Labour Supply Responses and the Extensive Margin: The US, UK and France

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  - the relative importance of the extensive and intensive margin is shown to differ systematically by age, gender and family composition.

Fig 1.A Mean annual hours per individual aged 16 to 74

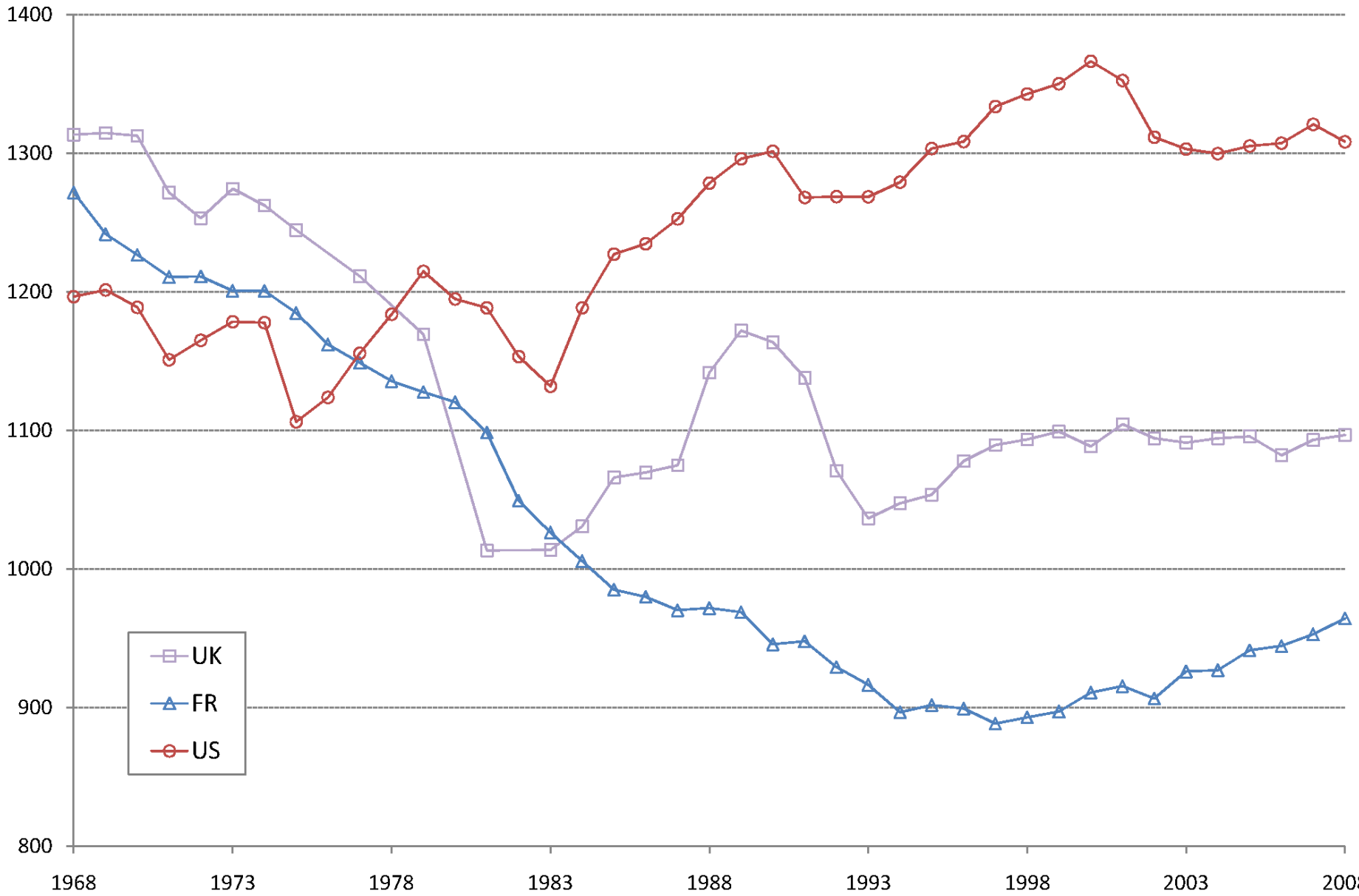


Fig 1.B. Employment rate (per population) aged 16 to 74

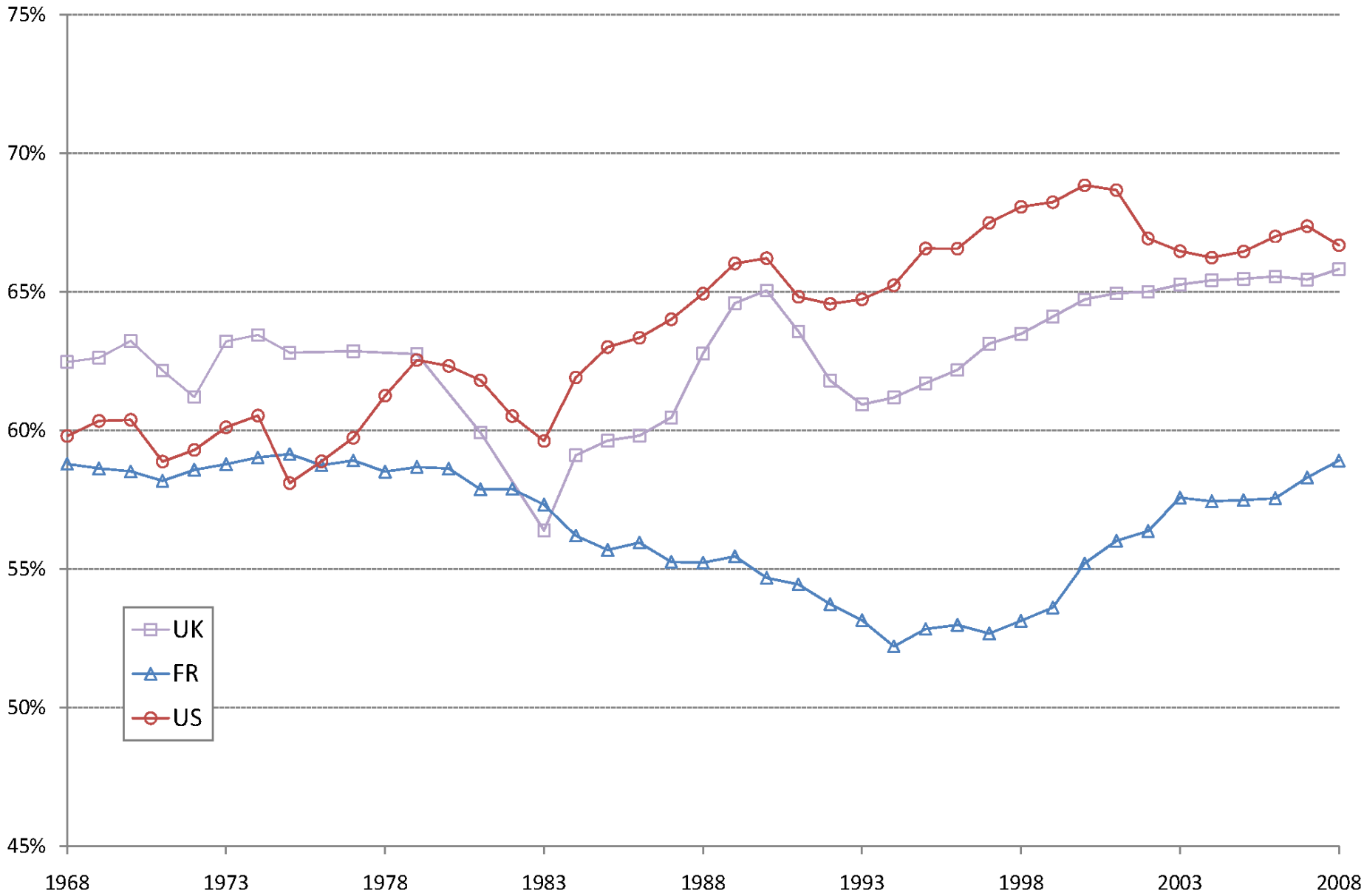


Fig 1.C. Mean annual hours per worker aged 16 to 74

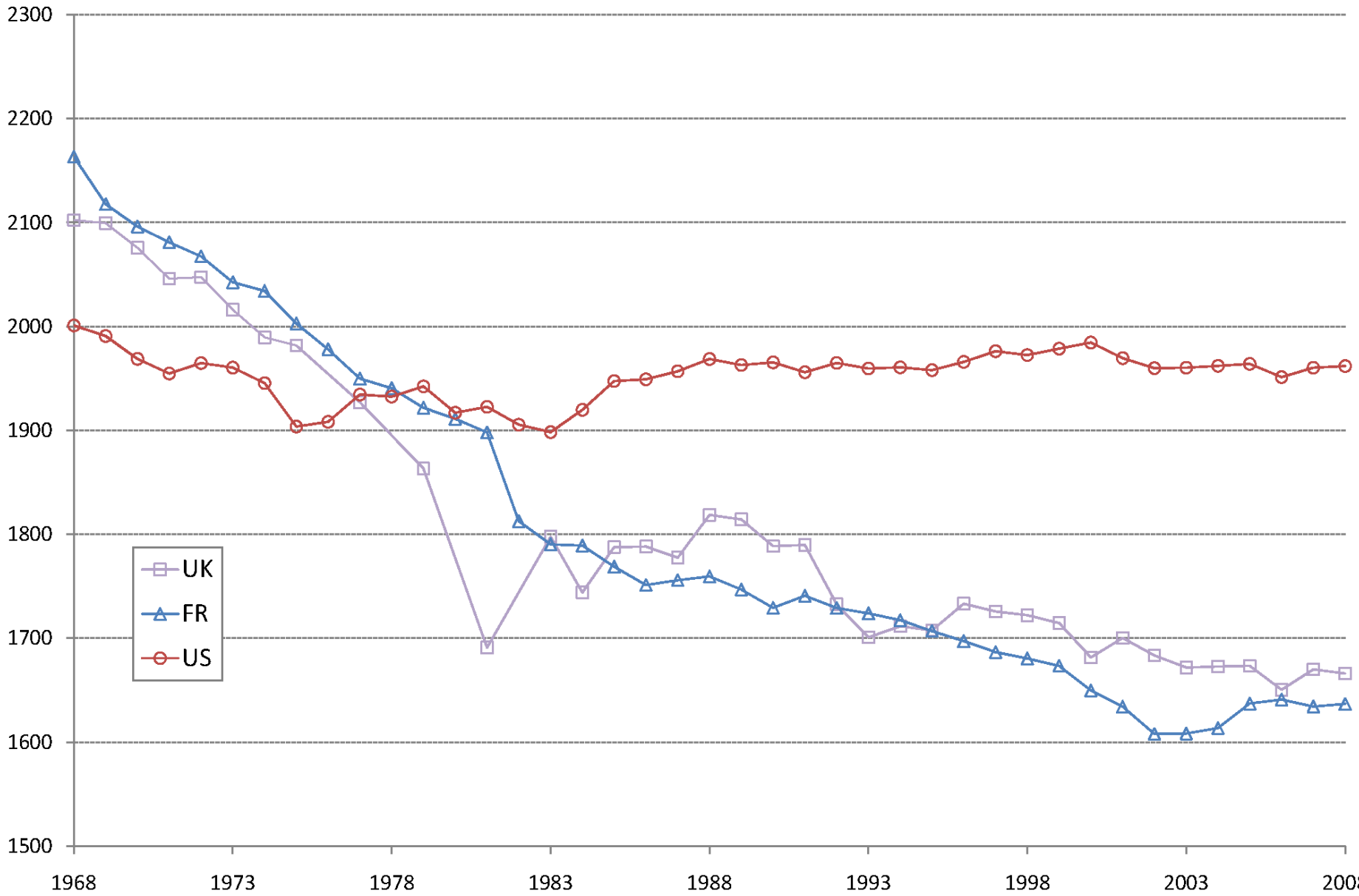


Fig 2.A. Male total hours by age 1977

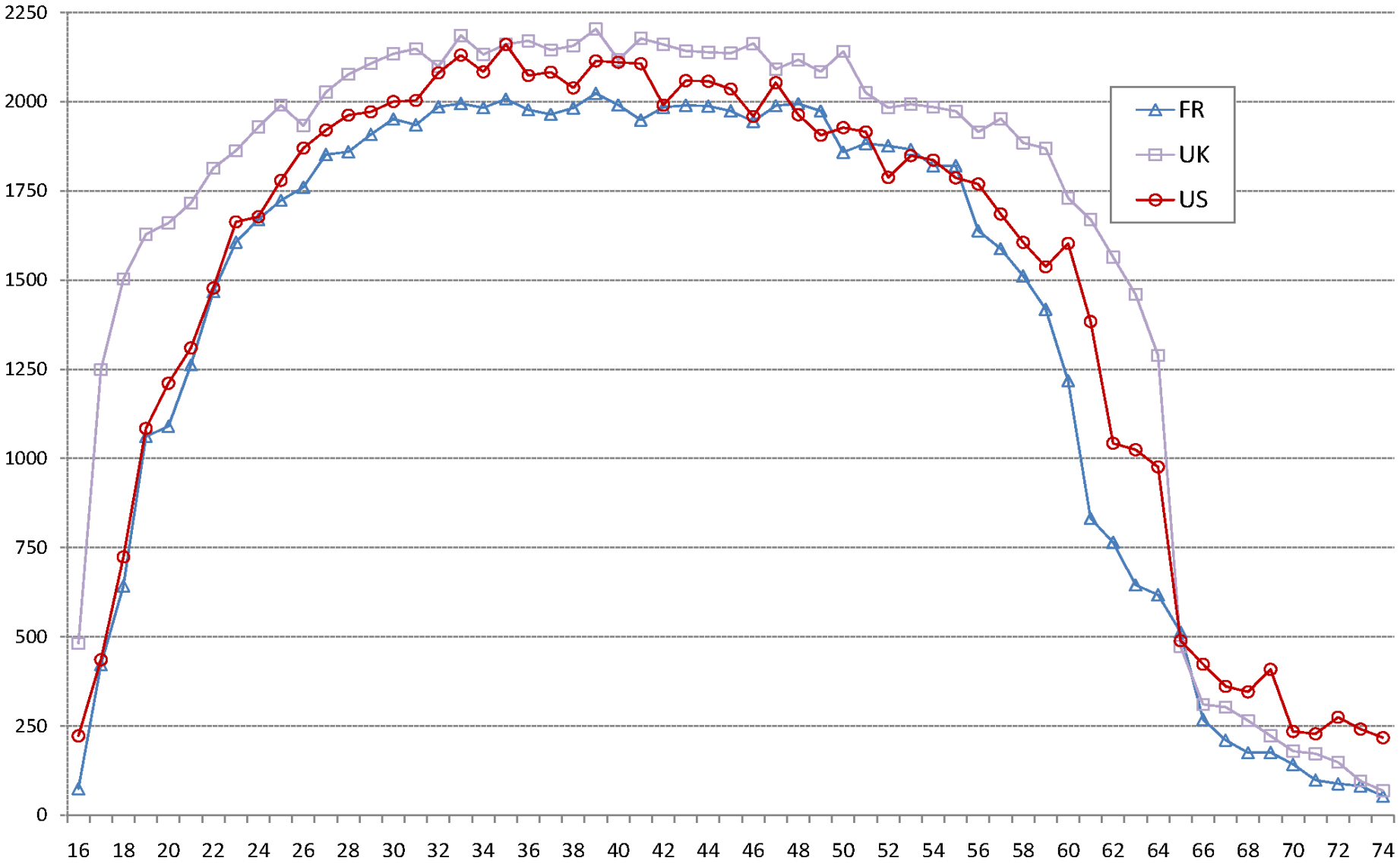


Fig 2.B. Male total hours by age 2007

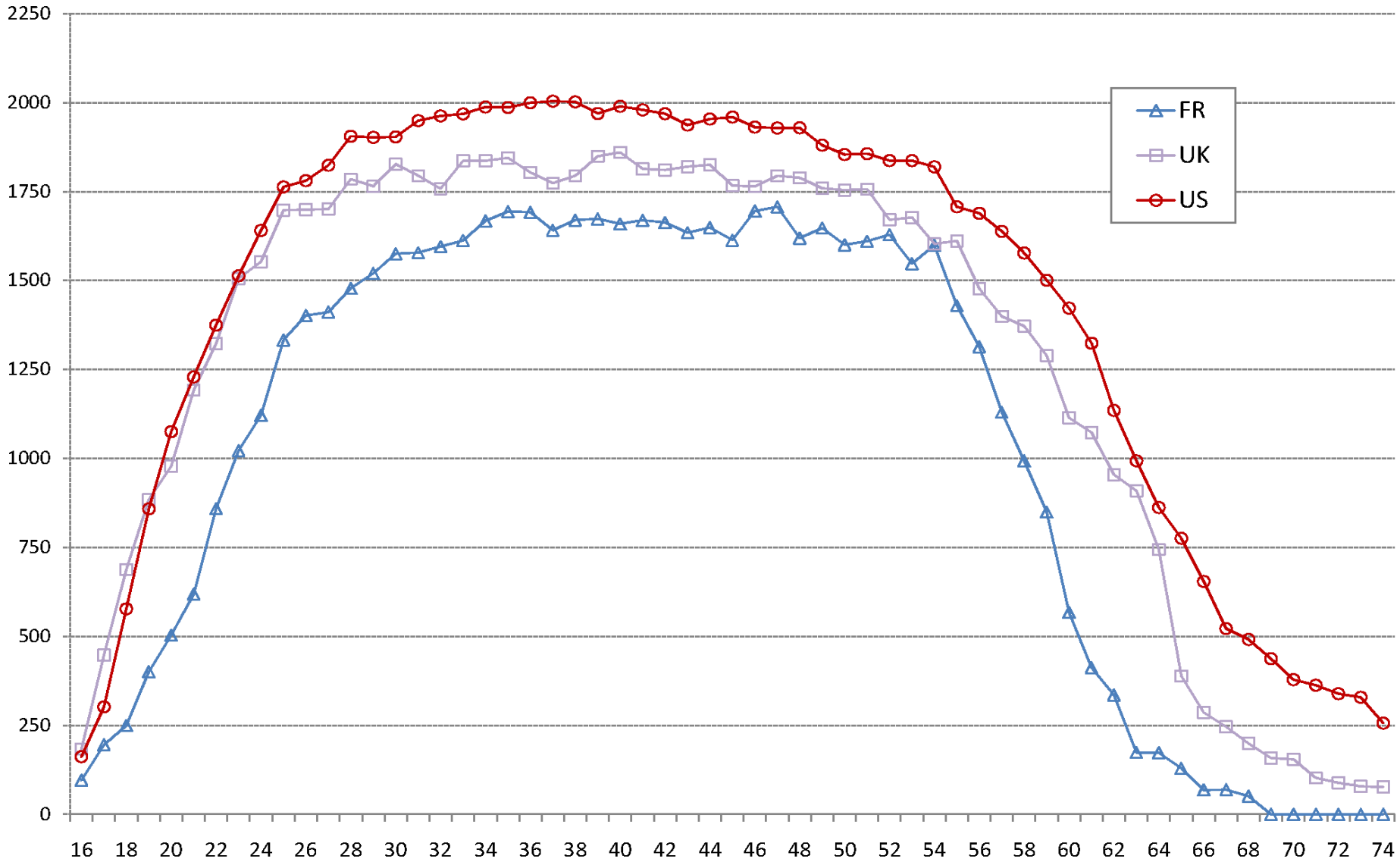
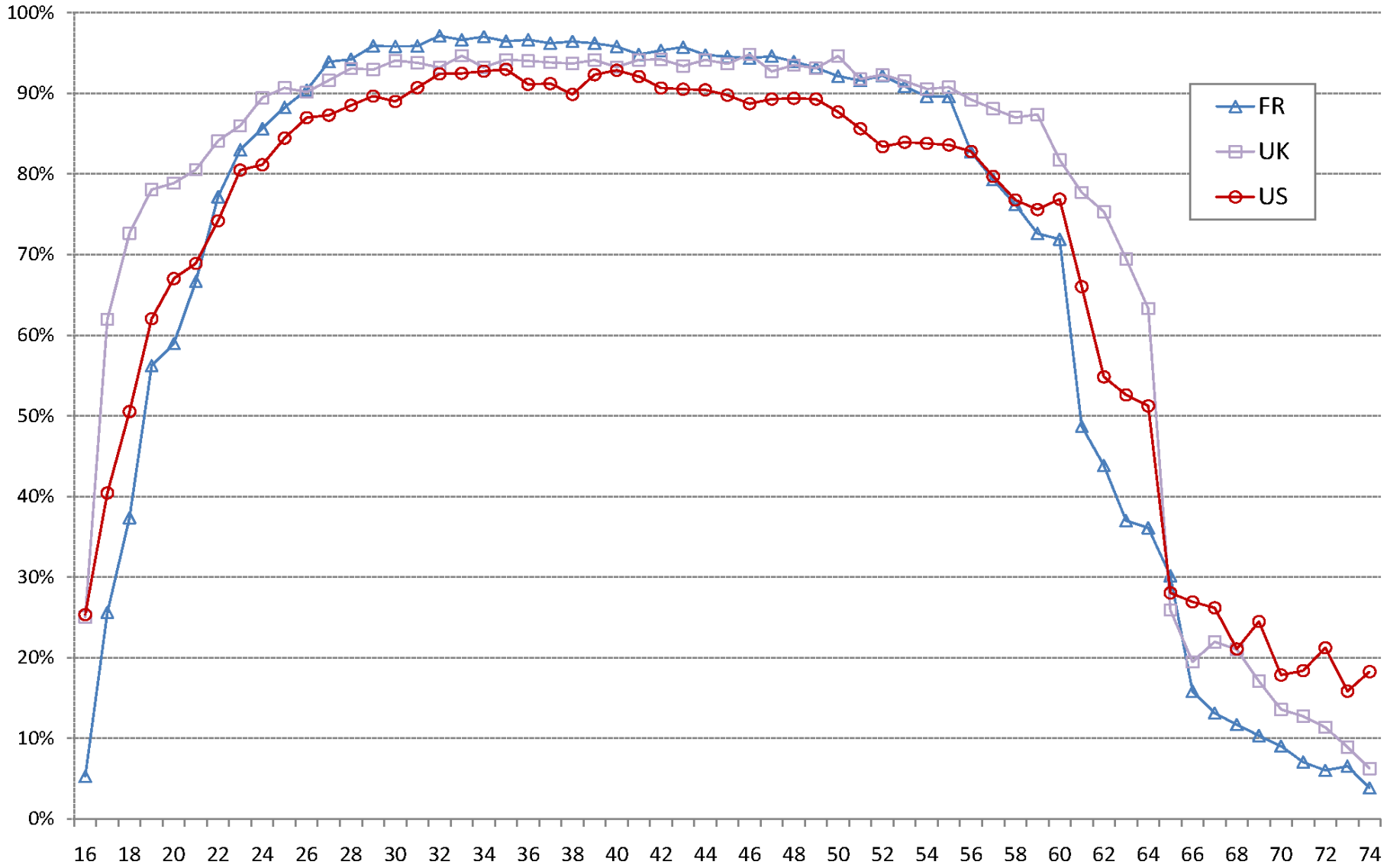


Fig 3.A. Male employment by age 1977



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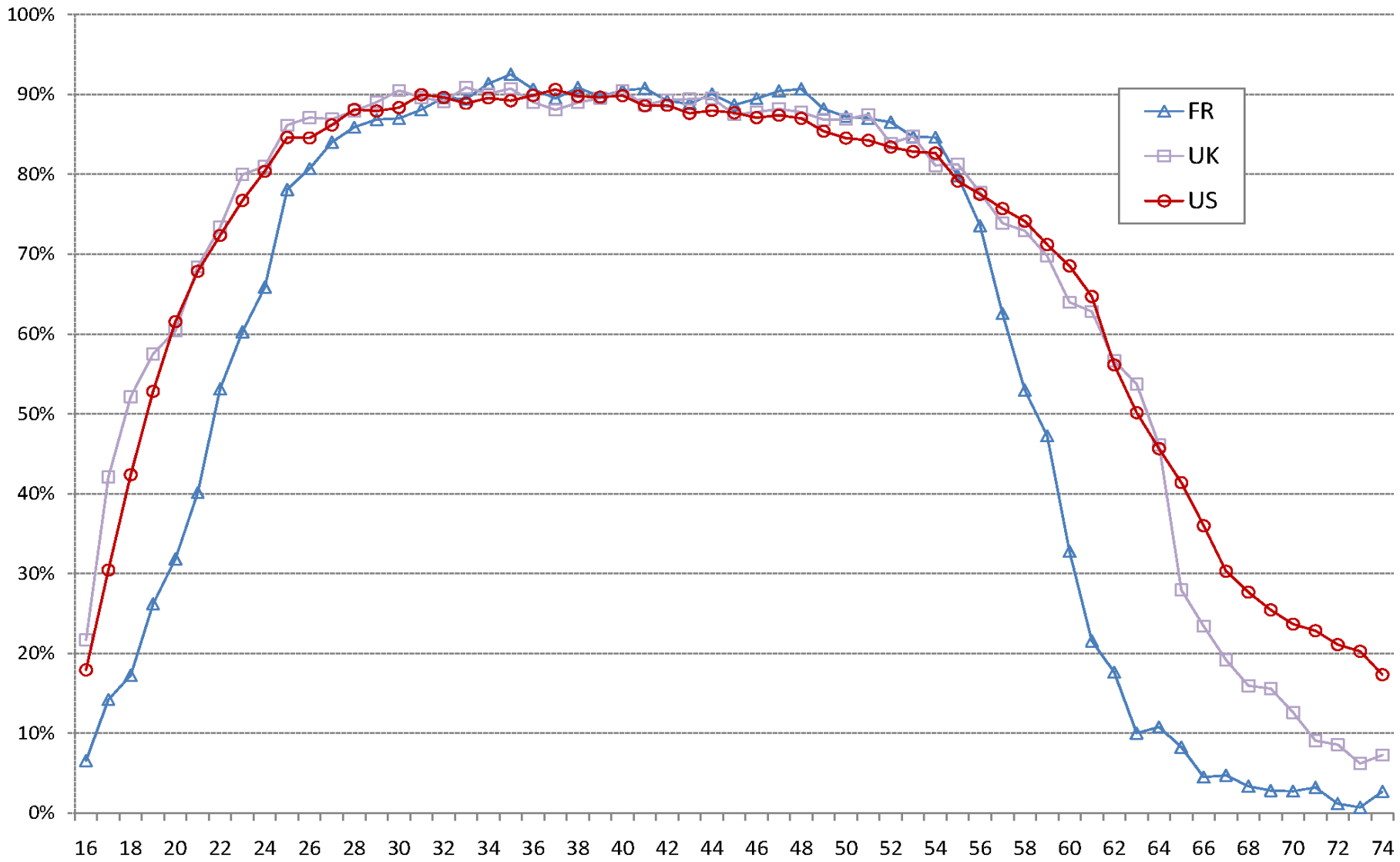
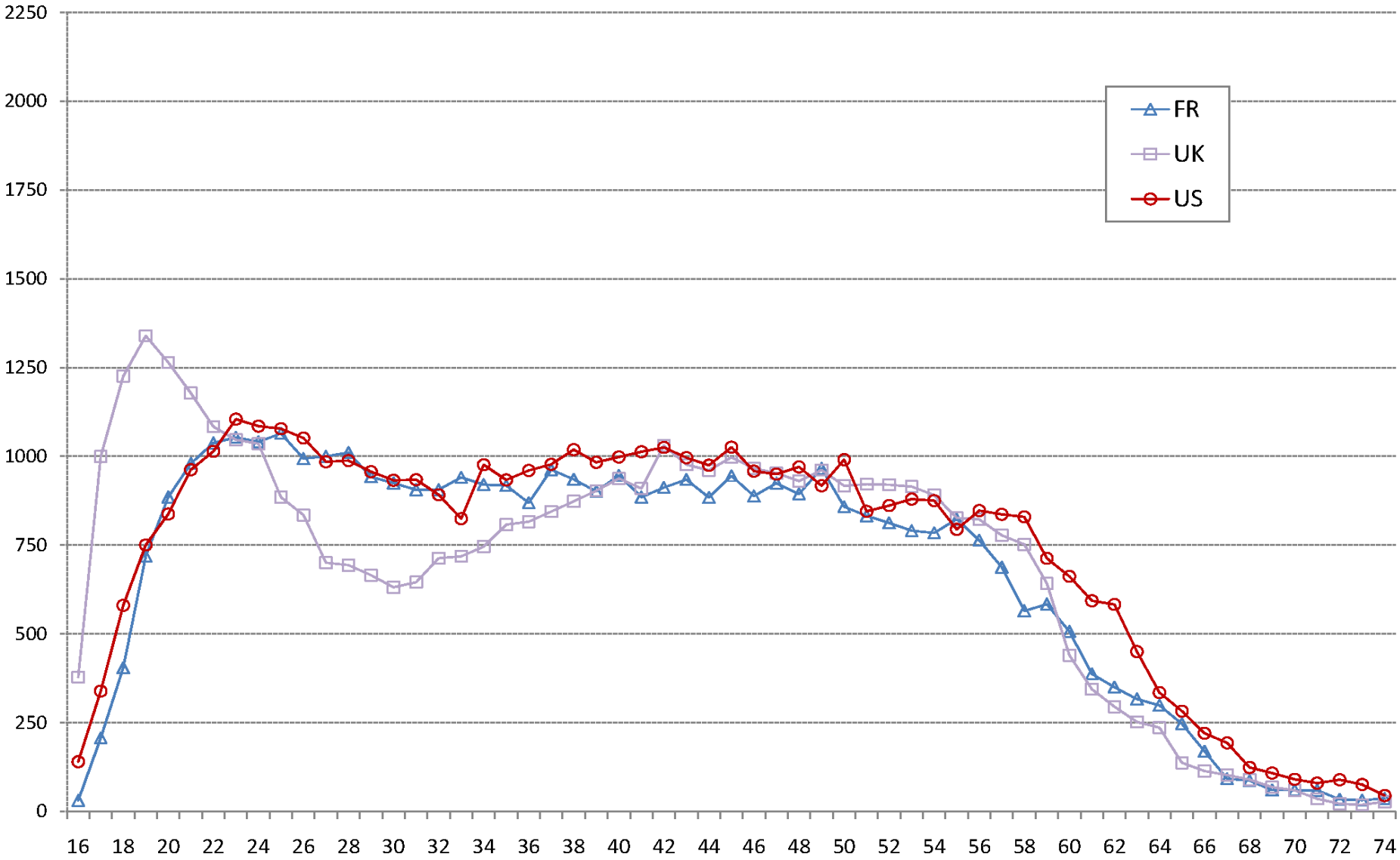


Fig 4.A. Female total hours by age 1977



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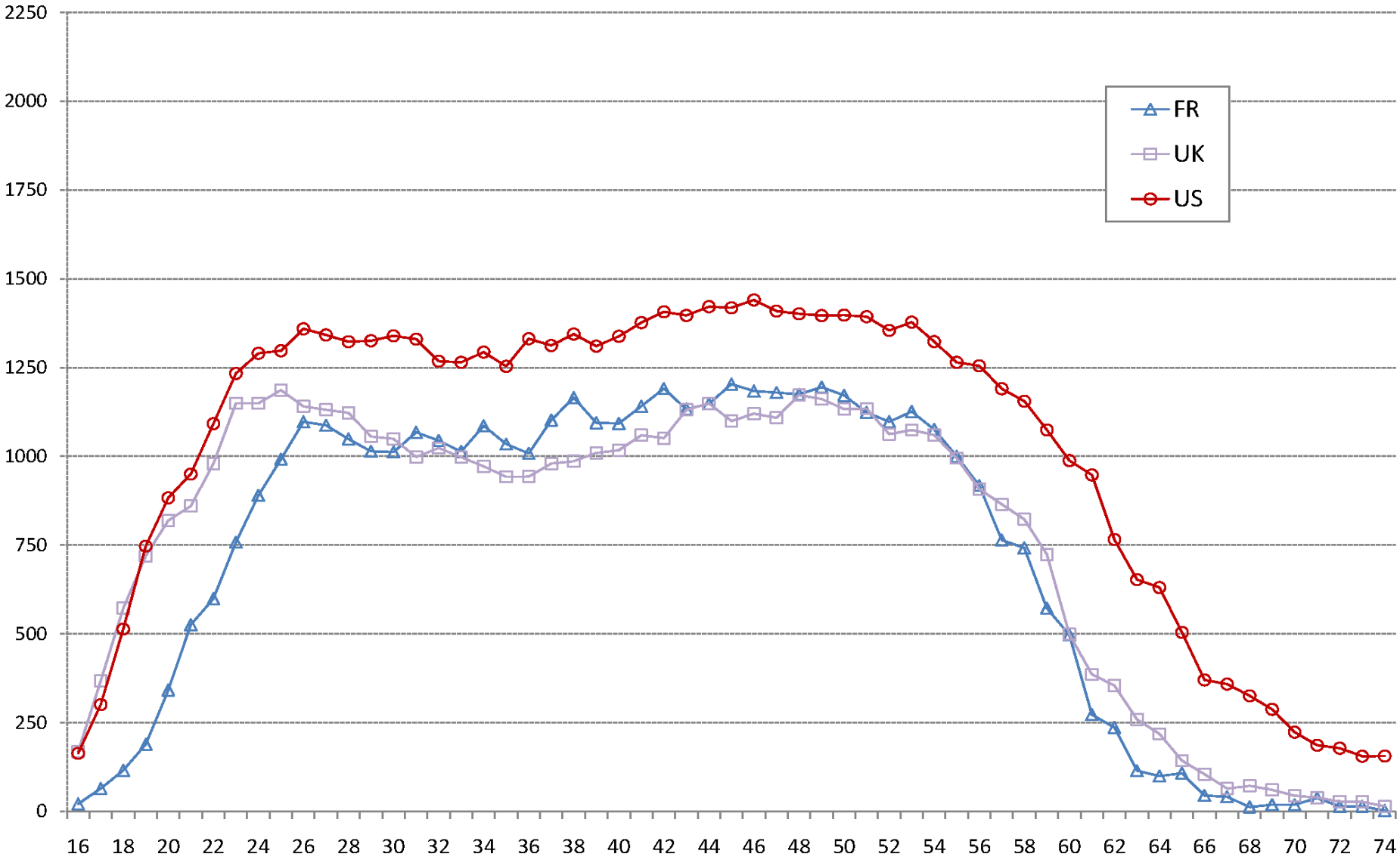

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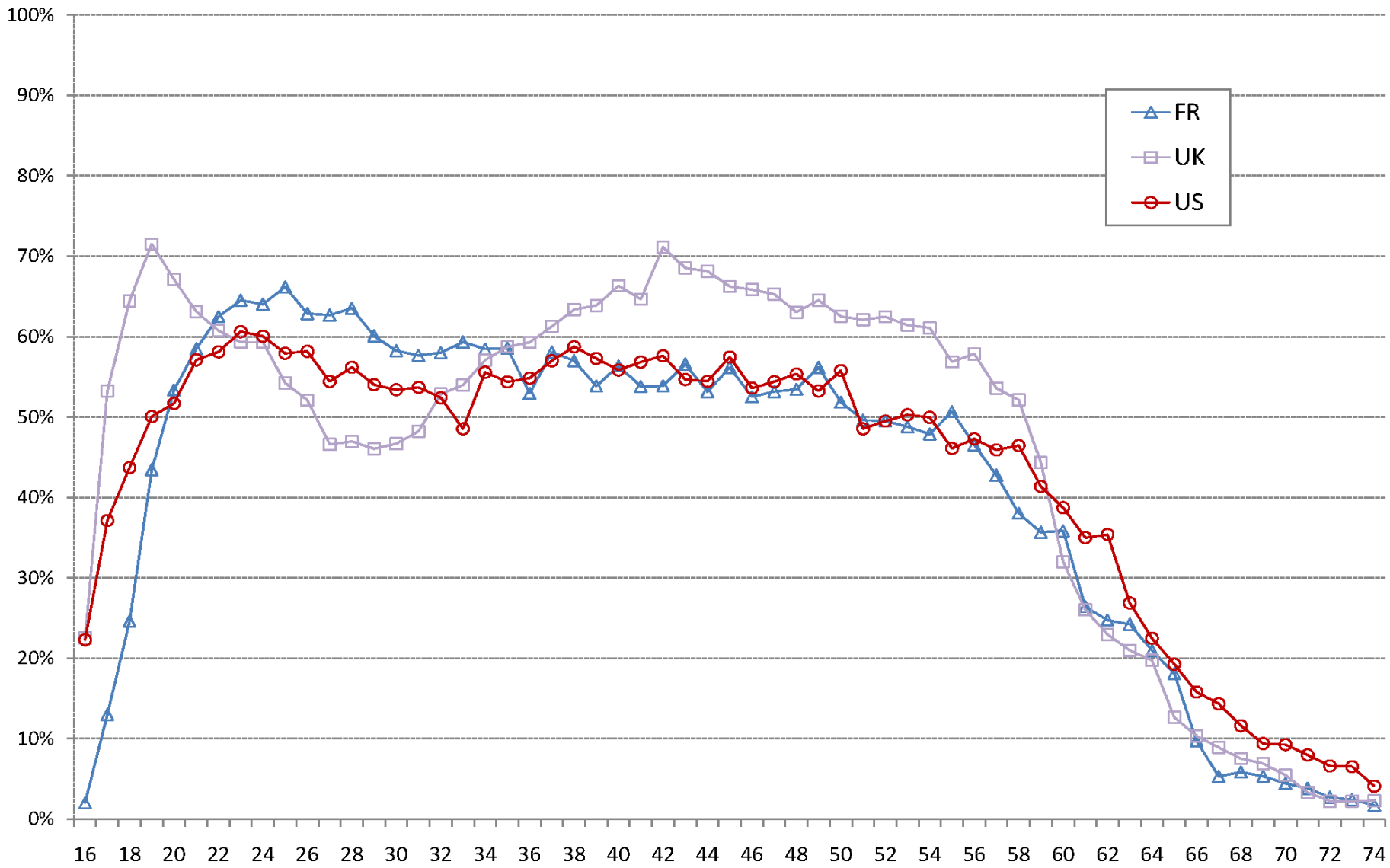

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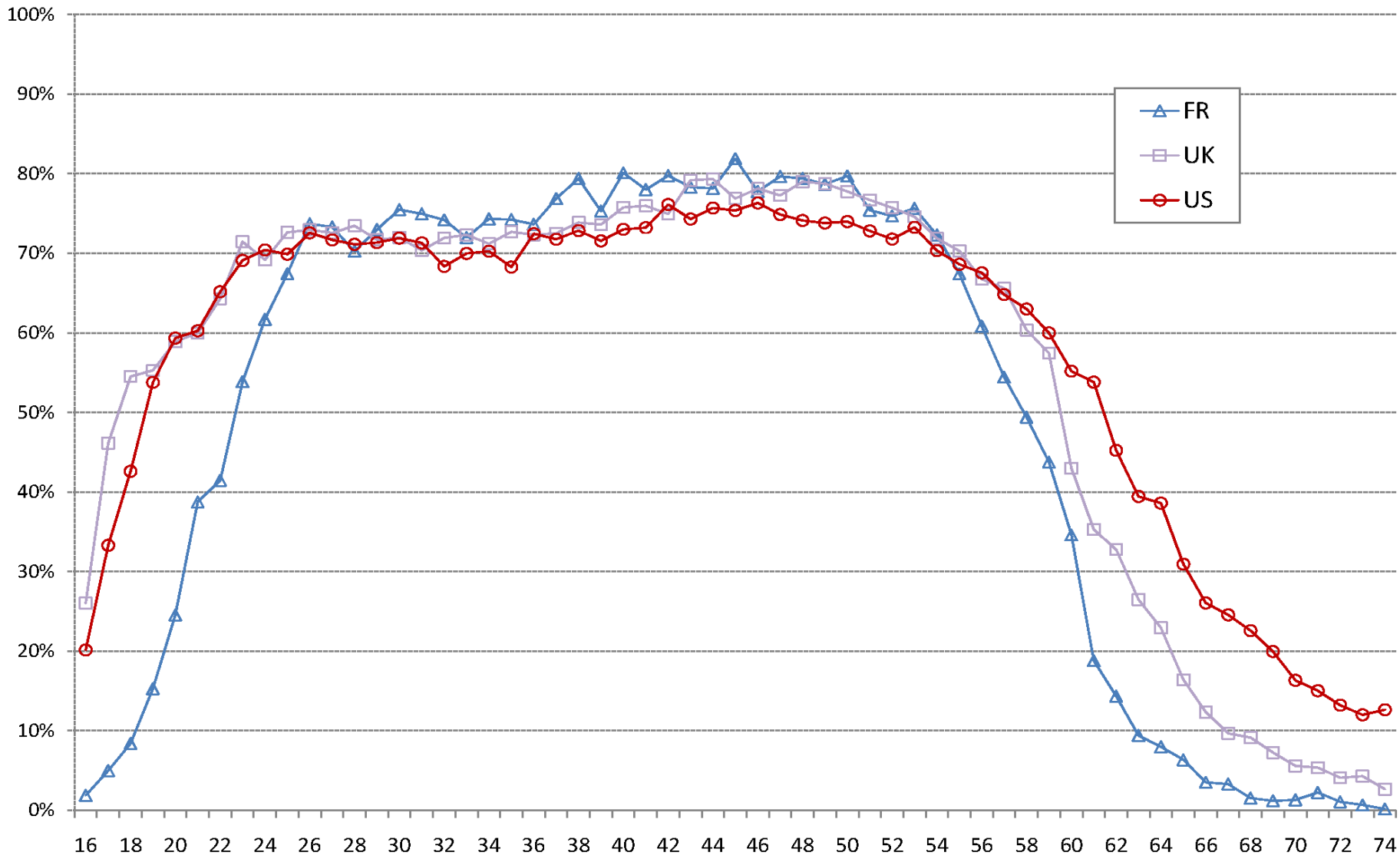

Elasticities at the Intensive and Extensive Margin

- We consider intertemporal preferences represented by

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

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  - (α, β) are unobserved heterogeneity in tastes and costs of work.
  - α is the Frisch elasticity of labor supply with respect to the net marginal wage rate.
- The distribution of heterogeneity is described through the conditional distribution of fixed costs β given (α, λ, w), $F(\beta|\alpha, \lambda, w)$, and the marginal pdf of (α, λ, w), $g(\alpha, \lambda, w)$.

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

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  - elasticities are weighted by the share of type (α, λ, w) labor supply in the aggregate.

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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_{j_t}

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

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Table 1 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, Census Population Survey.

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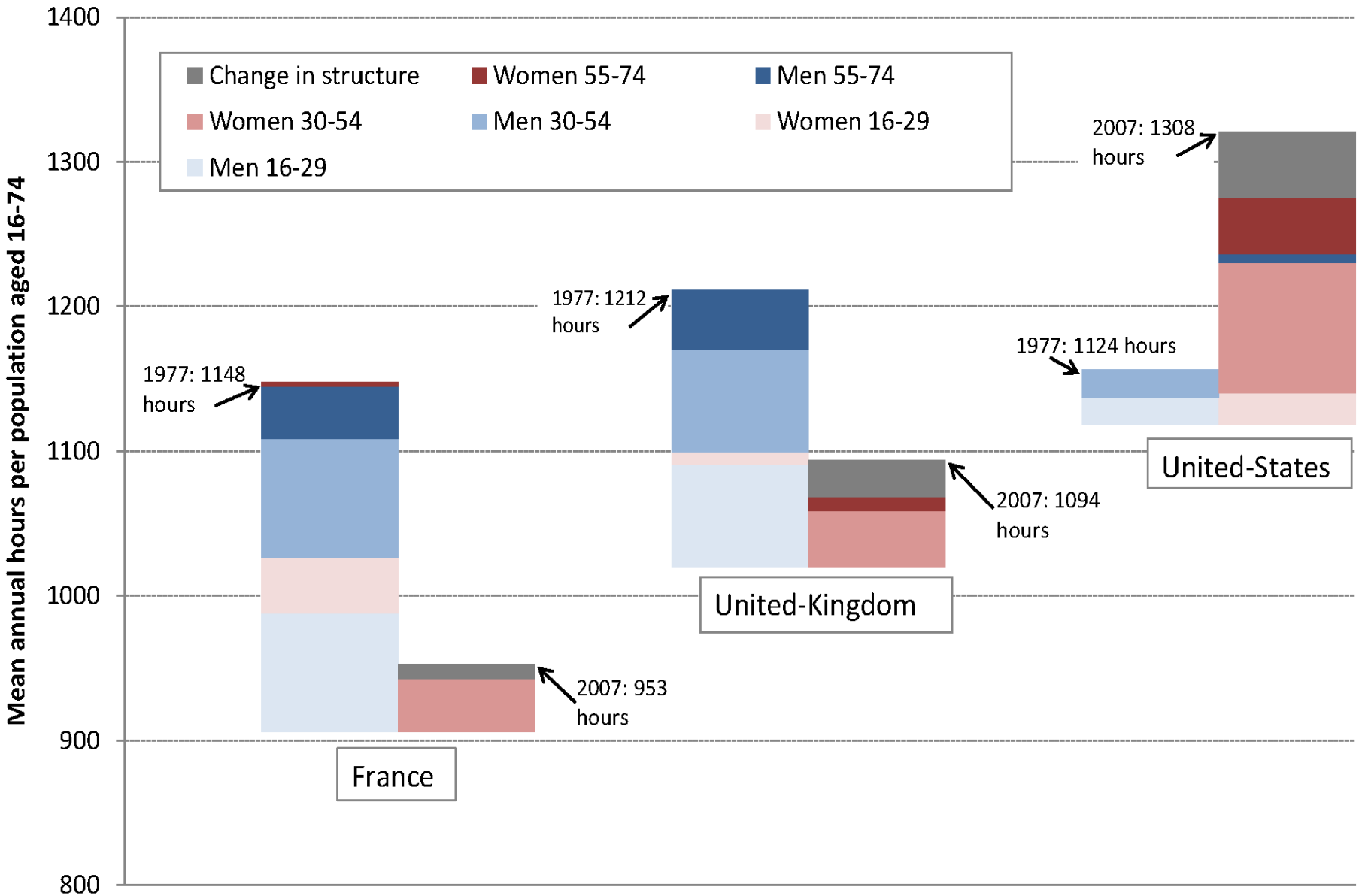
- composition S: +10 for FR, +25 for UK, +46 for US, see Figure 6..

Fig 6. Decomposing the change in total hours (1977-2007)



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- Assuming the fraction p_{Ij} is in the interval $[p_{j,t-1}, p_{jt}]$, we get the intensive bounds:

I_j belongs to the interval $[p_{j,t-1}(h_{jt} - h_{j,t-1}), p_{j,t}(h_{jt} - h_{j,t-1})]$.

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- From the identity $\Delta_{jt} = I_j + E_j$, the extensive bounds are given by

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

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

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- The second term is the extensive margin (Laspeyres in (1), Paasche in (2)).

Table 2. 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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	E-L, E-P	[-13, -13]	[21, 21]	[-14, -14]	[72, 77]	[3, 3]	[33, 35]
	Δ	-19	22	-19	90	6	38

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

Decomposing the Estimated Distribution of Elasticities

- Finally, we illustrate the way we use this micro-data analysis to recover the distribution of labour supply elasticities that is consistent with the decomposition in Table 2

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- We highlight differences between the extensive and intensive margins and draw implications for the aggregate hours elasticity.
- There have been distinct changes in participation and effective marginal tax rates over this period

Fig 7.A Changes in the participation tax rate in the UK

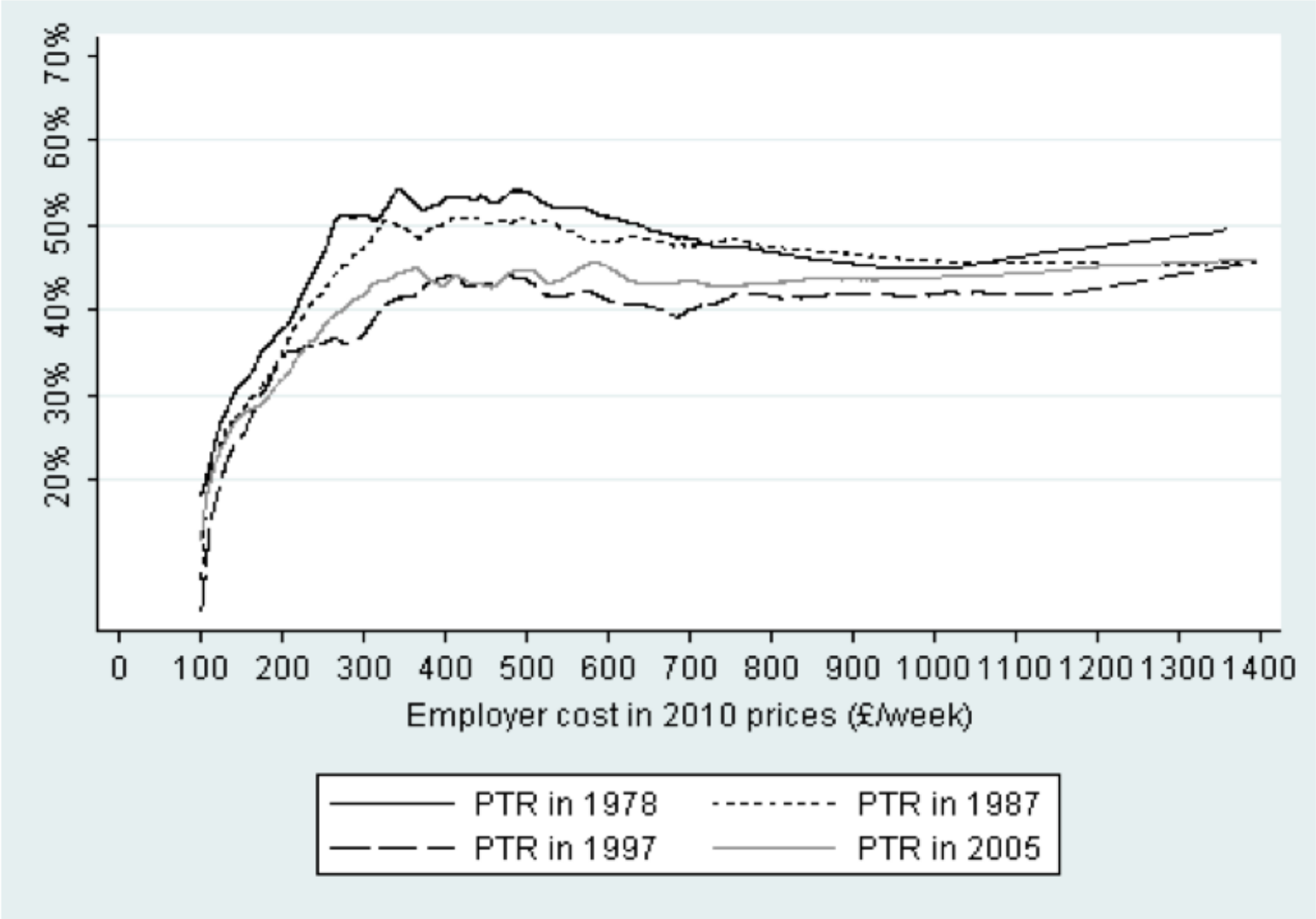
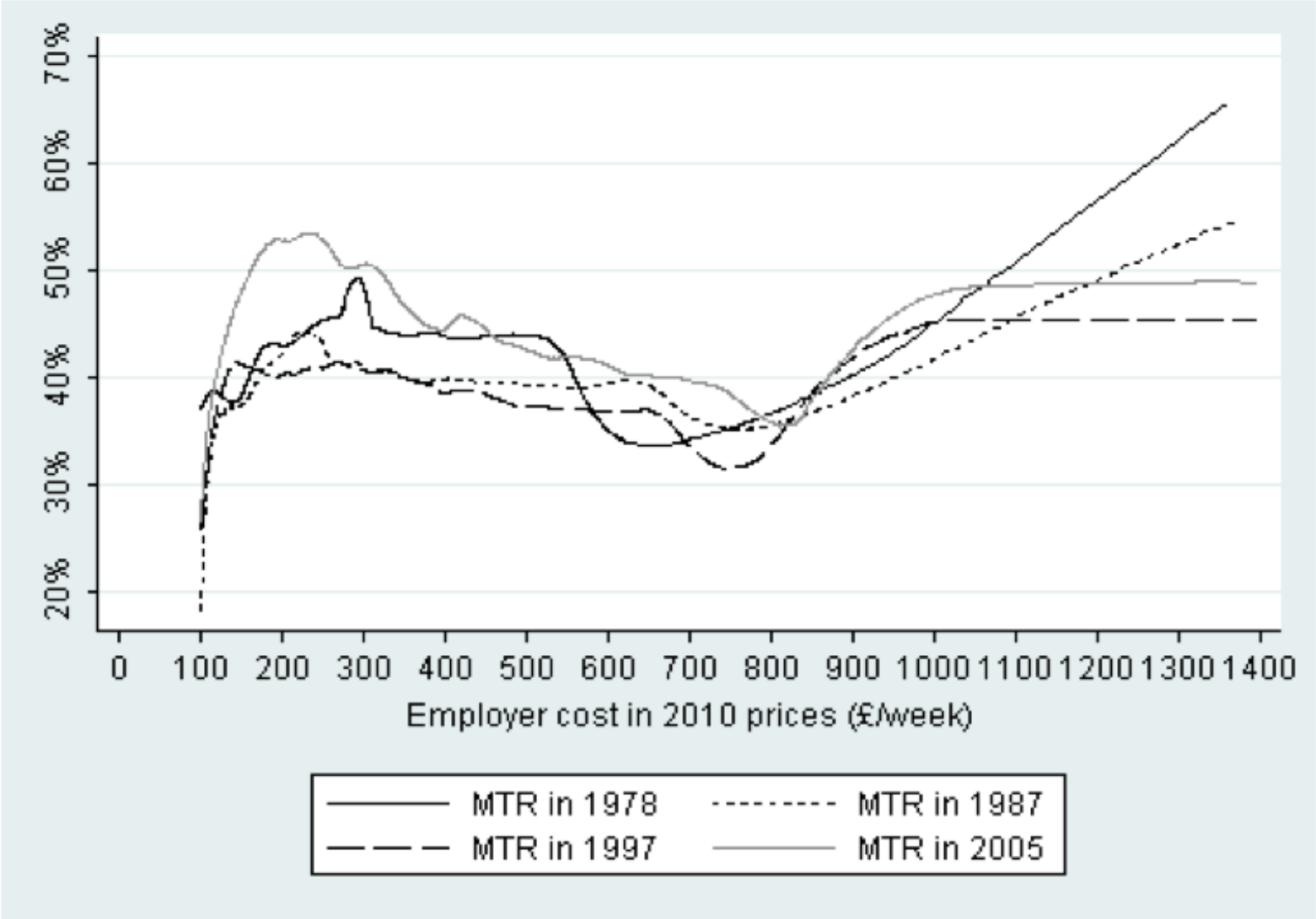


Fig 7.B Changes in the marginal tax rate in the UK



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- Recover Marshallian elasticities for within period utilities - Frisch elasticities are also be estimated.
- The extensive margin is a structural normal binary response model which allows for general unobserved fixed costs of work as well as a set of demographic and education characteristics.

Aggregate responses and elasticities at the intensive and extensive margins

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- aggregate hours elasticity to lies in the range .3 to .44 (using the empirical distribution of the wages and estimated unobserved heterogeneity).
- little evidence of instability of preferences over time, given demographics and composition.

Fig 8.A Intensive elasticity estimates: UK men and women, age 30-54

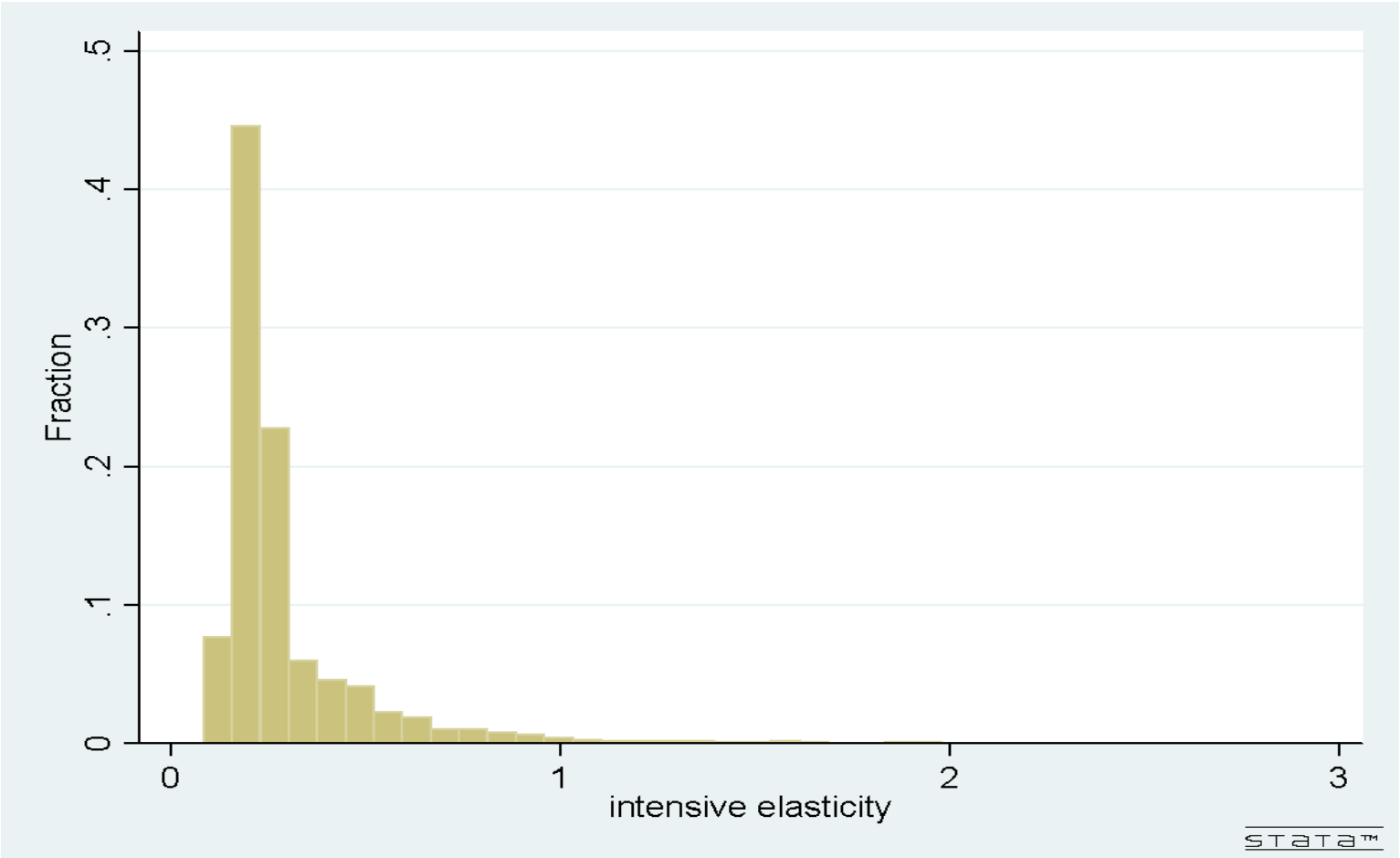
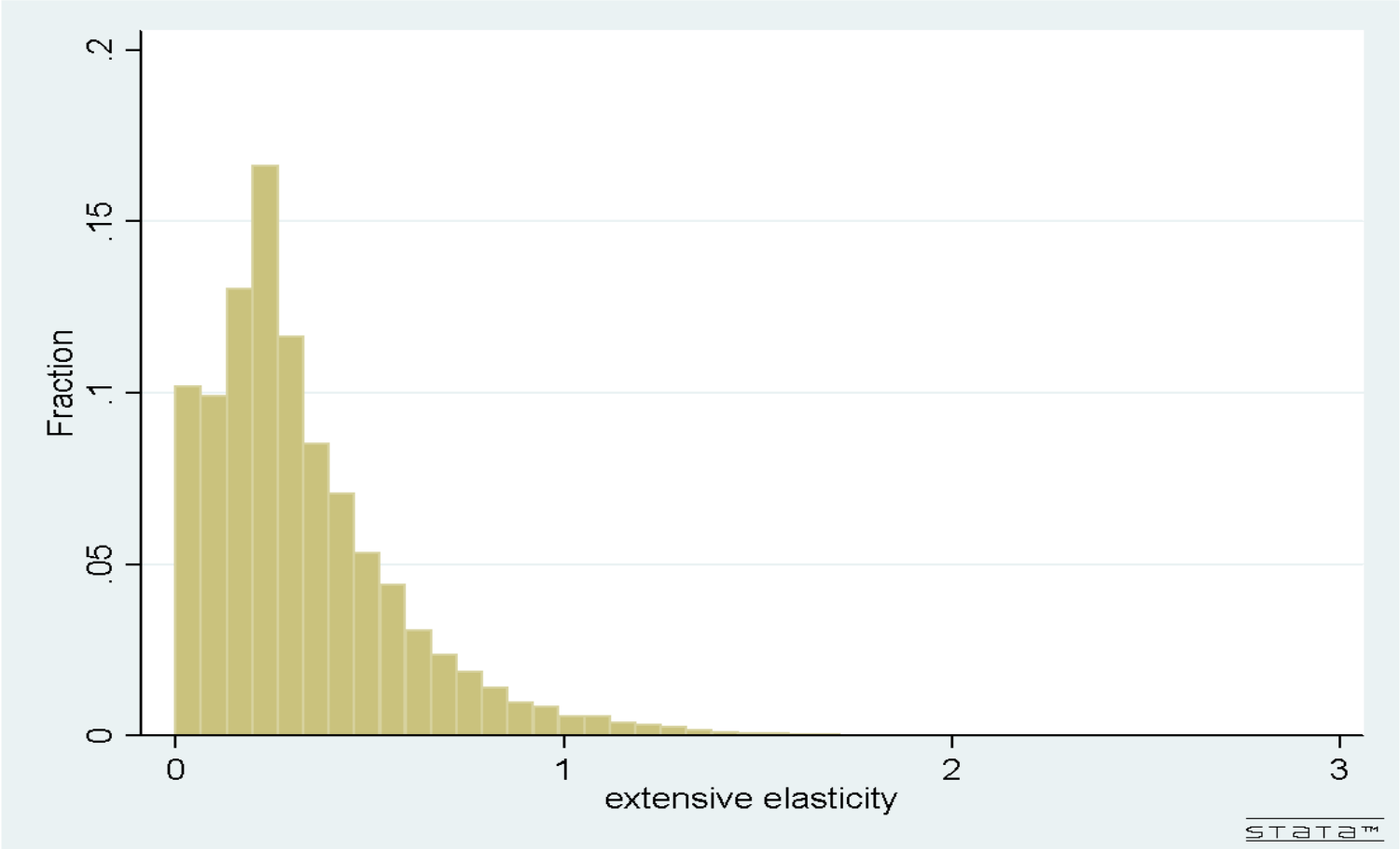


Fig 8.B Extensive elasticity estimates: UK men and women, age 30-54



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- We have shown that the extensive and intensive margins both matter in explaining changes in total hours.
- We have estimated the total hours elasticity from the distribution of micro elasticities at the extensive and intensive margins.