of production $\bar{y}$, the firm minimizes labor costs Λ, solving

$$\min_{L,h} \Lambda = (wh + \omega w(h - \bar{h})d + F)L + \lambda(\bar{y} - Lh^{\alpha}),$$

where λ is the Lagrange multiplier.

After some algebra we obtain the optimal numer of hours:

$$h^* = \frac{\alpha(F - \omega w \bar{h} d)}{(1-\alpha)w(1+\omega d)},$$

and the optimal number of workers

$$L^* = \bar{y}\left(\frac{\alpha(F - \omega w \bar{h} d)}{(1-\alpha)w(1+\omega d)}\right)^{-\alpha}.$$

Intensive and Extensive Margins (III)

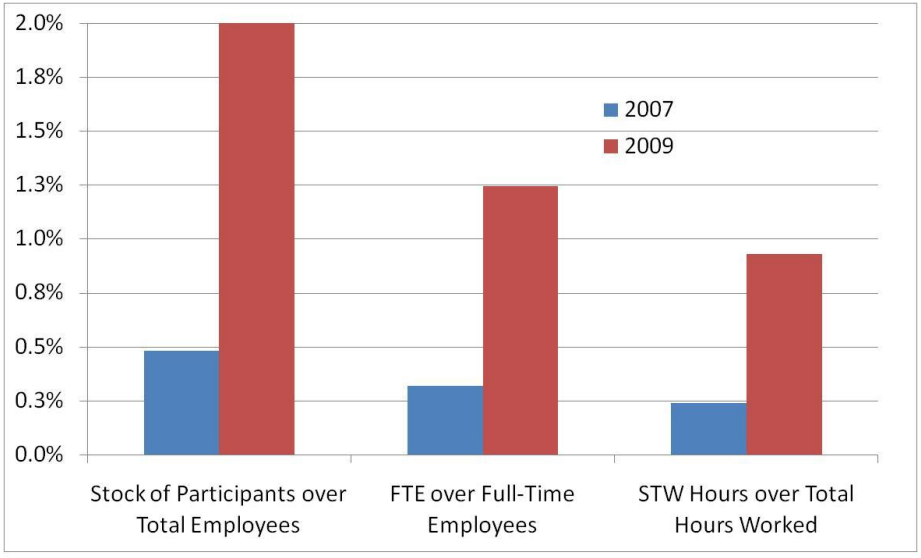
From these two optimal conditions we can derive the following results:

Effects of changes of	on hours (h^*)	on employees (L^*)
$\bar{y}$	0	$+$
F	$+$	$-$
$\overline{h}$	$-$	$+$

ADDITIONAL MATERIAL:

Short-Time Work (STW) throughout the Great Recession

Short-time work, take-up rates in 10 OECD countries (nonweighted average):



Note: countries include Austria, Belgium, Canada, Finland, France, Germany, Italy, Japan, Norway and Switzerland.
Source: OECD, Hijzen and Venn (2010).

◂ STW Eligibility and Entitlement Conditions for STW scheme

Intensive vs. extensive margin

During the Great Recession, in some countries more adjustment along the intensive margin than under previous recessions. Decomposition of variation of total hours (H) in hours per worker (h) and number of workers (L):

$$\Delta \log(H) = \Delta \log(h) + \Delta \log(L)$$

Contribution of the intensive margin to total hours adjustment

Country	2008-2009	Previous Recessions
Canada	56%	41%
France	55%	58%
Germany	117%	48%
Italy	79%	31%
Japan	91%	89%
UK	48%	46%
US	36%	47%

Note: past recessions include 1974-1975 and 1991-1993. Peak-to-trough defined following total working hours dynamics
Source: number of workers, OECD MEI; average hours worked, IMF and OECD Economic Outlook une 2010.

◂ STW Eligibility and Entitlement Conditions for STW scheme

The rationale for STW

Consider production function

$$y = Lh^{\alpha}$$

where

$$0 < \alpha < 1$$

and cost function

$$C = L(F + wh)$$

Cost minimization over h and L obtains the (conditional) demands for hours and workers:

$$h = \frac{\alpha}{1-\alpha}\frac{F}{w} \text{ and } L = \frac{y((1-\alpha)w)^{\alpha}}{(\alpha F)^{\alpha}}$$

hence

$$\frac{dh}{dy} = 0 \text{ and } \frac{dL}{dy} > 0$$

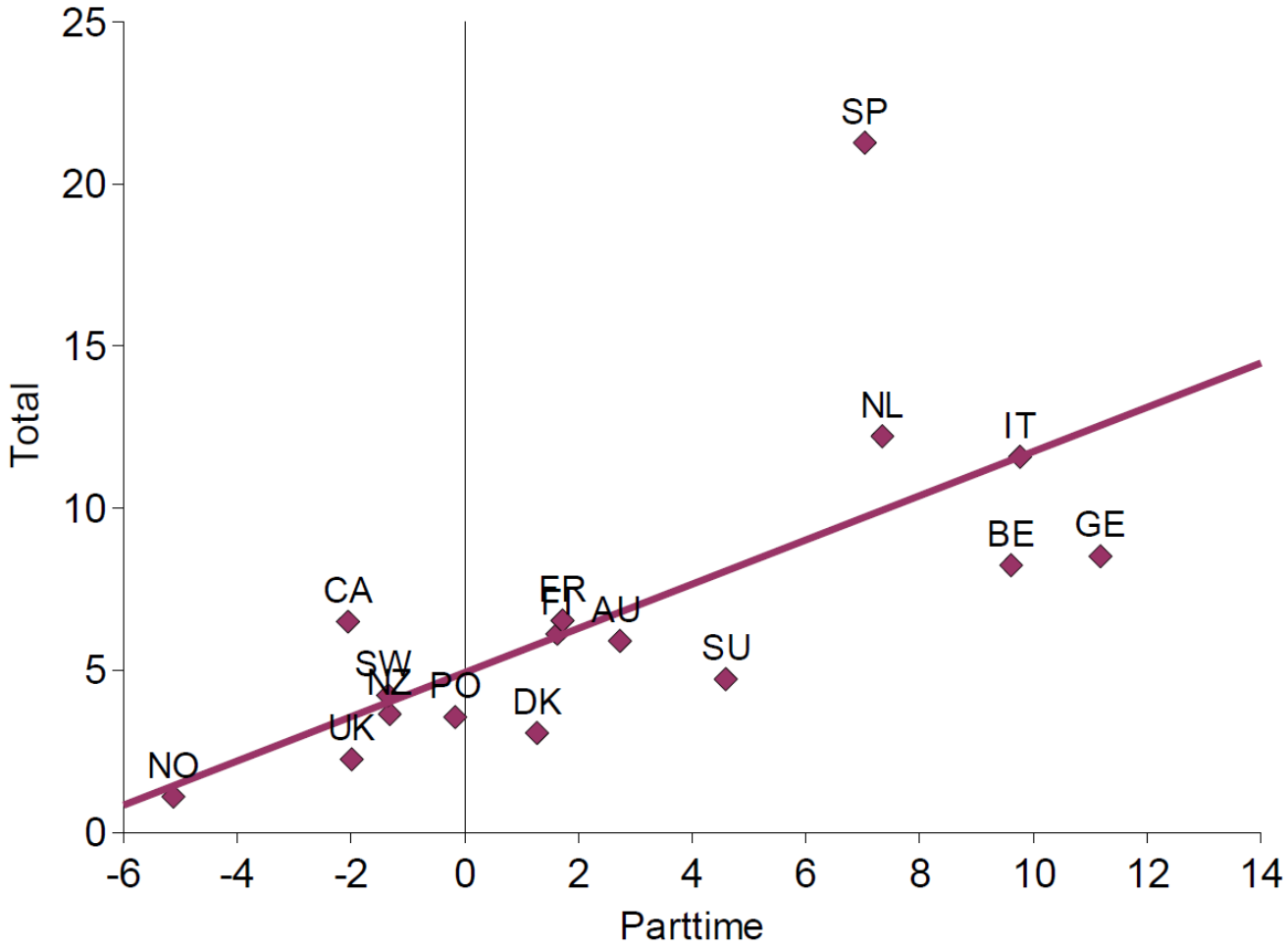
The bias towards workers adjustment

Notice that:

- per given hourly wages a negative shock to output, will be accommodated by reducing the number of workers rather than by reducing the hours of work
- with hourly wages increasing (as h falls), the optimal choice of hours of the firm is also independent of y
- in a more general case, small adjustments of hours if F is small

◂ STW – labor supply

Changes in employment rate 1997-2007



◂ Cultural attitudes towards part-time jobs