

Extensive and Intensive Margins of Labour Supply: Working Hours in the US, UK and France

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- **Micro vs macro elasticities**
 - Large vs small variations (Chetty 2009)
 - Short-term vs long-term elasticities
 - Extensive vs intensive elasticity (Rogerson and Wallenius 2009)

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- ③ provide a first attempt at consistently estimating micro and macro elasticities on UK data

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- **Our estimation**
 - Extensive: employment rate from the reference week
 - Intensive: actual hours from the reference week in continuous surveys; usual hours adjusted for annual surveys for France; actual hours adjusted for UK and US for annual surveys

Figure 1: Mean annual hours per individual aged 16 to 74

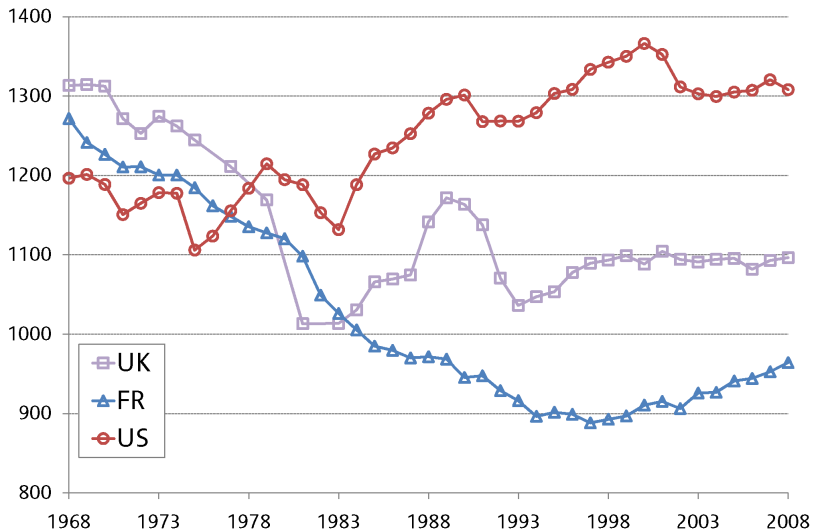


Figure 2: Employment rate (per population) aged 16 to 74

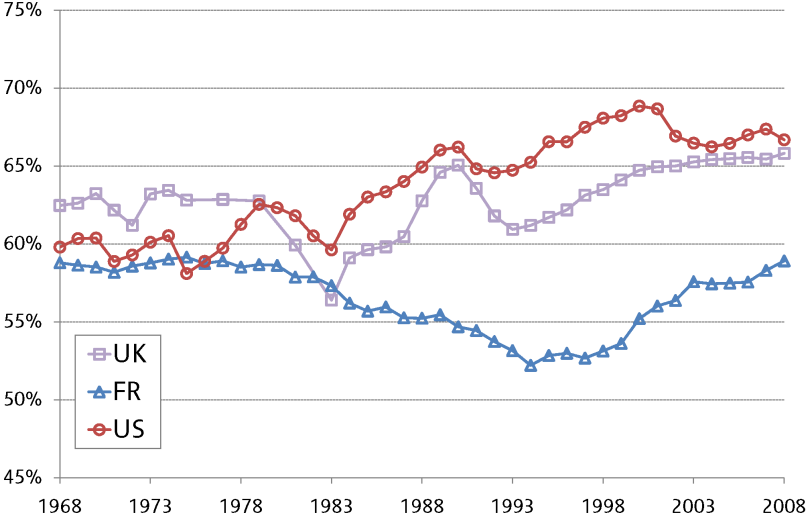


Figure 3: Mean annual hours per worker aged 16 to 74

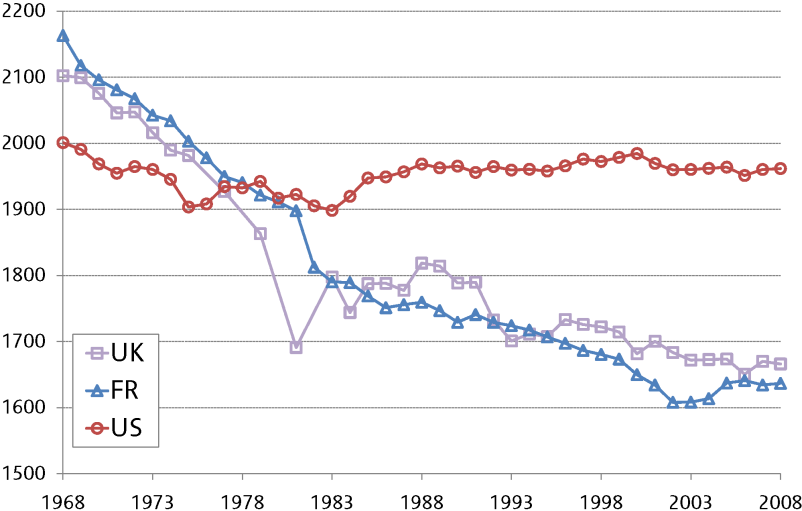


Figure 4: Male total hours by age 1977

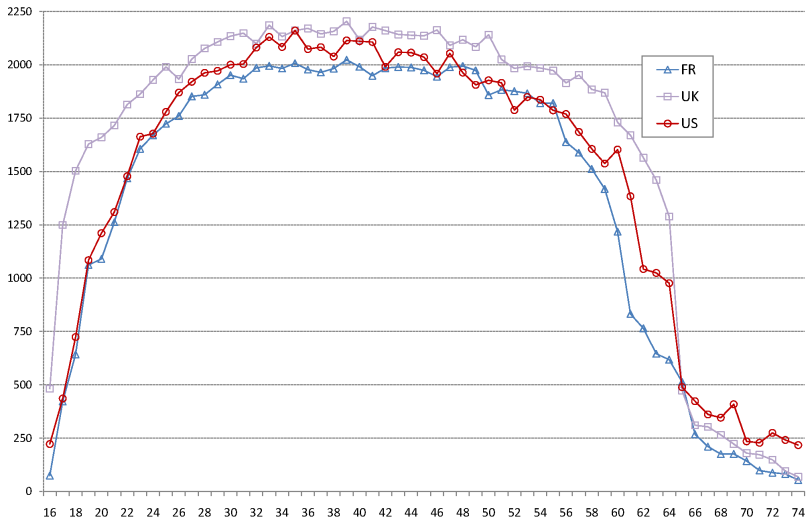


Figure 5: Male total hours by age 2007

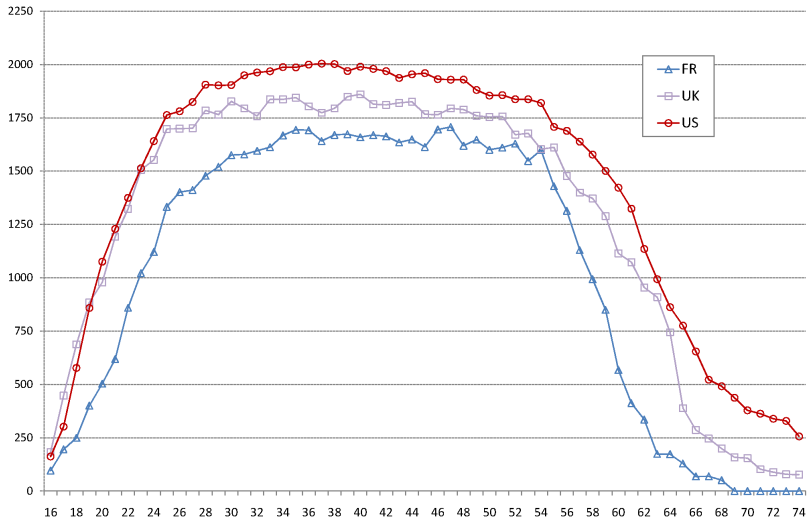


Figure 6: Male employment by age 1977

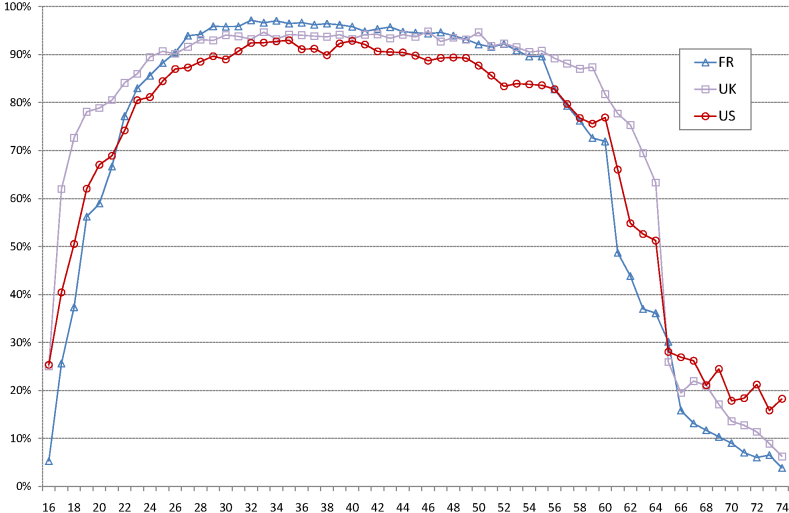


Figure 7: Male employment by age 2007

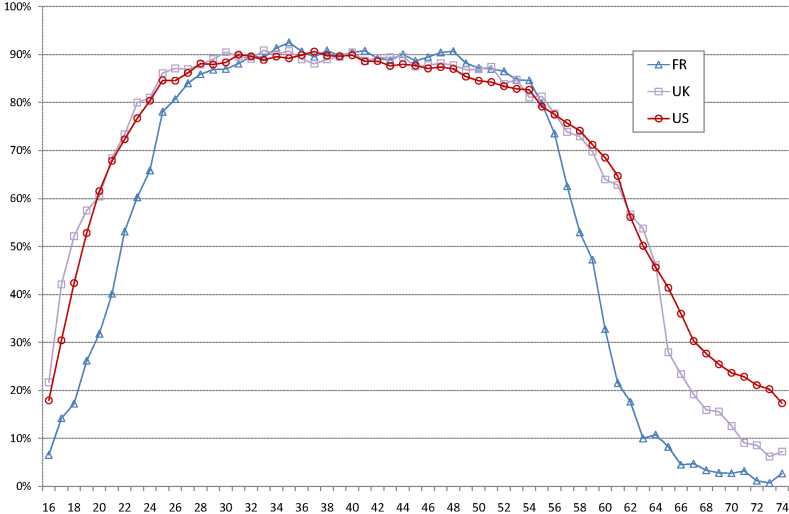


Figure 8: Female total hours by age 1977

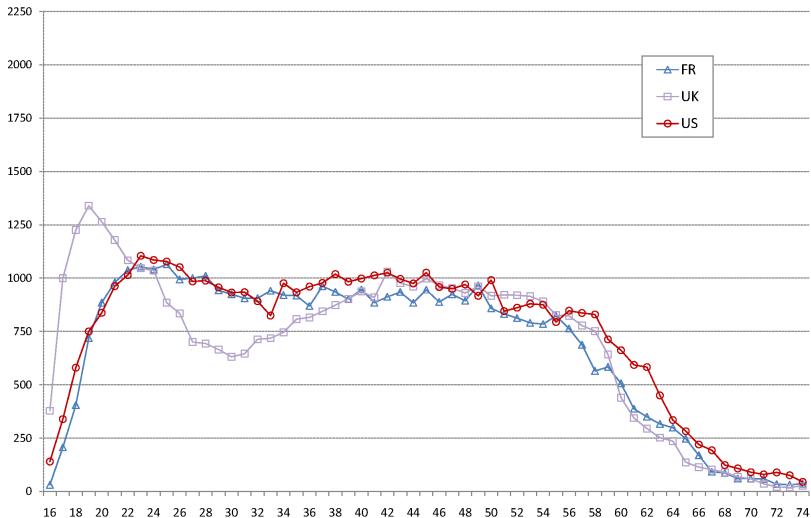


Figure 9: Female total hours by age 2007

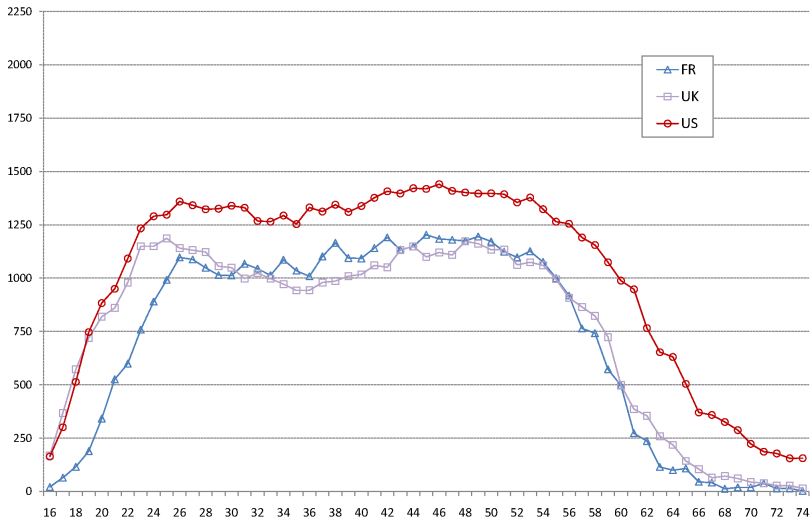




Figure 10: Female employment by age 1977

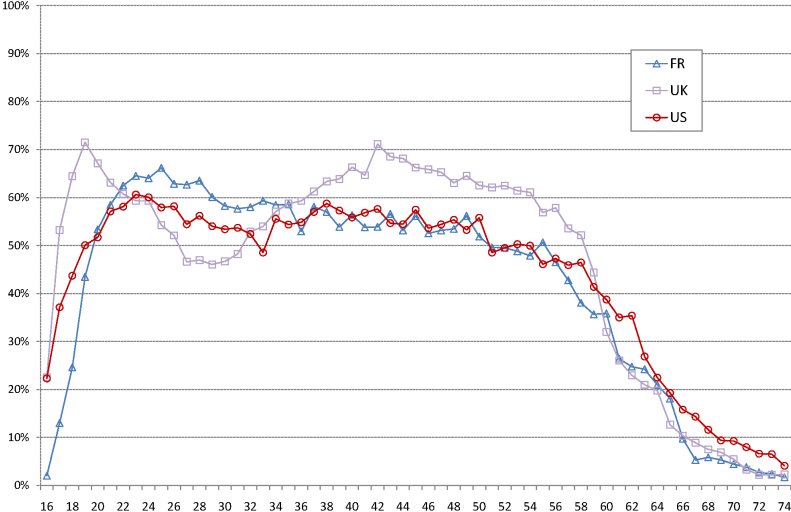


Figure 11: Female employment by age 2007

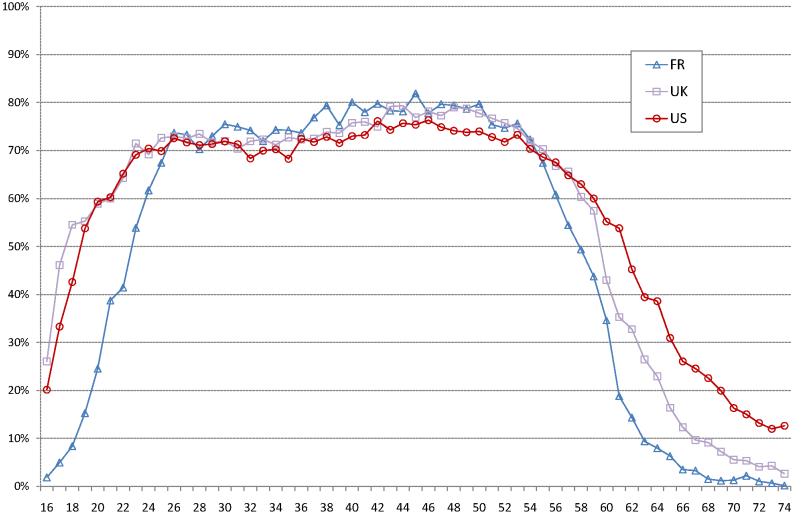
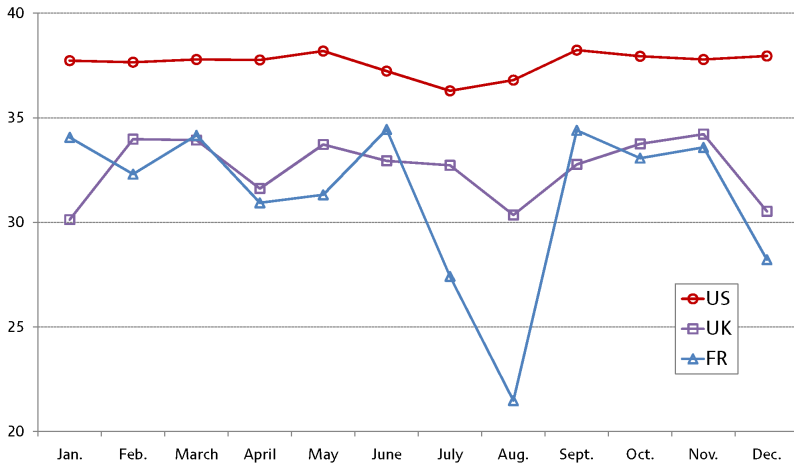


Table 1: Weekly hours and weeks worked (2007)

	Men			Women		
	FR	UK	US	FR	UK	US
Annual hours (all)	1800	1919	2107	1445	1389	1792
Share part-time	5.0%	10.5%	10.1%	29.4%	41.9%	23.9%
Full-time workers						
Annual hours	1839	2044	2229	1631	1777	2041
Weekly hours	42.1	46.8	44.6	39.0	43.5	42.0
Weeks worked	43.7	43.7	50.0	41.8	40.9	48.5
Part-time workers						
Annual hours	995	857	1030	1008	851	1021
Weekly hours	22.5	22.2	21.3	23.7	22.9	21.5
Weeks worked	44.2	38.6	48.4	42.5	37.1	47.5

Figure 12: Actual weekly hours by month of the year (2002-2008)



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- where each H_{jt} can be expressed as the product of hours per worker h_{jt} and participation in the labour market p_{jt}

$$H_{jt} = p_{jt} h_{jt}.$$

Decomposing Changes in Hours

- We measure the change due to the behavior of category j , holding the population structure constant as in date $t - 1$, as in a Laspeyres index

$$\Delta_{jt} = q_{j,t-1}[H_{jt} - H_{j,t-1}].$$

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- where S_t measures the change in the composition of the population:

$$S_t = \sum_{j=1}^J H_{jt}[q_{jt} - q_{j,t-1}].$$

Table 2: Decomposing the change in total hours, 1977-2007

	Year	Youth (16-29)		Prime aged (30-54)		Old (55-74)	
		Men	Women	Men	Women	Men	Women
FR	1977	1402	871	2010	951	827	367
	2007	858	627	1639	1116	508	344
	Δ_j	-82	-38	-82	36	-36	-3
UK	1977	1707	938	2117	873	1107	323
	2007	1219	876	1786	1055	790	385
	Δ_j	-71	-9	-70	39	-42	10
US	1977	1344	835	2018	947	1025	447
	2007	1236	956	1922	1373	1084	754
	Δ_j	-19	22	-19	90	6	38

SOURCES: Enquête Emploi, Labour Force Survey, Current Population Survey.

- evolution of total Δ differs: -195 for FR, -118 for UK, +165 for US.

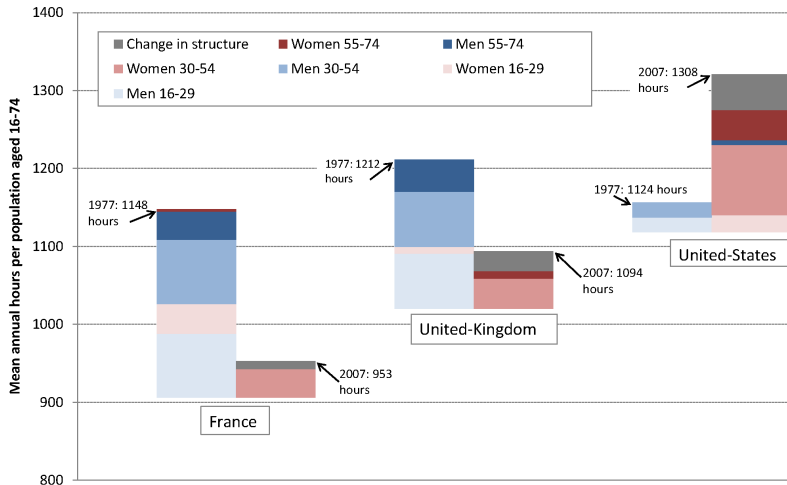
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- composition S : +10 for FR, +25 for UK, +46 for US

Figure 13: Decomposing the change in total hours (1977-2007)



- We decompose the change in total hours for the j type Δ_j into:
 - an intensive component $I_j = p_{ij}\Delta h_j$
 - an extensive component $E_j = h_{Ej}\Delta p_j$

$$\Delta_{jt} = I_j + E_j$$

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- We get intensive bounds

- Assuming $p_{ij} \in [p_{j,t-1}, p_{jt}]$

$$I_j \in [p_{j,t-1}(h_{jt} - h_{j,t-1}), p_{j,t}(h_{jt} - h_{j,t-1})]$$

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- We get extensive bounds

- From the identity $\Delta_{jt} = I_j + E_j$

$$E_j \in [h_{j,t-1}(p_{jt} - p_{j,t-1}), h_{j,t}(p_{jt} - p_{j,t-1})]$$

$$E_j \in [E - \text{Laspeyres}, E - \text{Paasche}]$$

- At the limits, the change in total hours for any type j satisfies two polar exact statistical decompositions:

$$\Delta_{jt} = q_{j,t-1} \{ [h_{jt} - h_{jt-1}] p_{jt} + [p_{jt} - p_{jt-1}] h_{jt-1} \} \quad (1)$$

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or

$$\Delta_{jt} = q_{j,t-1} \{ [h_{jt} - h_{jt-1}] p_{jt-1} + [p_{jt} - p_{jt-1}] h_{jt} \} \quad (2)$$

$$\Delta_{jt} = q_{j,t-1} \{ I - Laspeyres + E - Paasche \}$$

Figure 14: Decomposing the changes at the extensive and intensive margins by age and gender (1977-2007)

	Year	Men 16-29	Women 16-29	Men 30-54	Women 30-54	Men 55-74	Women 55-74
FR	I-P, I-L	[-37, -28]	[-23, -19]	[-59, -56]	[-49, -35]	[-11, -8]	[-10, -9]
	E-L, E-P	[-54, -45]	[-19, -16]	[-27, -23]	[71, 85]	[-28, -25]	[6, 7]
	Δ	-82	-38	-82	36	-36	-3
UK	I-P, I-L	[-42, -36]	[-26, -23]	[-48, -45]	[-3, -2]	[-22, -19]	[-8, -6]
	E-L, E-P	[-35, -29]	[14, 17]	[-25, -22]	[41, 41]	[-23, -20]	[15, 17]
	Δ	-71	-9	-70	39	-42	10
US	I-P, I-L	[-6, -6]	[1, 1]	[-5, -5]	[14, 19]	[3, 3]	[3, 5]
	E-L, E-P	[-13, -13]	[21, 21]	[-14, -14]	[72, 77]	[3, 3]	[33, 35]
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Figure 15: Share of the 16-29 population in work

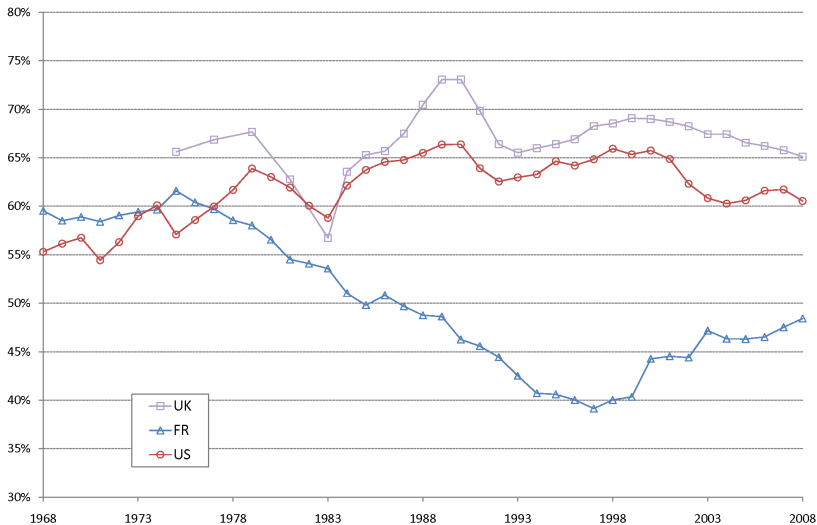


Figure 16: Share of the 16-29 population looking for work

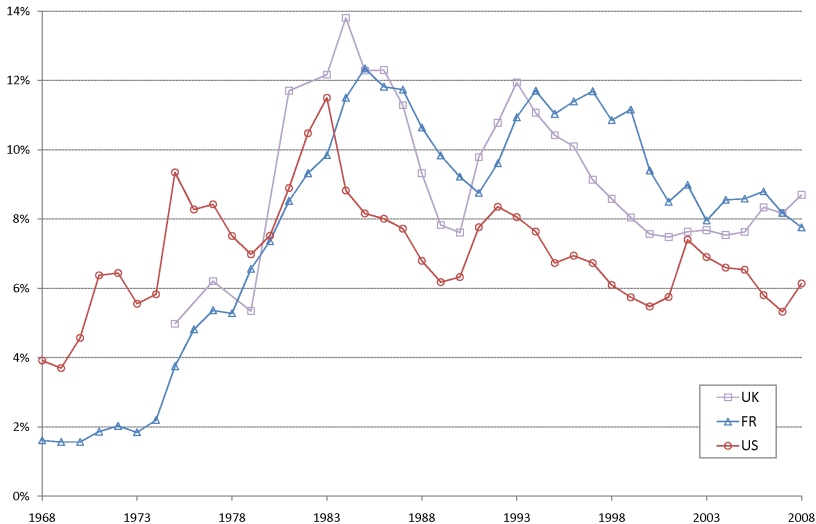


Figure 17: Share of the 16-29 population in school and not in work

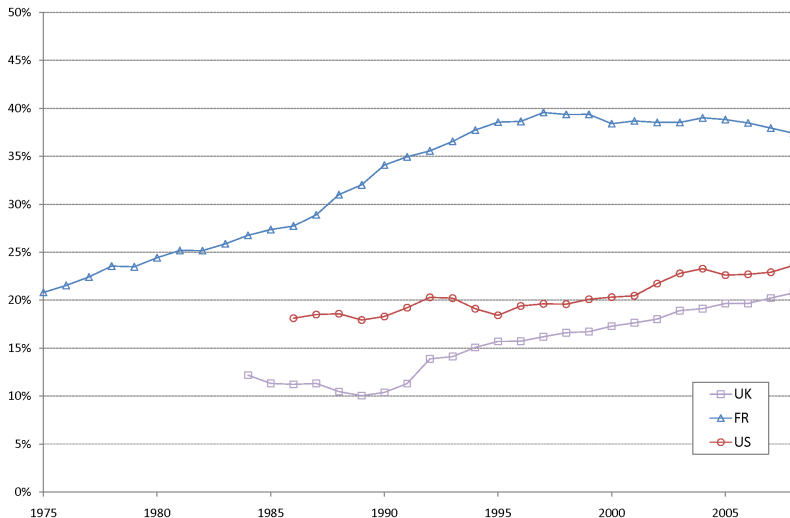


Figure 18: Male employment rate from 50 to 74 (1977)

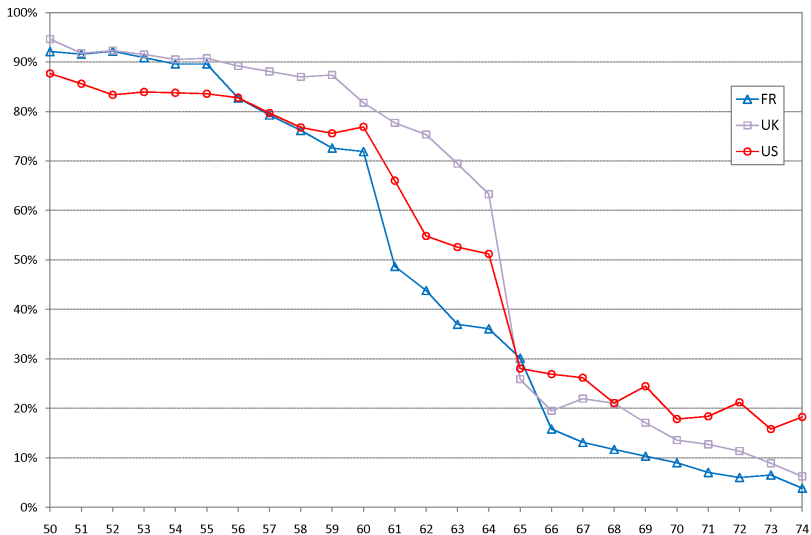
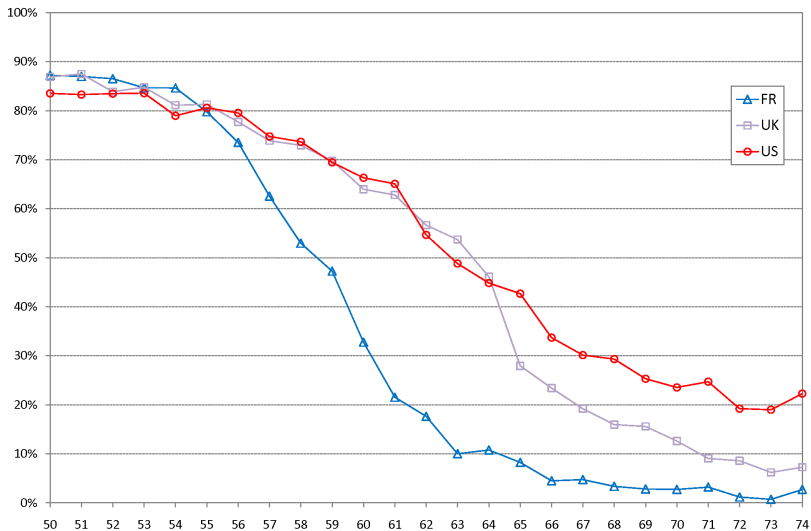


Figure 19: Male employment rate from 50 to 74 (2007)



- **Objectives**

- Link up these changes at the extensive and intensive margins to movements in the distribution of taxes, relative wages, demographics and other incomes.
- Draw implication for extensive and intensive elasticities
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- **Empirical issues (forthcoming)**

- Use IFS microsimulation model TAXBEN
- Estimation extensive and intensive elasticities
- Similar approach for France and the US

- Consider preferences

$$U = \begin{cases} \lambda R(h) + \frac{(T-h)^{1-1/\alpha}}{1-1/\alpha} - \beta & \text{if } h > 0 \\ \lambda s & \text{if } h = 0 \end{cases}$$

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- The 'aggregate' hours elasticity is given by

$$\varepsilon = \frac{1}{\bar{H}} \int_w \int_\alpha \int_\lambda p(h) h(\alpha, \lambda, w) [\varepsilon_I(\alpha, \lambda, w) + \varepsilon_E(\alpha, \lambda, w)] g(\alpha, \lambda, w) d\alpha d\lambda dw.$$

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- $h(\alpha, \lambda, w)$ hours, $p(\alpha, \lambda, w)$ proportion of type (α, λ, w) workers

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- We have shown that the aggregate evolution cannot be ascribed to a single cause but covers very diverse movements at the extensive and intensive margins by age and gender.

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- We have shown that the aggregate evolution cannot be ascribed to a single cause but covers very diverse movements at the extensive and intensive margins by age and gender.
- We have developed an approach to estimating the total hours elasticity from the distribution of micro elasticities at the extensive and intensive margins.