Econ 3007 Economic Policy Analysis

Reforming the Tax System
Lecture I: The Taxation of Earnings

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Richard Blundell
University College London

http://www.ifs.org.uk/mirrleesReview

Lecture I: The Taxation of Earnings

1. What is earnings taxation?
2. Taxing the rich
3. Taxing lower income families

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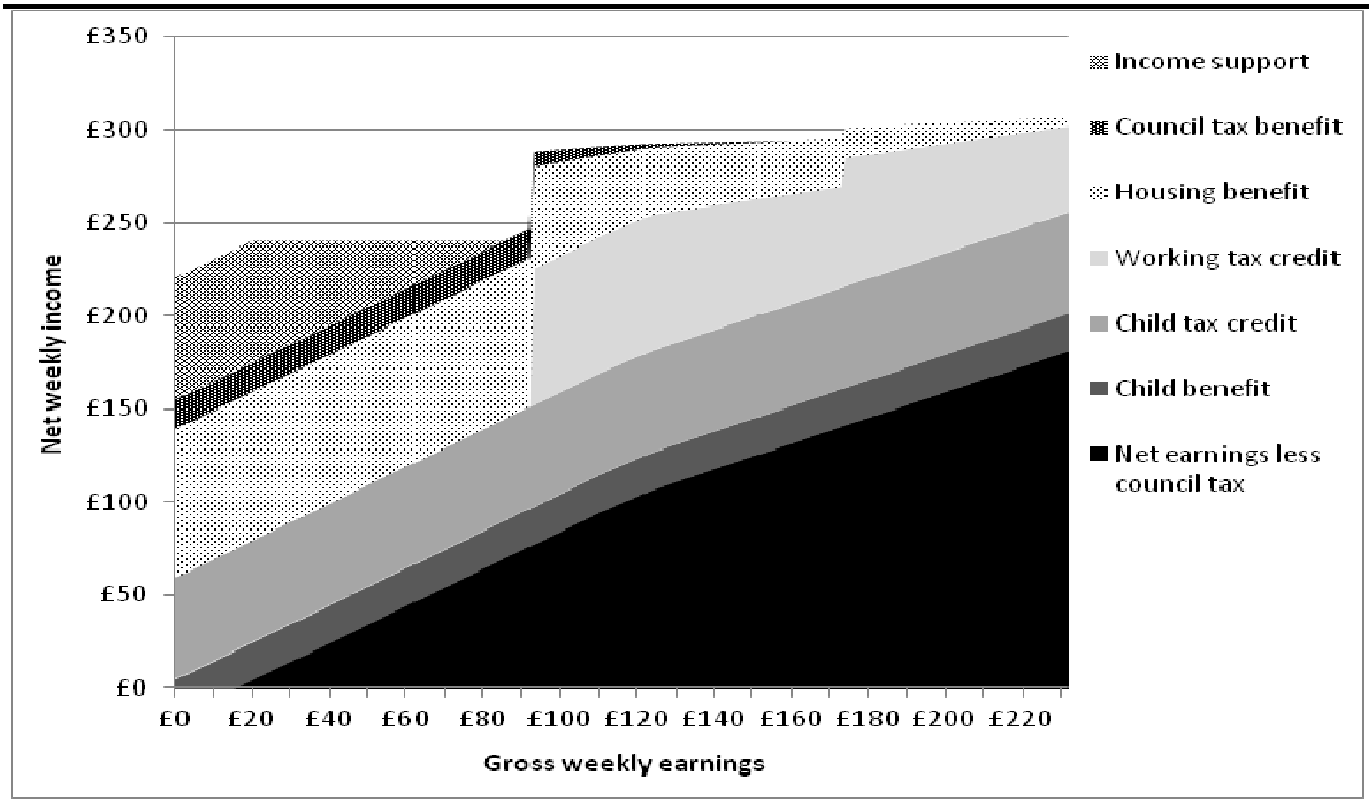
Why reform earnings taxation?

- Changes in employment patterns, in earnings inequalities and in population trends
- New empirical findings on labour supply elasticities
- New insights from optimal tax design
- A need to look at the whole income tax/benefit system
- Key chapter (in Mirrlees Review Vol I: Dimensions of Tax Design): Brewer, Saez and Shephard (2010), http://www.ifs.org.uk/mirrleesReview
- Commentaries by Moffitt, by Laroque and by Hoynes

What is earnings taxation?

- The earnings tax schedule describes the total amount of taxes paid, or transfers received, by an individual for different levels of his or her labour earnings.
- It determines the difference between the amount income an individual worker has to spend or to save and the wage cost of that worker to an employer.
- In most developed economies this schedule is far from simple - not just because of the income tax system but through interactions between capital taxes, benefits and social security.
- As a rule, the earning tax schedule is complex and will differ according to family composition and by the level of other income in the family unit.

The interaction of Taxes with other benefits in the UK



Example is for a lone parent, with one child aged between one and four, earning the minimum wage (£5.80 per hour), with no other private income and no childcare costs, paying £80 per week in rent to live in a council tax Band B property in a local authority setting council tax rates at the national average.

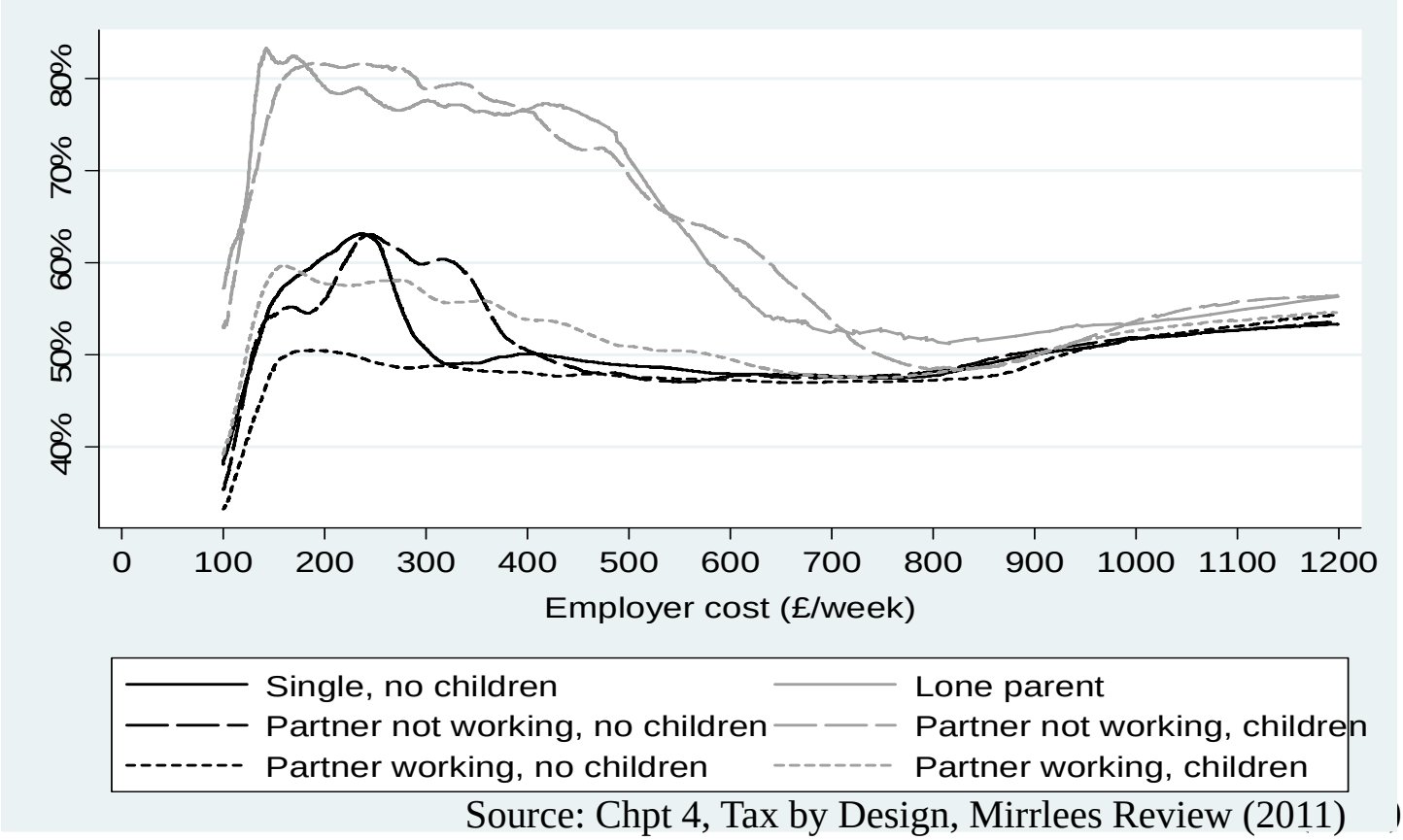
The taxation of income from earnings

- It is essential to assemble all the components of the tax schedule and examine the system as a whole.
- One way to achieve this and to capture the complete picture of the tax rate schedule is through the calculation of effective marginal tax rates and participation tax rates.
- The 'effective marginal tax rate' is the proportion of an £1 of extra earnings retained in the tax and benefit system. This will include all employer taxes and contributions as well as the full set of taxes and benefits. It typically varies widely.
- By contrast the 'participation tax rate' is the net loss, through taxes and benefits, of earnings in work relative to being out of work.

The taxation of income from earnings

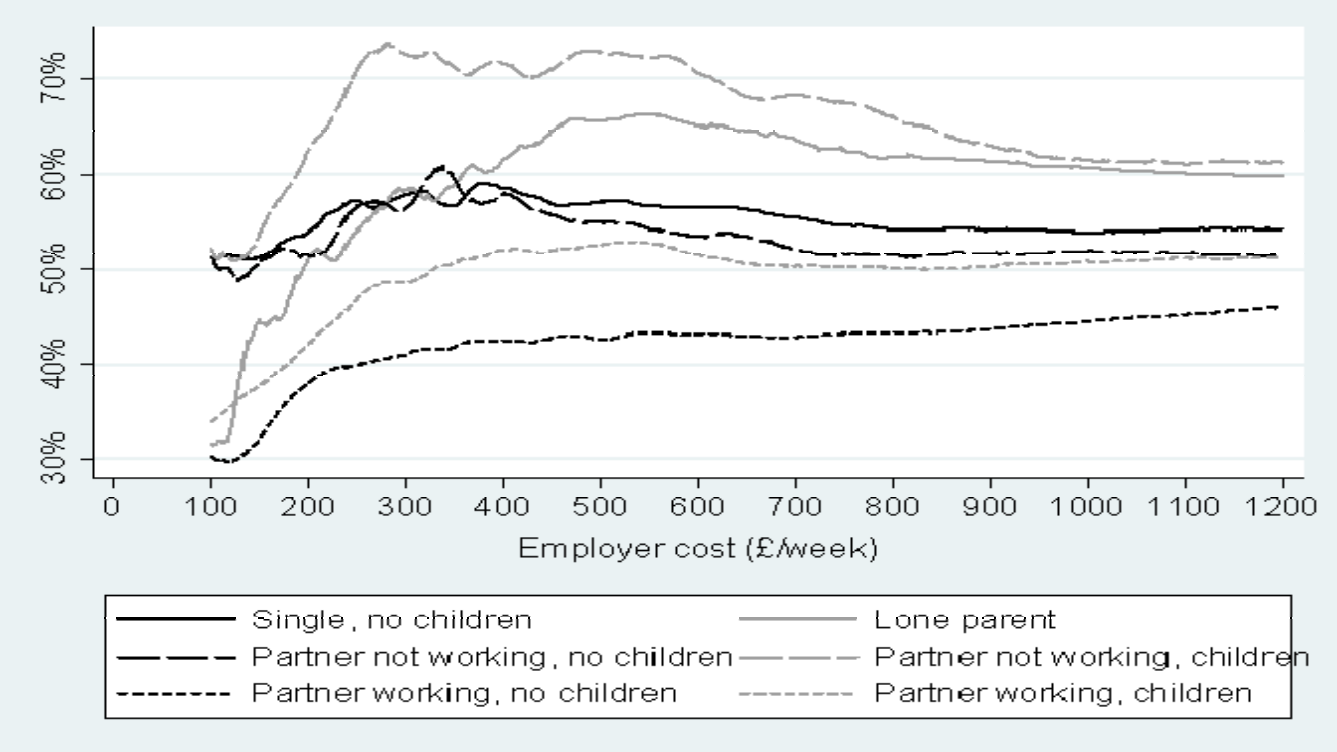
- The higher the PTR, the more the tax and benefit system reduces the financial gain to work.
- If someone who did not work had an income from a benefit programme of £60 a week, and would earn £250 in gross earnings, but pay £40 of that in income tax if they were to work, then the PTR is given by 1 - (210-60)/250, or 40%.
- A PTR in excess of 1 means the individual would be worse off in work than not working; a PTR equal to 1 means that there is no financial reward to work; a PTR of zero means that the financial reward to work is equal to gross earnings;
- Negative PTRs are possible where benefits are conditional on being in work or having positive earnings.

Average EMTRs across the earnings distribution for different family types



Source: Chpt 4, Tax by Design, Mirrlees Review (2011)

Average PTRs across the earnings distribution for different family types



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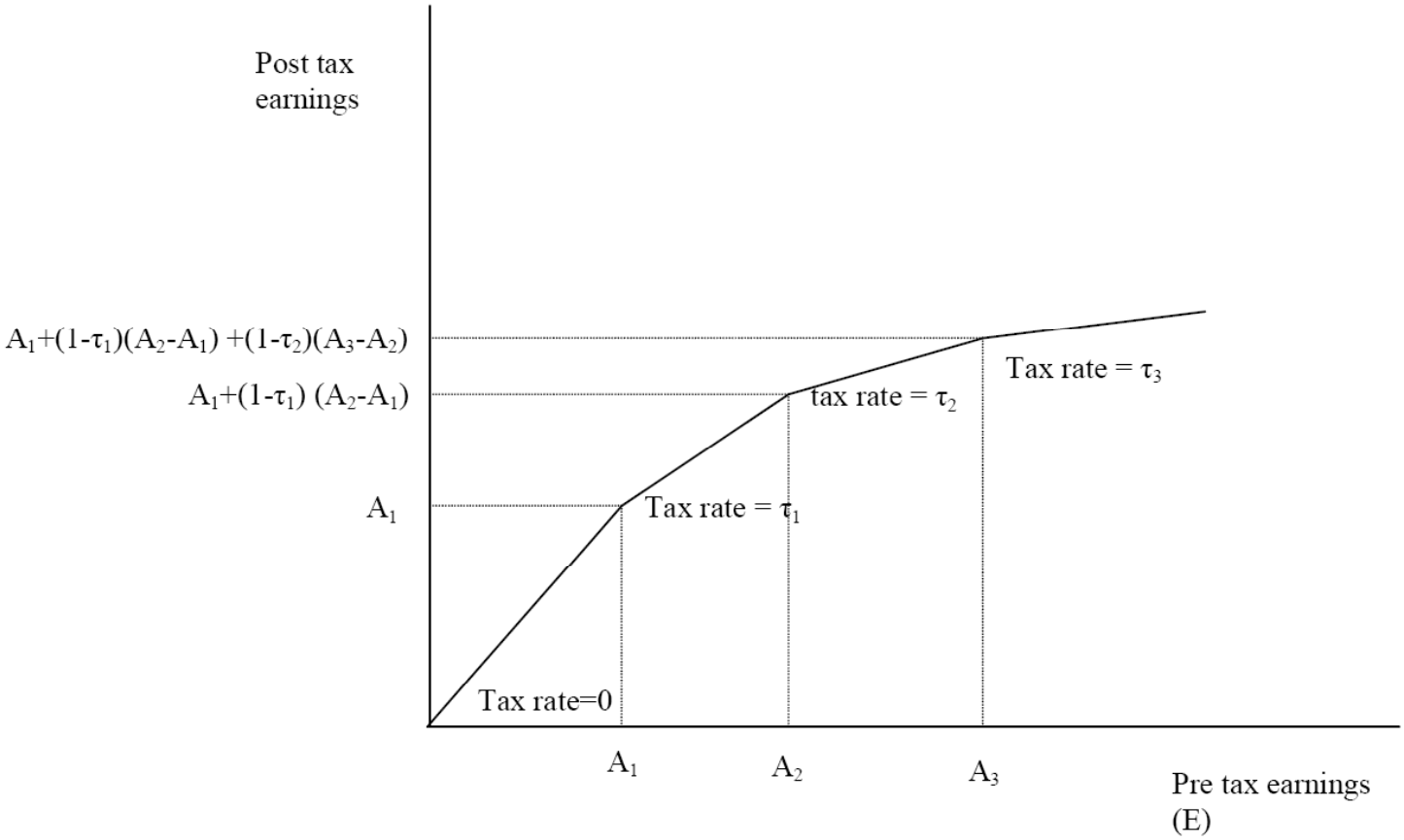
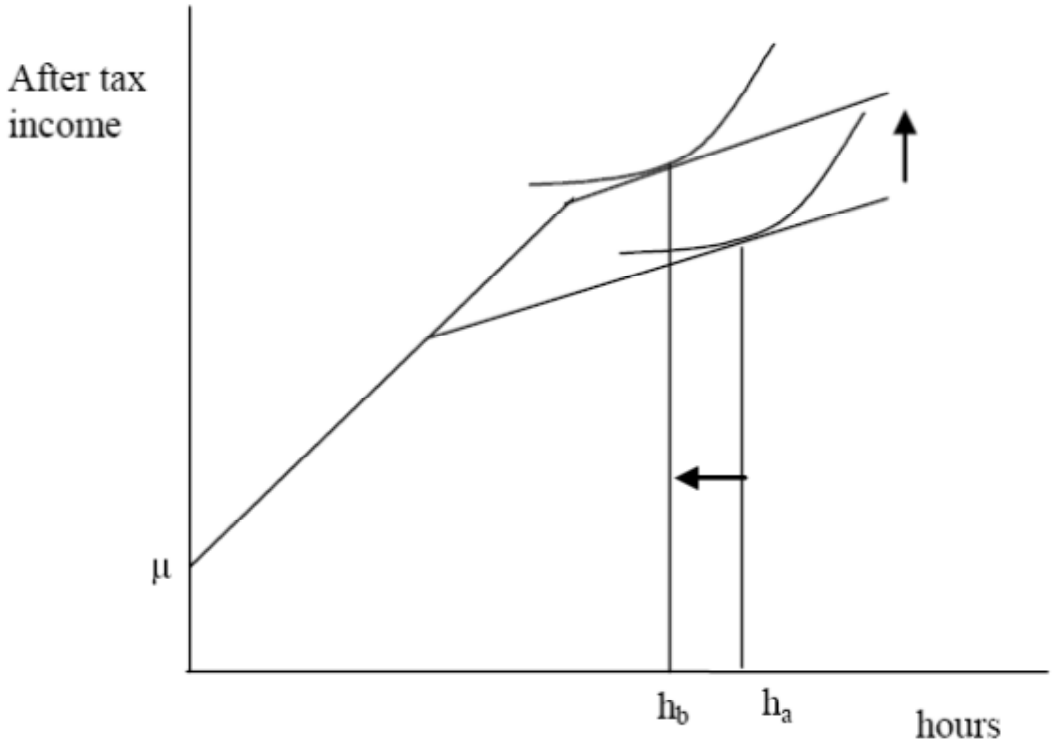
Labour supply and taxation

- Taxes and means tested transfers affect the returns to work, often in complicated ways. A key purpose of a labour supply model is to provide a framework for understanding and measuring the way that tax and welfare systems affect incentives.
- In particular take a decrease in the marginal tax rate at different points in the system. Two cases:
- The tax rate being changed relates to earnings higher than those earned by the individual. In this case the tax rate change has no impact on her optimal hours of work.
- The tax rate being changed is precisely the one faced by the individual. In this case the effect on labour supply comes about because both the marginal wage and the effective non-labour income changes: the decrease in the tax rate increases the slope of the budget constraint (the incentive effect of the wage rate) and reduces its intercept, as if the individual had less non-labour income.

Labour supply and taxation



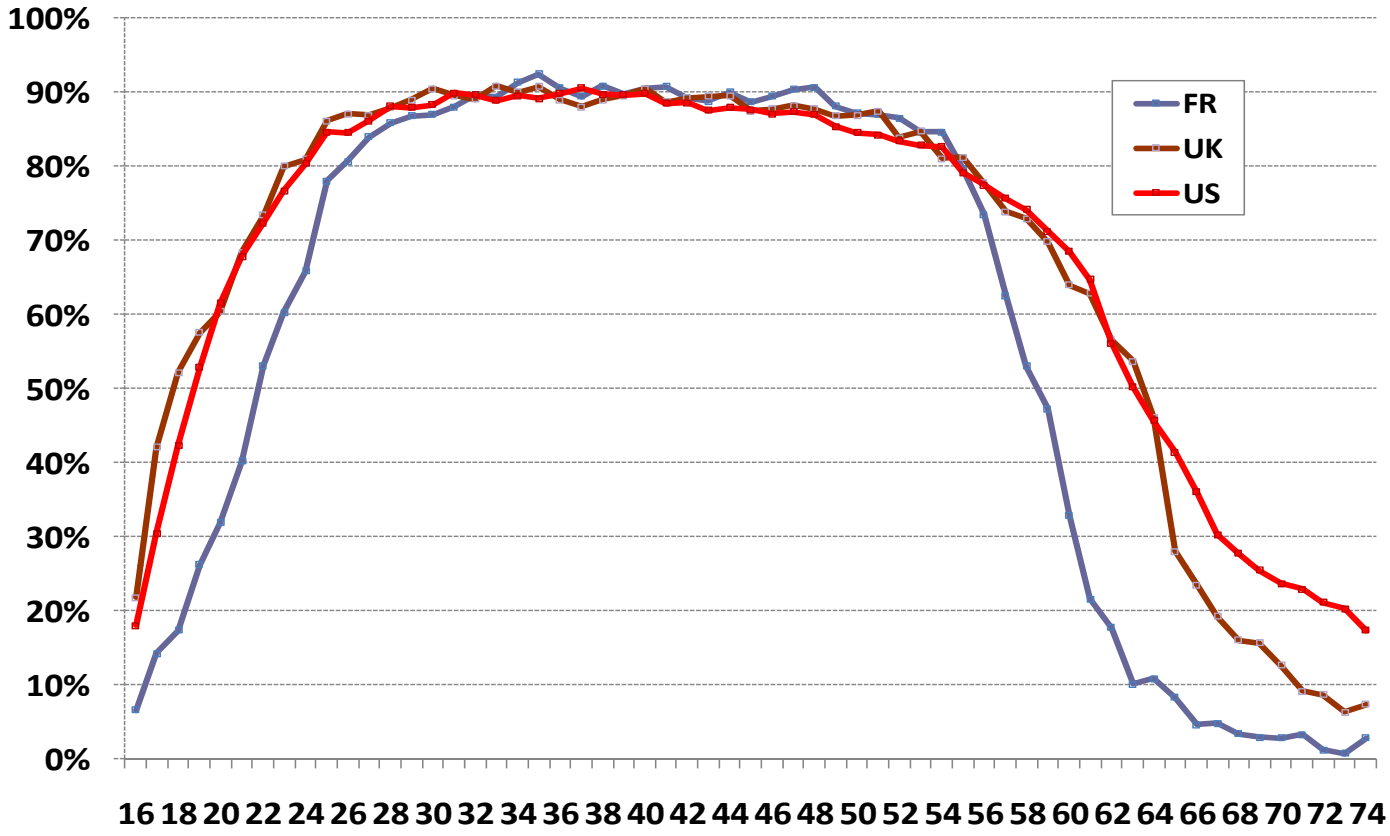
Labour supply and taxation



The taxation of income from earnings

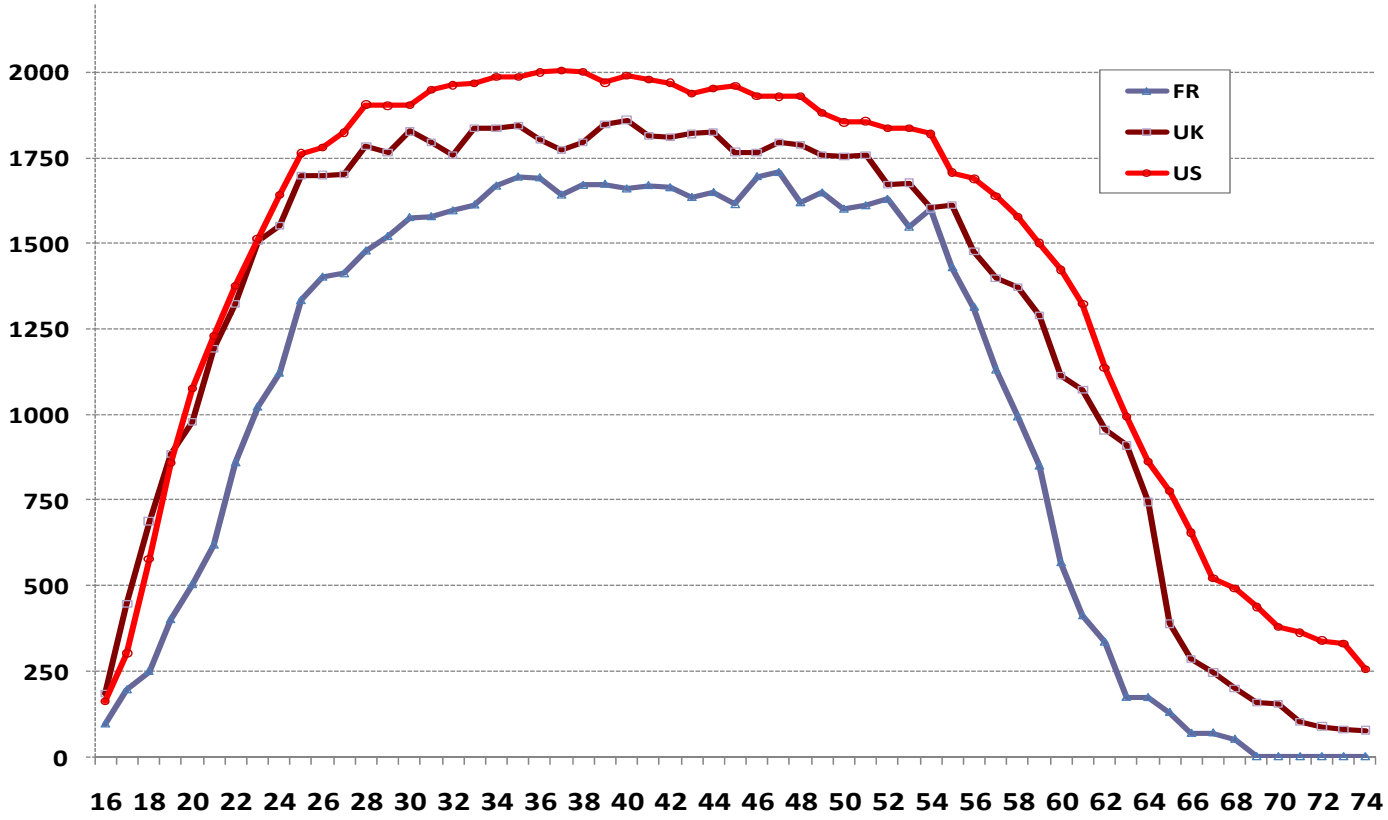
- There are certain key margins where tax rates impinge on earnings decisions.
- For many male workers this is at the beginning and at the end of their working lives. These are the schooling-work margins and the early retirement margins.
- Indeed much of the difference in male employment across OECD countries occurs at these points in the life-cycle.

Employment for men by age – FR, UK and US 2007



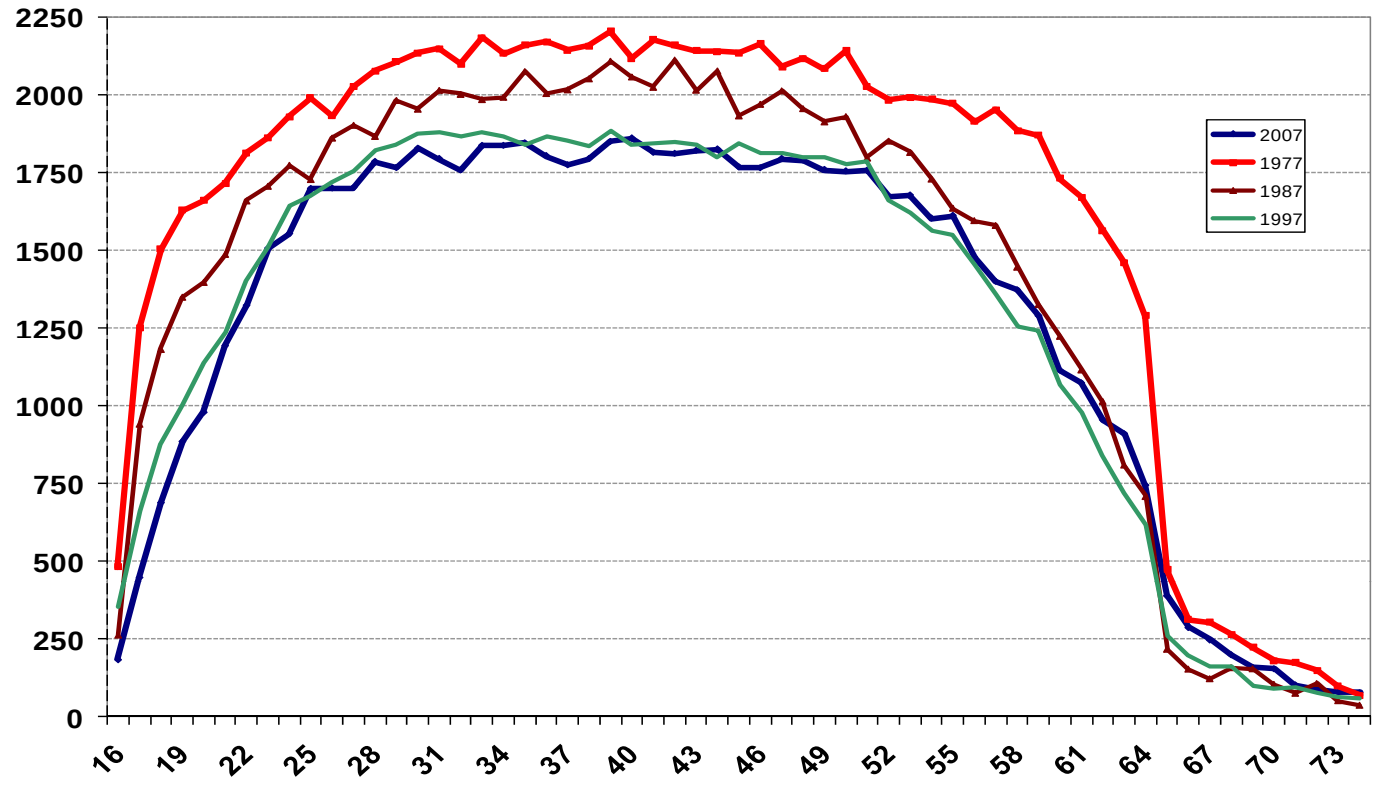
- Blundell, Bozio and Laroque (2010)

Total Hours for men by age – FR, UK and US 2007



- Blundell, Bozio and Laroque (2010)

Total Hours for men by age in the UK: 1977 - 2007



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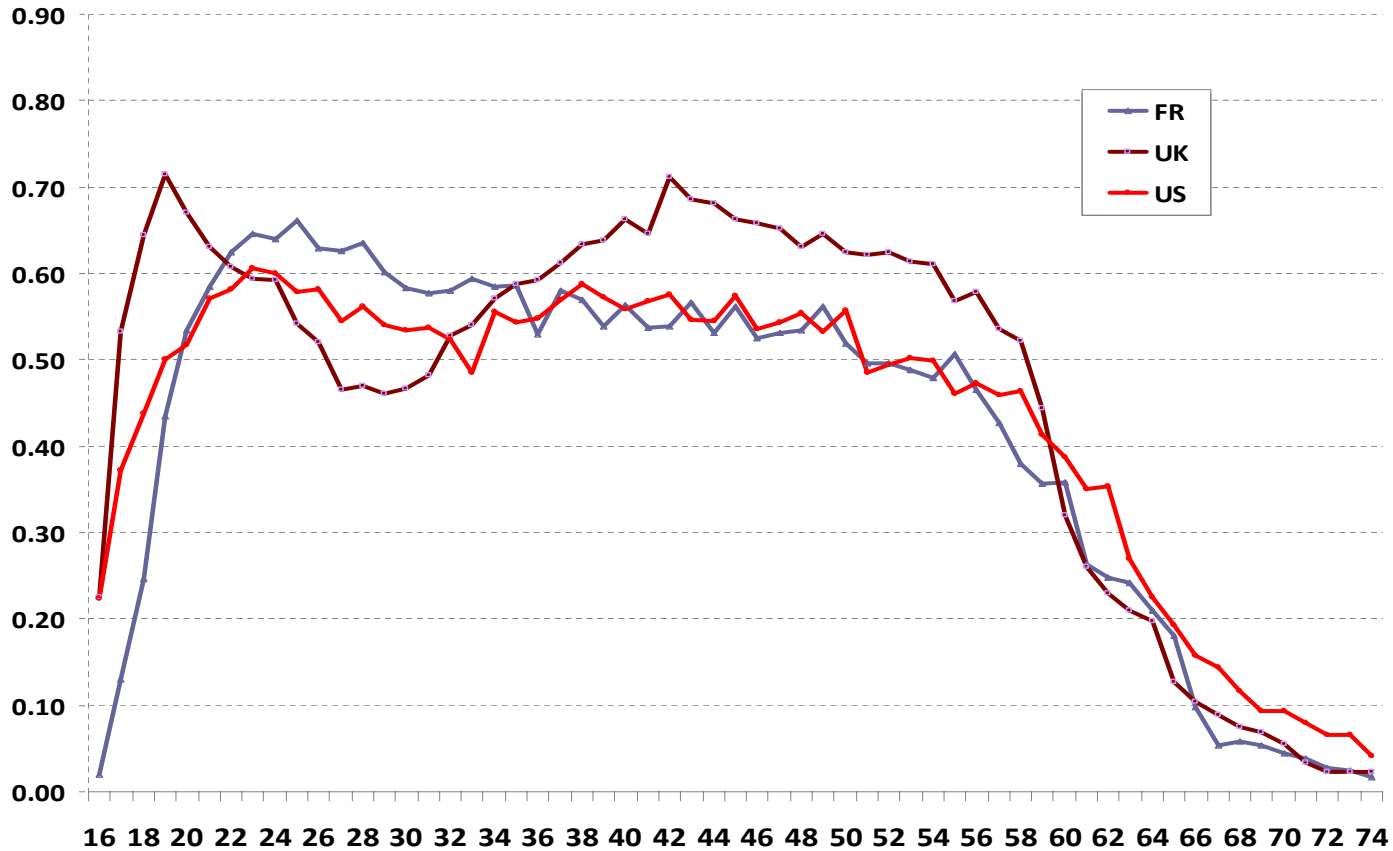
The taxation of income from earnings

- For women earnings are influenced by taxes and benefits not only at these margins but also when there are young children in the family.
- For women with younger children it is not usually just an employment decision that is important it is also whether to work part-time or full-time.
- Often the employment margin is referred to as the extensive margin of work and the part-time or hours of work decisions more generally as the intensive margin.

Female Employment by age – US, FR and UK 1977



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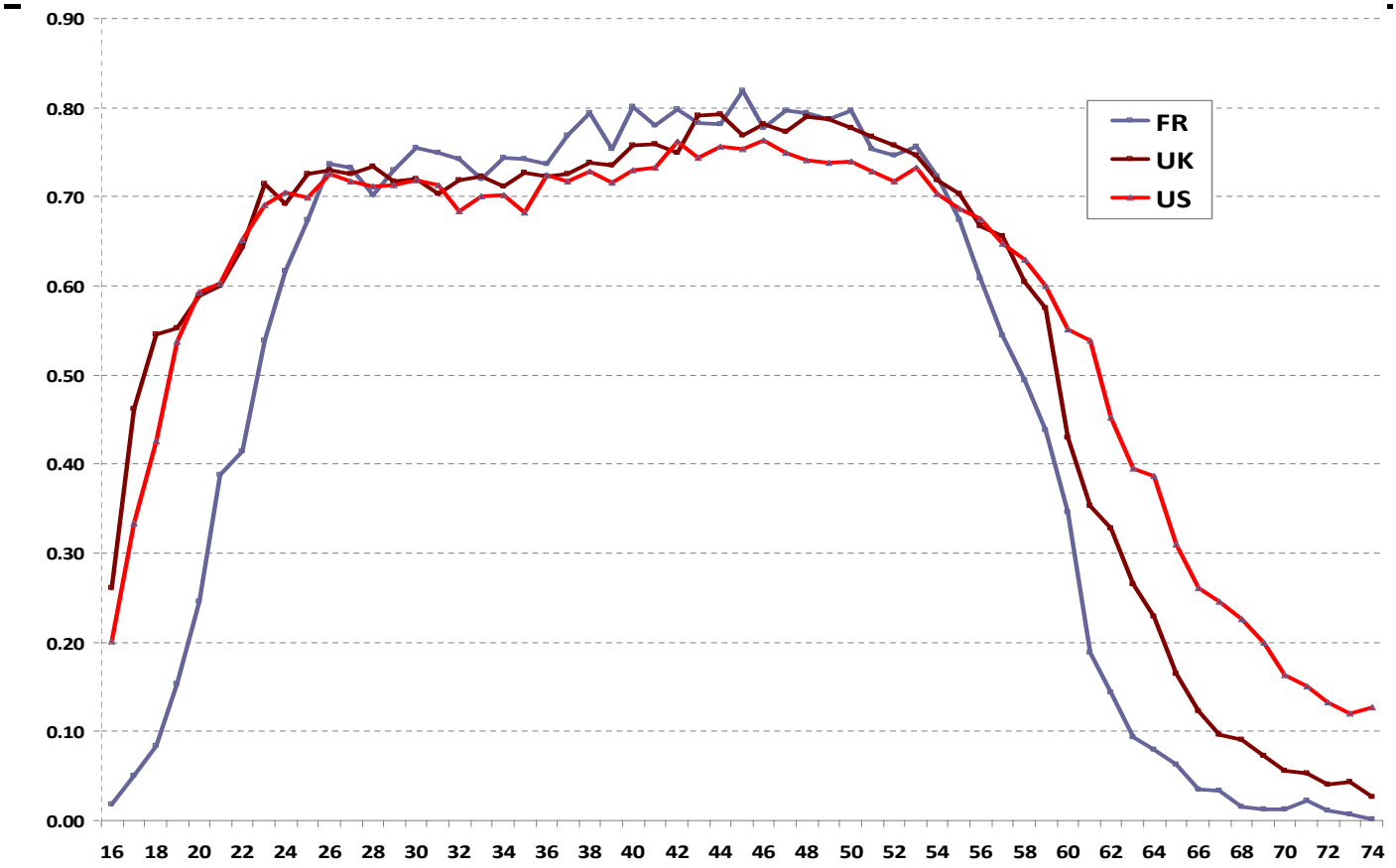

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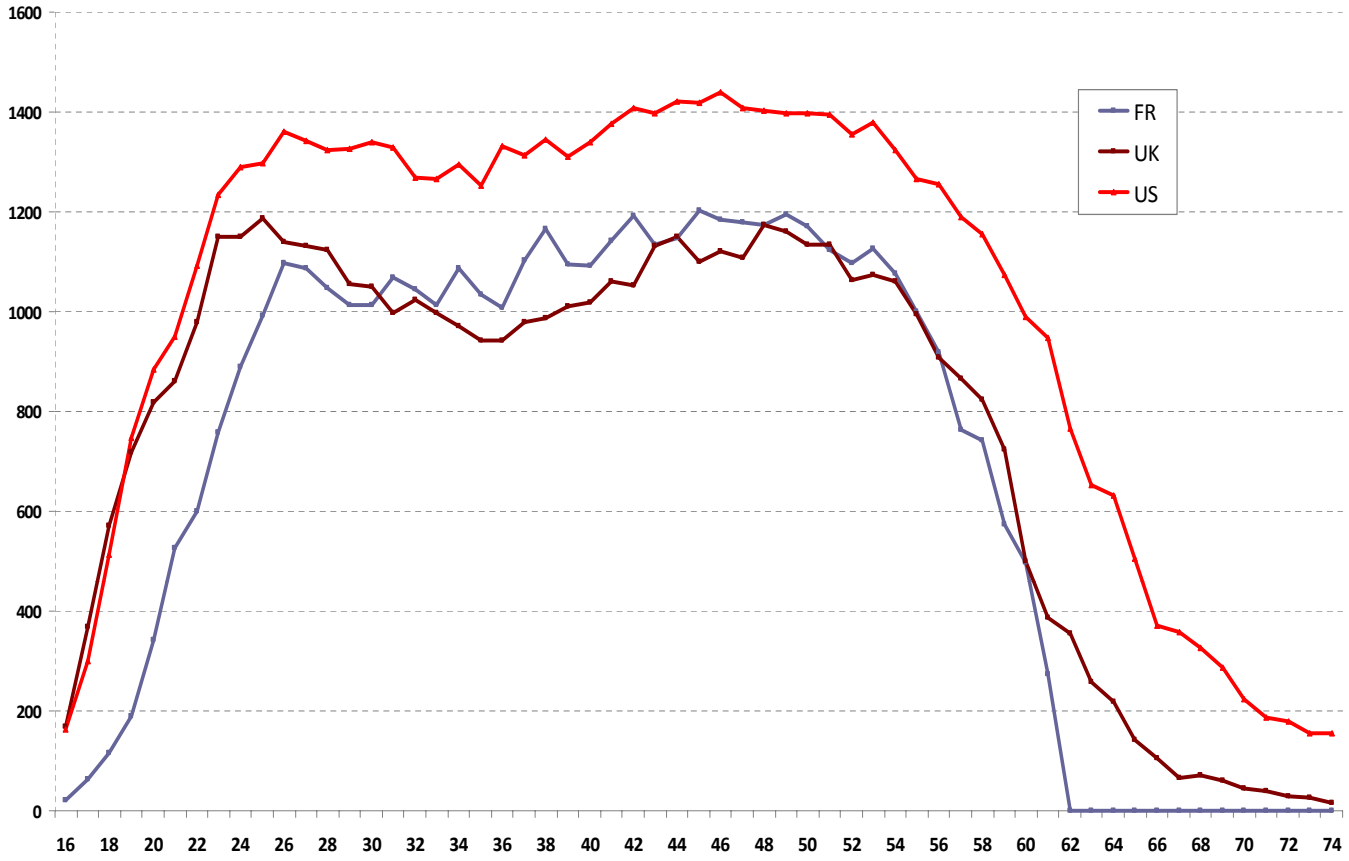
Female Total Hours by age – US, FR and UK 2007



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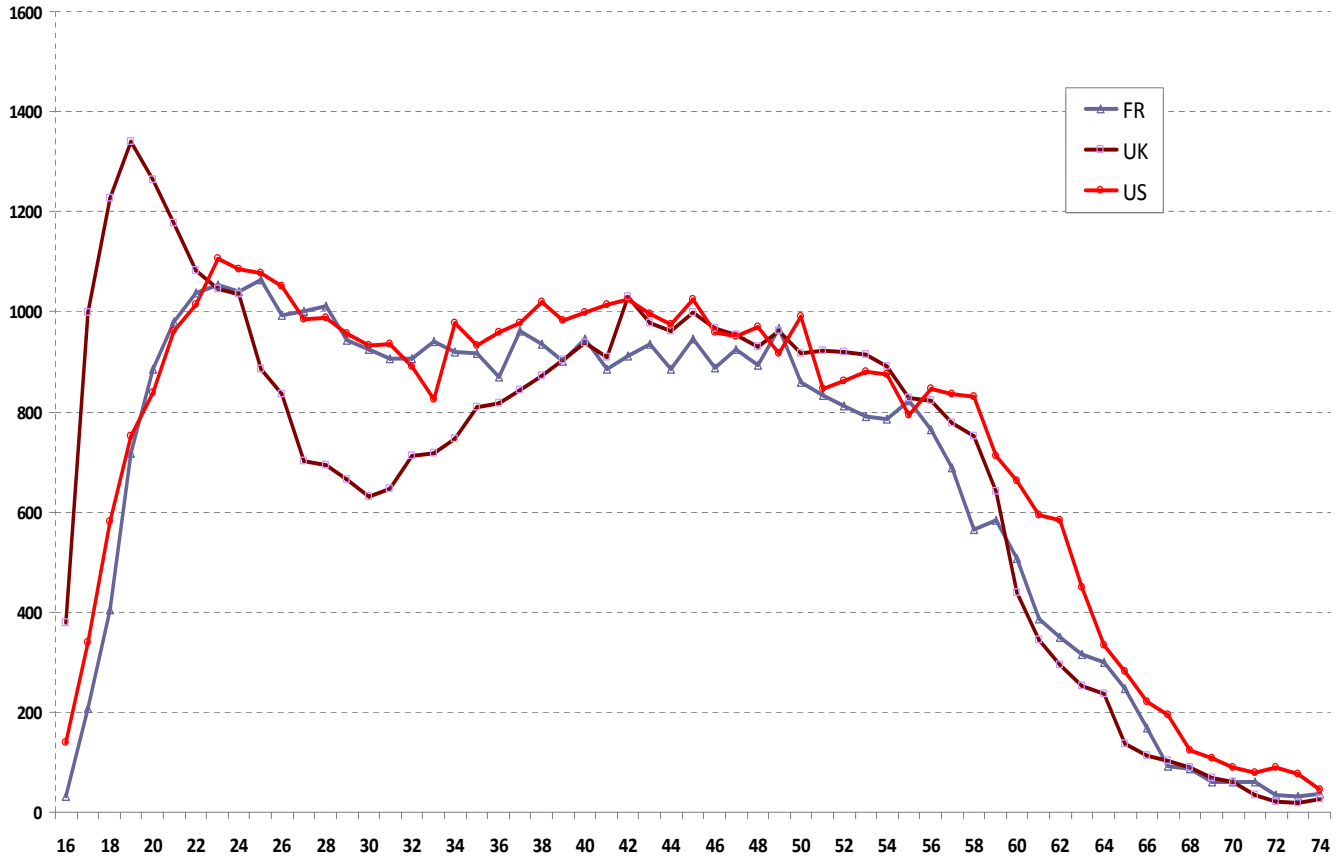


- Blundell, Bozio and Laroque (2010)

How should we choose tax rates?

- Follow the 'optimal tax design' approach due to Mirrlees (1971).
- In this framework a tax schedule is chosen that will maximise social welfare and raise a required amount of revenue.
- The government cannot observe effort, only earnings. So it cannot distinguish a high ability person working few hours from a low ability person working a large amount.
- It has to balance redistributive aims with effort incentives. If it taxes the high ability types too much they may choose to supply much less effort. Thus we need to know supply elasticities.

Start with the choice of the top tax rate

- How should we tax the very rich?
- We consider the different ways in which a small increase in the top rate affects social welfare.
- We assume that this top rate applies to earnings above a given level, and we will refer to this level as the top bracket.
- There are three impacts on social welfare:

1. *mechanical effect* on tax revenue

2. *behavioural response* on tax revenue

3. *welfare effect*, and it is a loss to society. How large is this loss depends on the redistributive tastes of the government.

The choice of the top tax rate

1. With no behavioural response, increasing the top rate will increase government revenue. This is the *mechanical effect* on tax revenue, and this is a benefit to society, as the revenue can be used for government spending or higher transfers.
2. Increasing the top rate may also induce top bracket taxpayers to reduce their earnings (but not below the top bracket, because nothing has changed below this point) because of the substitution effect described above. This is known as the *behavioural response* on tax revenue, and it is a cost to society as tax revenues will fall.
3. Finally, any increase in the top rate will reduce the welfare of top bracket taxpayers. This is the *welfare effect*, and it is a loss to society. If the government values redistribution, then, for incomes above a certain level, it will consider that the marginal value of income is small. In the limit, the welfare effect will be negligible relative to the mechanical effect on tax revenue.

The choice of the top tax rate

- Consider a reform that changes the top tax rate τ by a small amount $d\tau$
- Let z be the earned income being considered for taxation
- The top bracket begins at income z^*
- Assume there are N taxpayers in the top bracket

1. Mechanical effect of higher marginal tax rate on incomes above z^*:

$$dM = N[z - z^*]\, d\tau > 0$$

2. Behavioural effect will depend on the elasticity e – the elasticity of earnings with respect to the net of tax rate $(1-\tau)$. Reported income will be reduced by

$$dz = -\, e\, z\, d\tau / (1-\tau)$$

Hence revenue will be reduced by

$$dB = -\, N\, e\, z\, d\tau\, \tau / (1-\tau)$$

The choice of the top tax rate

- Suppose the government gives a value of g to an extra £1 to a top tax bracket taxpayer – will be strictly less than 1, since the weighted sum of welfare weights is unity.

3. Welfare effect of higher marginal tax rate on incomes above z^*:

$$dW = -\, g\, N[z - z^*]\, d\tau < 0$$

Summing these we get

$$dM + dB + dW = N\, d\tau\, [z - z^*]\, [1 - g - e.a.\tau / (1-\tau)]$$

where $a = z/(z - z^*)$.

At the optimum this has to be zero

$$\tau^* = (1 - g) / (1 - g + a.e)$$

The choice of the top tax rate

There are some nice interpretations of this simple formula

$$\tau^* = (1 - g) / (1 - g + a.e)$$

1. Note that a is a parameter of the upper tail of the Pareto distribution ($f(z) = C/z^{1+a}$). Approximately 1.67 in the recent UK data.
2. If g is approximately zero then

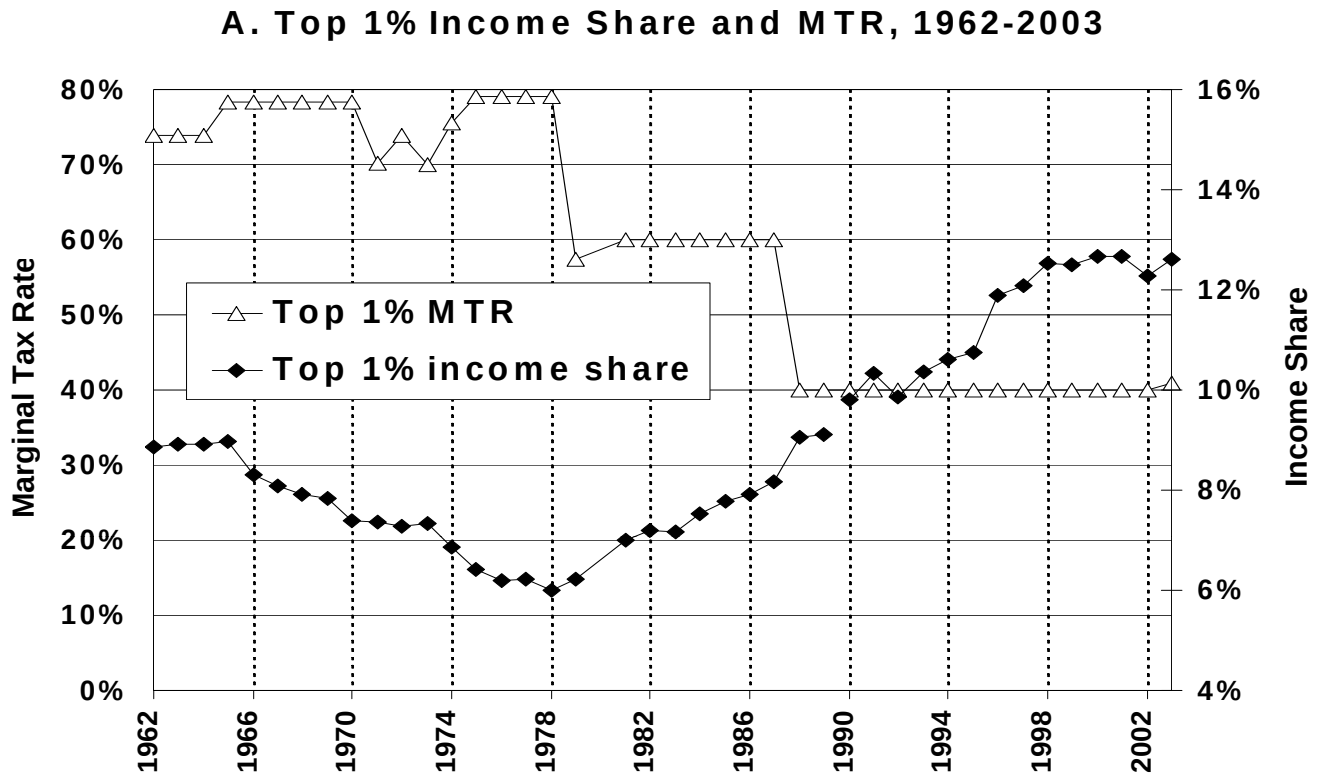
   $$\tau^* = 1 / (1 + a.e)$$

   which is very simple to estimate if we know the taxable income elasticity.

For example if $e = .5$ then $\tau^* = 1 / (1 + 1.67 .5) = .545$

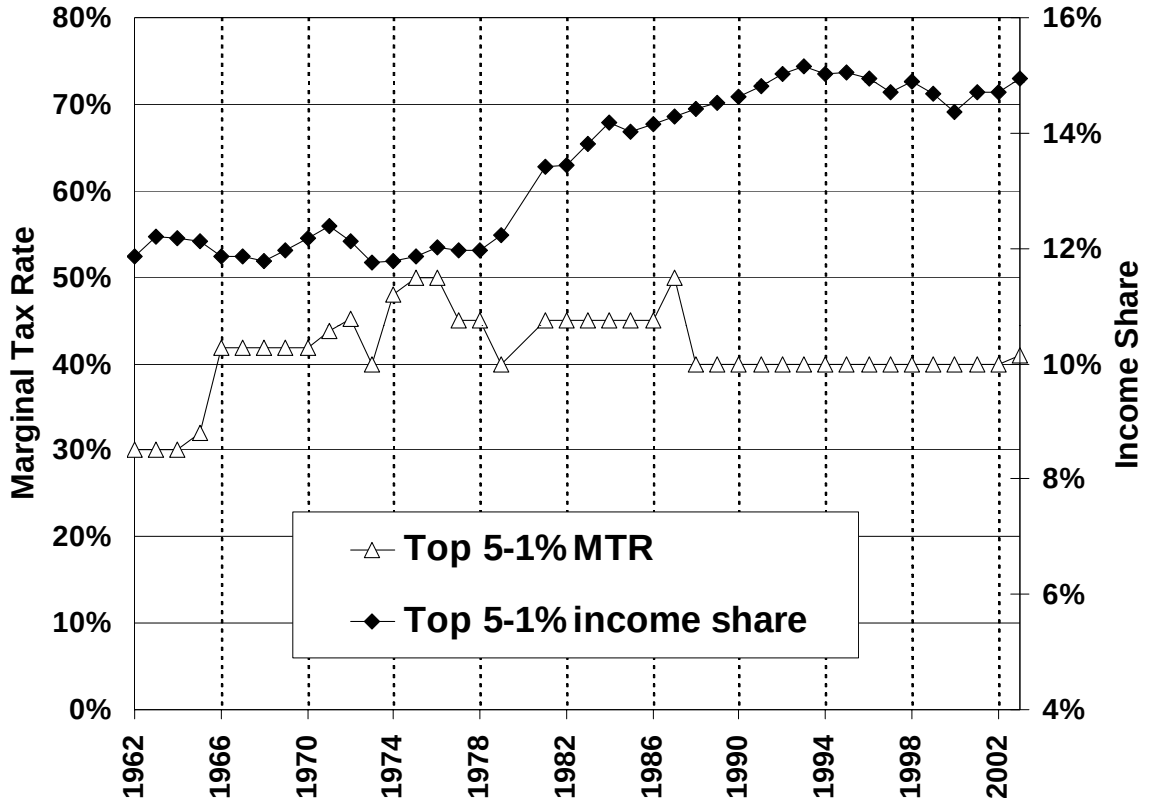
A top tax rate of 55%.

Top incomes and taxable income elasticities



- Source: MR1, UK SPI (tax return data)

B. Top 5-1% Income and MTR, 1962-2003



Source: Brewer, Saez and Shephard (Mirrlees Review)

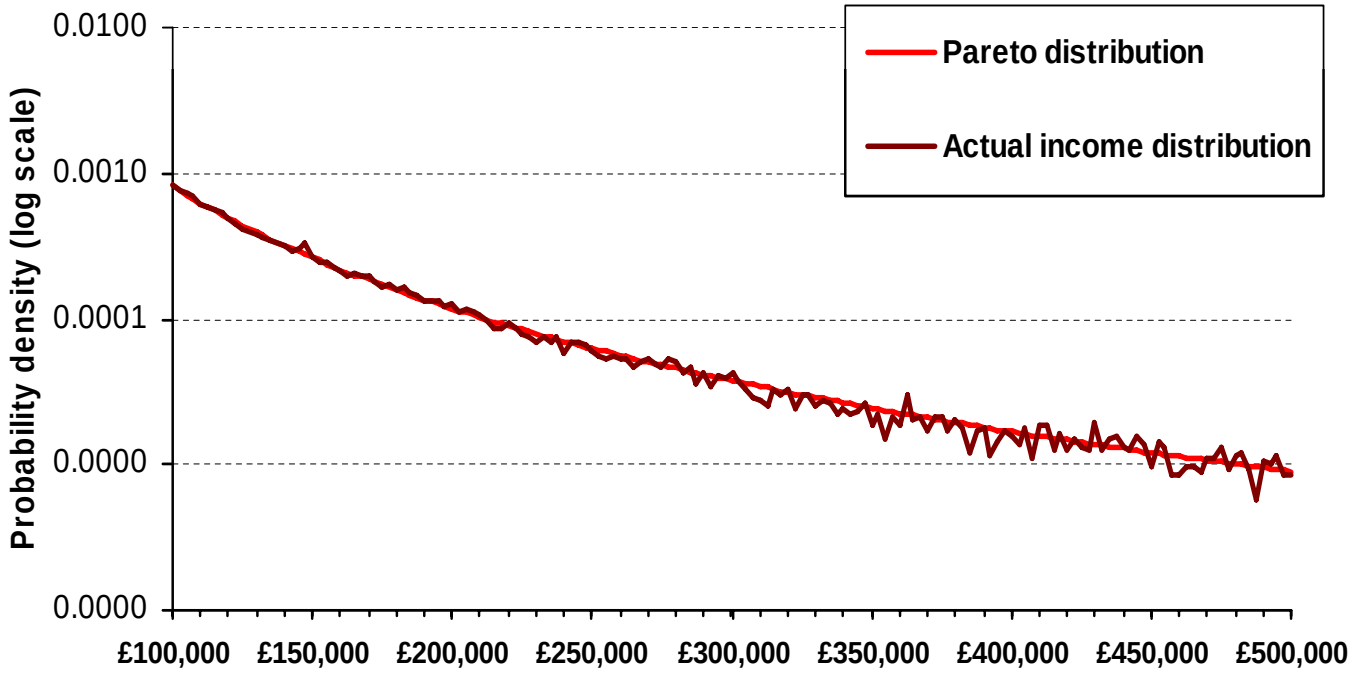
Taxable Income Elasticities at the Top

	Simple Difference (top 1%)	DD using top 5-1% as control
1978 vs 1981	0.32	0.08
1986 vs 1989	0.38	0.41
1978 vs 1962	0.63	0.86
2003 vs 1978	0.89	0.64
Full time series	0.69	0.46
	(0.12)	(0.13)

With updated data the estimate remains in the .35 - .55 range with a central estimate of .46, but remain quite fragile

Note also the key relationship between the size of elasticity and the tax base (Slemrod and Kopczuk, 2002)

•Pareto distribution as an approximation to the income distribution



•Pareto parameter quite accurately estimated at 1.8

•=> revenue maximising tax rate for top 1% of 55%.

The taxable income elasticity *e*

- Top 1% income share increases from 6% to 12%
- Net-of-tax rate increases from 20% to 60%
- elasticity $e = 2/3$, t max = 47%
- But is relative growth in top 1% due only to tax cuts?
- compare with 1-5% group
- Taxable income elasticity falls to around .45
  - implies an 'optimal' top incomes tax rate around 57%
- Topics for open discussion:
- Has the elasticity *e* changed over time?
- Is the method for estimating *e* reliable?
- Is the Pareto distribution assumption a good one?
- How would a bargaining model change the arguments? (see Picketty, Saez and Stantcheva (CEPR DP 8675, Nov 2011)

Top tax rates and migration

- Concern that individuals move to low tax countries
  - migration response is similar to an extensive response
- Optimal top tax rate with migration elasticity *(m)* + intensive elasticity *(e)* is:

$$MTR = 1/(1 + a \cdot e + m)$$

  - does it change in recessions?
  - nature of evidence on migration elasticity '*m*' is weak

- For some earners, usually those on higher incomes, there are exemptions and deductions which reduce taxable earnings.
- A higher tax rate on a smaller base will raise less revenue and will probably be harder to sustain. *As Slemrod and Kopczuk* note:
- 'When personal tax rates on ordinary income rise, evasion may increase, businesses may shift to corporate form, there may be a rise in the consumption of deductible activities such as charitable giving, and individuals may rearrange their portfolios and compensation packages to receive more income as tax-preferred capital gains. These responses to higher taxes, and all others, will show up in declines in taxable income, and there is a growing body of evidence, that, at least for high-income individuals, the elasticity of taxable income to the marginal tax rate is substantial.'

What about the general tax schedule?

- How should we tax lower incomes?
- Again we consider the different ways in which a small increase in the rate at any point in the earnings distribution affects social welfare.
- We begin by allowing the tax and benefit system to be fully 'non-linear', which means that marginal tax rates at a particular point of the earnings distribution can be set to any value without altering marginal rates at other points.
- Remember in this framework identical people vary in their earnings by choosing how much productive effort to supply.

What about the general tax schedule?

- The optimal MTR at any point is set so as to balance the costs and benefits from changing the MTR by a very small amount.
- As before, an increase in the MTR over a very small band of income has three effects on government tax receipts and welfare:

1. the *mechanical effect*
2. the *behavioural effect* generates a loss in tax revenue
3. a *welfare cost* whose size will depend upon the extent to which the government values redistribution.

The optimal marginal tax rate schedule

- For income z, denote $T(z)$ as the tax function, $H(z)$ as the cumulative distribution of individuals & $h(z)$ is the density.
- The optimal tax system is characterised by a lumpsum grant given to those without earned incomes – $T(0)$, combined with a schedule of marginal rates $T'(z)$.
- Consider a reform that changes the marginal tax rate $T'(z)$ by $d\tau$ in a small band of income $(z, z + dz)$.

1. The reform increases taxes by $d\tau.dz$ for every taxpayer above the small band, the mechanical effect is:

$$dM = (1 - H(z)).dz.d\tau$$

The optimal marginal tax rate schedule

2. Those extra taxes also generate a welfare cost.

   let G(z) be the average social value of distributing £1 uniformly among taxpayers with income above z. The welfare cost is

$$dW = dM.G(z)$$

3. The marginal tax rate increase $d\tau$ reduces earnings by

$$dz = - e.z.d\tau / (1- T'(z))$$

   There are h(z)dz such taxpayers, hence revenue will be reduced by the behavioural effect

$$dB = - e.z.[T'(z)/(1- T'(z))] d\tau.h(z).dz$$

The optimal marginal tax rate schedule

At the optimum all these must sum to zero

$$dM + dW + dB = 0$$

Consequently, at the optimum

$$T'(z)/(1- T'(z))] = 1/e \; . \; 1-H(z)/zh(z). \; (1-G(z))$$

1. The optimal tax rate decreases with the elasticity *e*.
2. It is also decreasing in G(z) which measures the marginal value placed on income for individuals above z.
3. It is also decreasing in the hazard ratio $zh(z)/1-H(z)$ which measures the thinness of the distribution.

Negative marginal tax rates?

- It is worth noting that, in this framework, negative MTRs are never optimal: if the MTR were negative in some range, then increasing it a little bit in that range would raise revenue (and lower the earnings of taxpayers in that range), but the behavioural response (which would be to work less) would also be to raise revenue, because the marginal tax rate is negative in that range.
- Therefore, this small tax reform would unambiguously increase social welfare.
- All this changes when we introduce a participation or 'intensive' margin of labour supply response.

What about a participation margin?

- With participation effects, the optimal tax formula changes.
- Negative tax rates become possible and can justify earned income tax credit policies.
- Labour supply estimation suggest extensive margin is more responsive to incentives than intensive margin
- High marginal tax rates at the bottom are no longer necessarily desirable and negative participation tax rates can be optimal

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- If an individual decides to work he or she gets $z - T(z)$.
- If she decides not to work she will get $-T(0)$.
- Suppose utility was simply $u = c - q$ where c is disposable income and q are costs of work.
- Cost of work are distributed with a cumulative distribution $P(q|z)$
- Define the elasticity of participation (extensive margin elasticity) as:

$$\eta = \frac{z - T(z) + T(0)}{P} \frac{\partial P}{\partial q}$$

- With participation effects, the optimal tax formula changes. Suppose we allow taxes to be different across I different earnings levels. Then the optimal structure has the form

$$\frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{e_i h_i} \sum_{j \geq i}^{I} h_j \left[1 - g_j - \eta_j \frac{T_j - T_0}{c_j - c_0} \right].$$

- Labour supply estimation suggest extensive margin is more responsive to incentives than intensive margin
- High marginal tax rates at the bottom are no longer necessarily desirable and negative participation tax rates can be optimal (Brewer, Saez and Shephard (2010), Saez, 2002; Laroque, 2004).