

# Public policy design, labour supply, and estimation

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## Further resources

- Short IFS video (3 ½ mins) covering similar issues (<https://www.ifs.org.uk/publications/7045>)
- LSE video/podcast (1 ½ hrs) “Taxing the rich: A history of fiscal fairness in the United States and Europe” (<http://www.lse.ac.uk/website-archive/newsAndMedia/videoAndAudio/channels/publicLecturesAndEvents/player.aspx?id=3607>)
- EconTalk podcasts (1hr):
  - Mulligan on Redistribution, Unemployment, and the Labor Market ([http://www.econtalk.org/archives/2012/12/mulligan\\_on\\_red.html](http://www.econtalk.org/archives/2012/12/mulligan_on_red.html))
  - Erik Hurst on Work, Play, and the Dynamics of U.S. Labor Markets ([http://www.econtalk.org/archives/2016/11/erik\\_hurst\\_on\\_w.html](http://www.econtalk.org/archives/2016/11/erik_hurst_on_w.html))
- Literature reviews
  - Meagher & Phillips (2010) – quite accessible
  - Blundell and MaCurdy (1999) – comprehensive

## What you will learn in this lecture

- How taxes, benefits, and labour supply play into important policy and economic debates.
- The intuition of the method and application of one way to estimate labour supply elasticities.
- Have a broad sense of key results from the literature.

# Outline

- 1. Labour supply and public policy design**
- 2. A simple model of labour supply**
- 3. Using natural experiments to estimate elasticities**
- 4. Summary**

## Taking a step back...

### Why have taxes and benefits at all?

- **Fund public services**
- **Redistribute income**
  - Reduce inequality
  - Reduce poverty
- **Provide insurance**
  - Unemployment, low earnings, illness

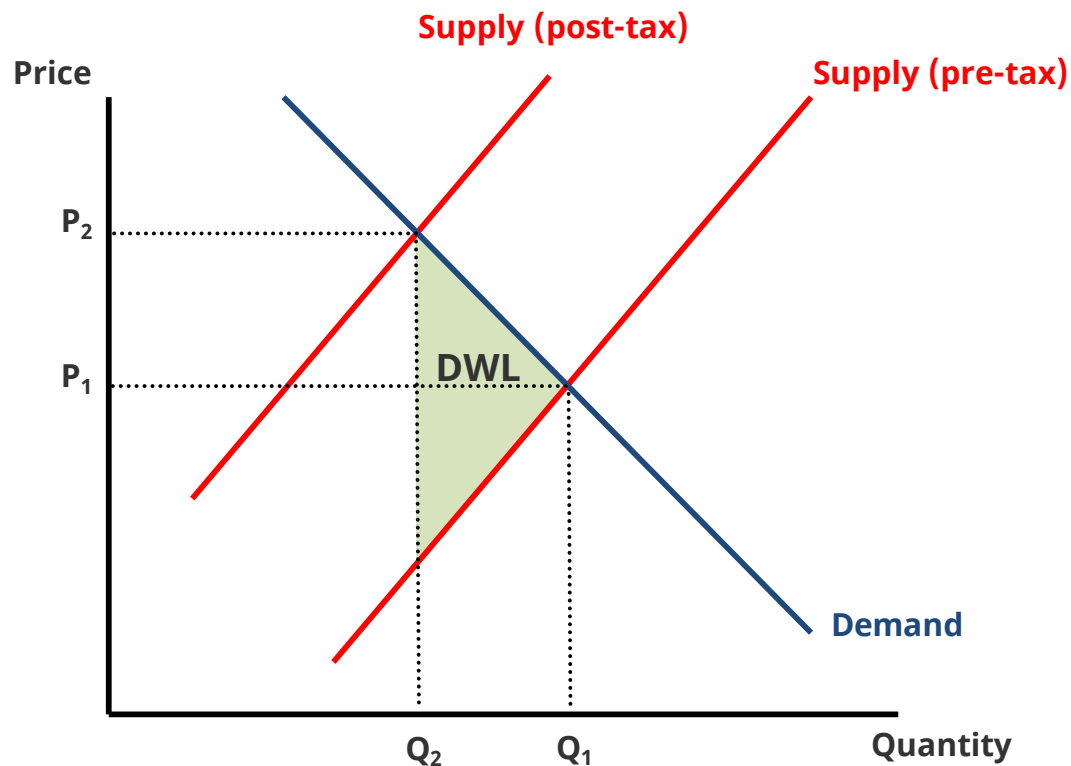
### But, comes with an efficiency cost

- **Prevent mutually beneficial exchanges**
  - Distort labour supply incentives

# Equity and efficiency

## Key concept: the equity/efficiency trade off

- Equity – can take from the rich to give to the poor
- Efficiency – taxes create deadweight loss



# Taxing the rich

- **2017 election – Labour planned to raise income tax for those with incomes of £80,000+**

- **Claim to increase equity...**

“We must all pay our fair share. There’s a moral imperative. We will raise tax at the top end in order to invest for the rest of society.” – Jeremy Corbyn, December 2017

- **... but with a cost to efficiency**

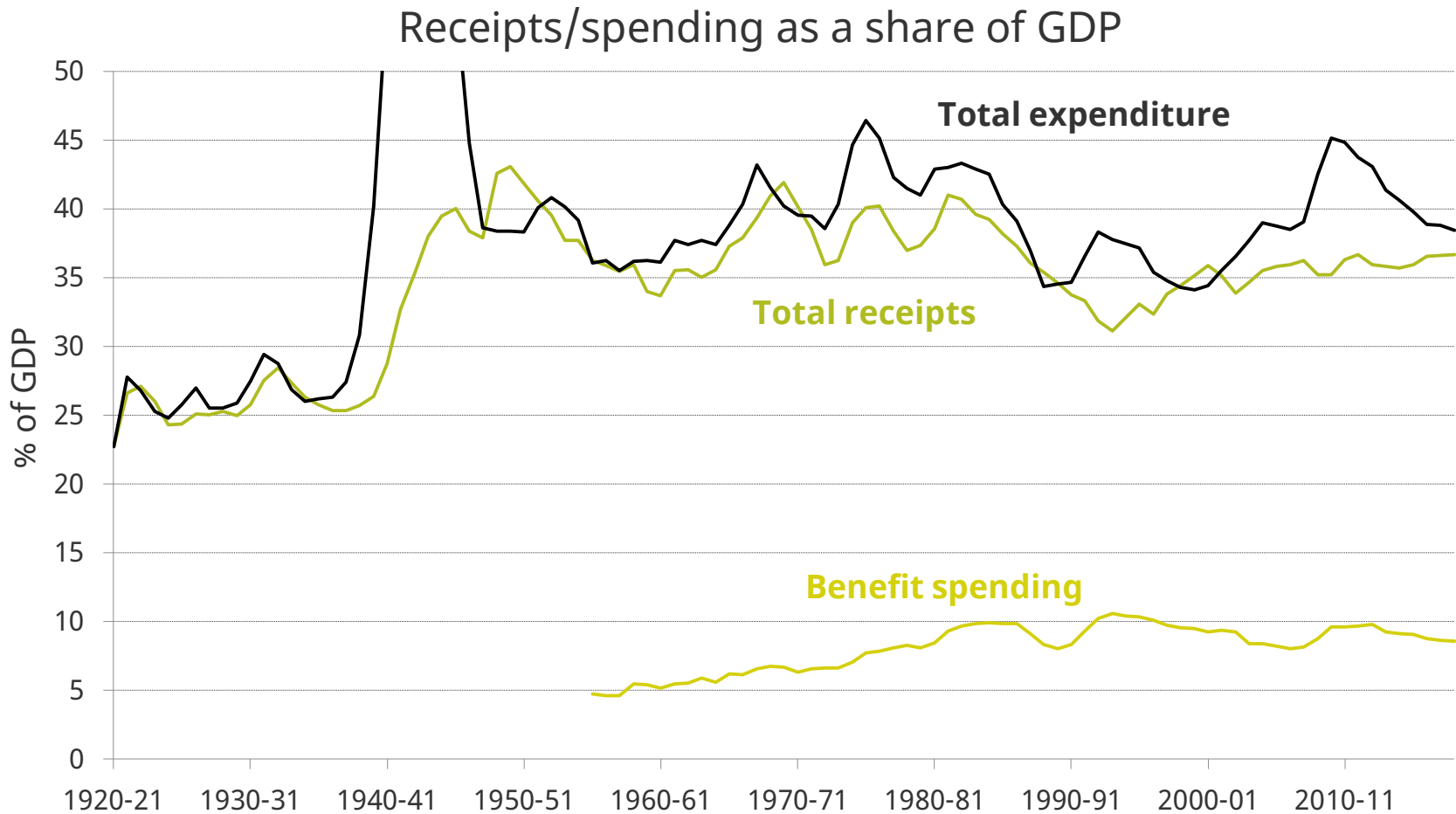
If people didn’t respond, would raise £7bn. Once accounting for behavioural response, only raises £2.5bn

- Working less, putting in less effort, tax avoidance.



**Bigger question: how should we design the tax and benefit system given these trade-offs?**

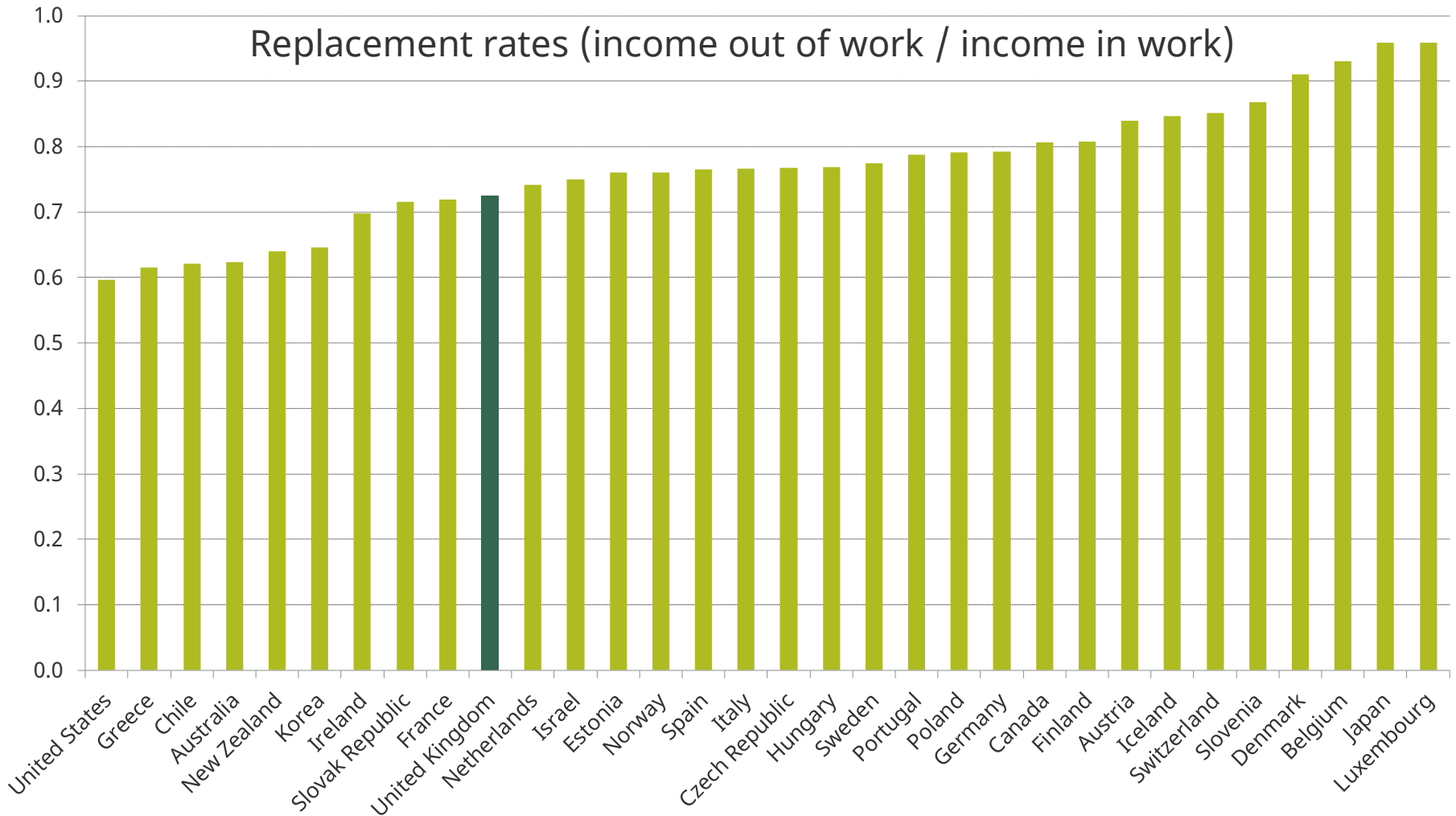
# What choices have UK governments made given these trade-offs?



Source: OBR, March 2018 EFO



# What choices have other governments made?



Source: OECD Benefits and Wages Statistics. NB. For a lone parent, 2 children, 67% of average earnings, initial phase of unemployment

# Public policy choices and public economics

**Different choices → different outcomes (who works, how long, income distribution...)**

**Economic analysis of taxes and benefits helps us better understand the impact of these choices and evaluate them**

- Theory: model labour supply; conceptualise responses as elasticities
- Data & econometrics: measure elasticities – magnitude & sign

**Key point: extent of equity/efficiency trade-off depends on elasticities**

- Affects how much revenue tax policies raise (or benefits cost)
- Determines size of the distortion

**Today – one method for estimating elasticities; illustrate with papers**

# A simple model of labour supply

## A simple model of labour supply

Individual  $i$  with preferences over consumption ( $c_i$ ) and leisure ( $l_i$ ), and with a time endowment ( $T$ ), non-labour income ( $\mu_i$ ), and hourly wage ( $w_i$ ).

With simple proportional tax or means-tested benefit ( $\tau$ ), they solve:

$$\text{Max } U(c_i, l_i) \text{ s.t. } c_i = \mu_i + (1-\tau)w_i(T - l_i)$$

Yields labour supply function  $h_i = h^s[(1-\tau)w_i, \mu_i]$ . What's the effect of raising taxes?

- Taxes unambiguously reduce probability of working in the model

But effect on hours worked is less clear...

## A simple model of labour supply

Consider an increase in  $(1-\tau)w_i$ . Do you choose more leisure or less?

Slutsky equation:

$$\begin{array}{ccccccc} \varepsilon^U & = & \varepsilon^C & + & \eta & & \\ ? & & - & & + & (?) & \end{array}$$

**Elasticities:**

- $\varepsilon^C$  – compensated: holding utility constant, how leisure responds to  $(1-\tau)w_i$ 
  - Substitution effect – leisure becomes more expensive
- $\eta$  – income: how leisure responds to a change in income ( $\mu_i$ )
  - Income effect – extra money to spend – maybe more on leisure?
- $\varepsilon^U$  – uncompensated: how leisure responds to a change in  $(1-\tau)w_i$ 
  - Total response – do you have more leisure or less?

# A simple model of labour supply

**Super simple model. But shows importance of elasticities.**

**Ultimately the sign and magnitude of these elasticities is an empirical question.**

Not looking for 'the' elasticity. Varies between people/time/institutional settings/etc.

# Estimating labour supply elasticities with natural experiments

## Estimating the elasticity directly

**Model suggests hours are a function of marginal net-of-tax hourly wages  $((1-\tau)w)$  and other income  $(\mu)$**

So why not...

$$h_i = \alpha + \beta(1 - \tau)w_i + \gamma\mu_i + \varepsilon_i$$

**Selection: only observe wages for individuals in work**

- Running regression only on those observed working will give biased estimates: low wage workers must really like work/dislike leisure

**Endogeneity:  $(1-\tau)w$  likely to be correlated with error term - causes bias in estimates**

- Progressive taxes  $\rightarrow \tau$  becomes a function of hours - reverse causation



# Experiments

**How would we do this if we were doing medical research?**

**Get a sample, and randomise people into:**

- Treated – get the drug
- Control – get a placebo

**And compare their outcomes**

**Sometimes we can do that in economics – but often not**

# Quasi Natural Experiments

## (Difference-in-difference)

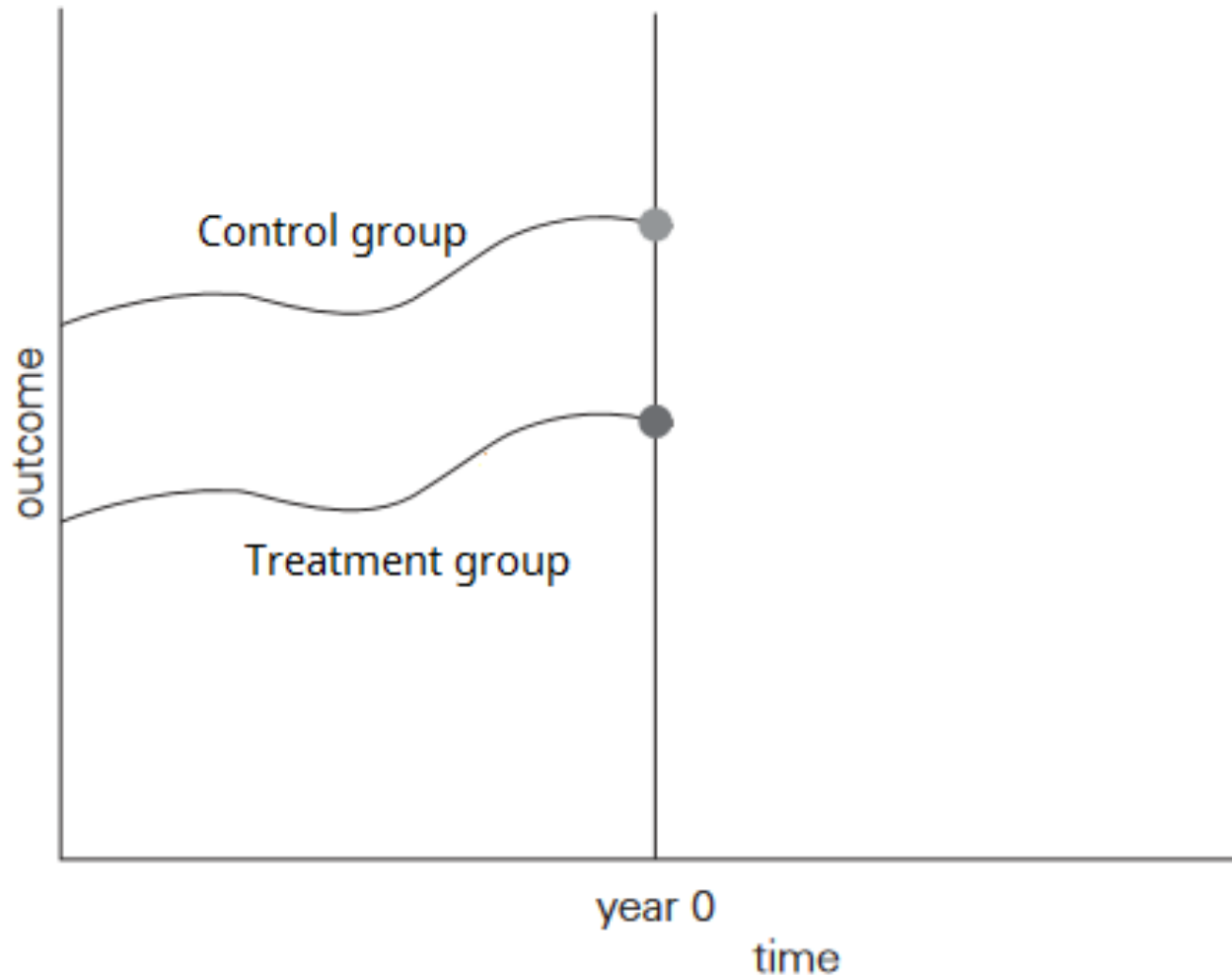
### Structure of tax reforms may provide a 'natural' experiment

- Policy changes tax rates for one group of workers ('treatment') but not another ('control')
- Compare labour supply of 'treated' group to that of 'untreated' group

### Approach relies on 2 key assumptions

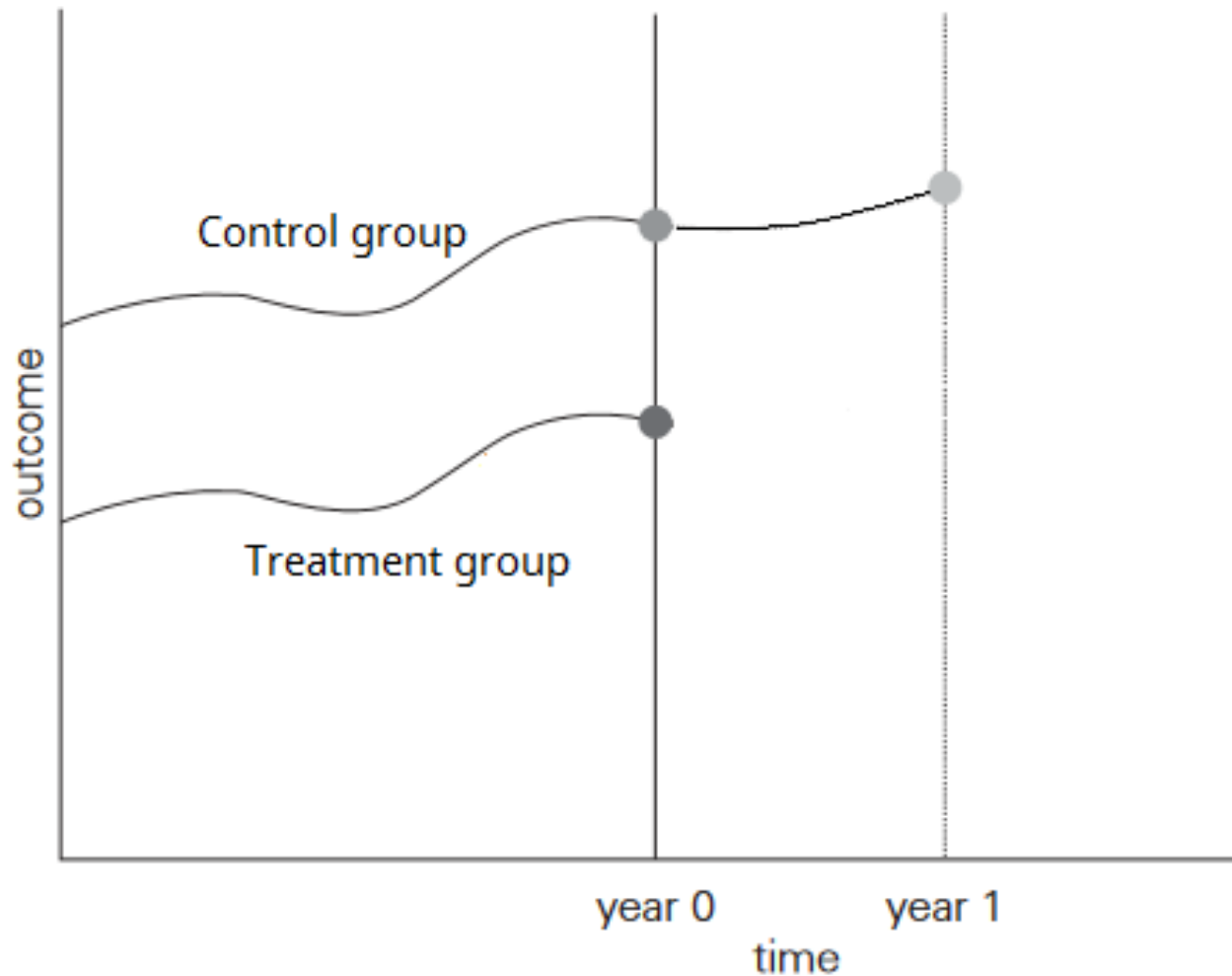
- Common trends: e.g. both groups subject to same macro shocks
  - Drug trial – can't have one group also exposed to additional virus
- Group composition does not systematically change
  - Drug trial – can't have control group sneaking themselves the real drug

# Quasi Natural Experiments (Difference-in-difference)



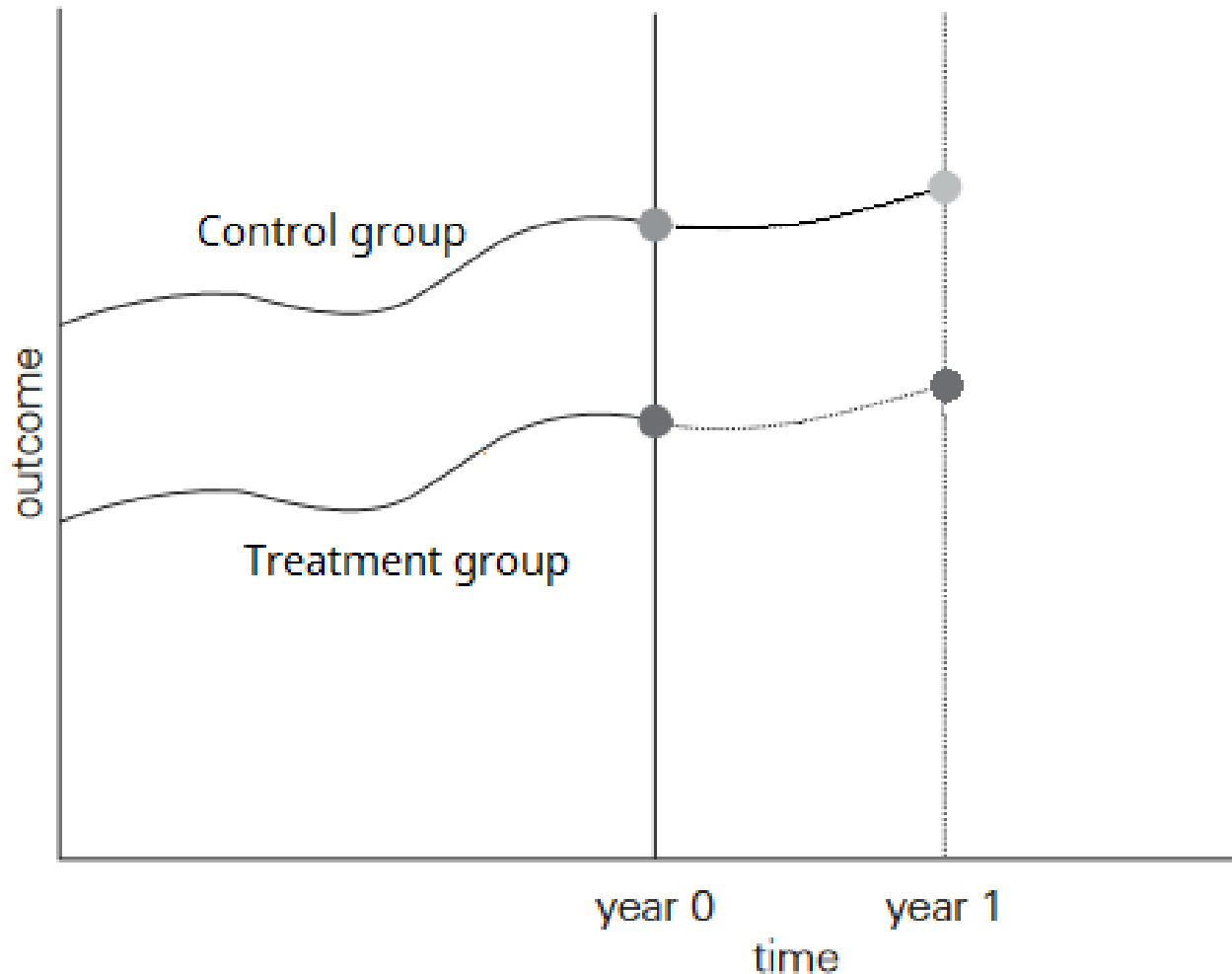
Source: Adapted from World Bank, *Impact Evaluation in Practice*

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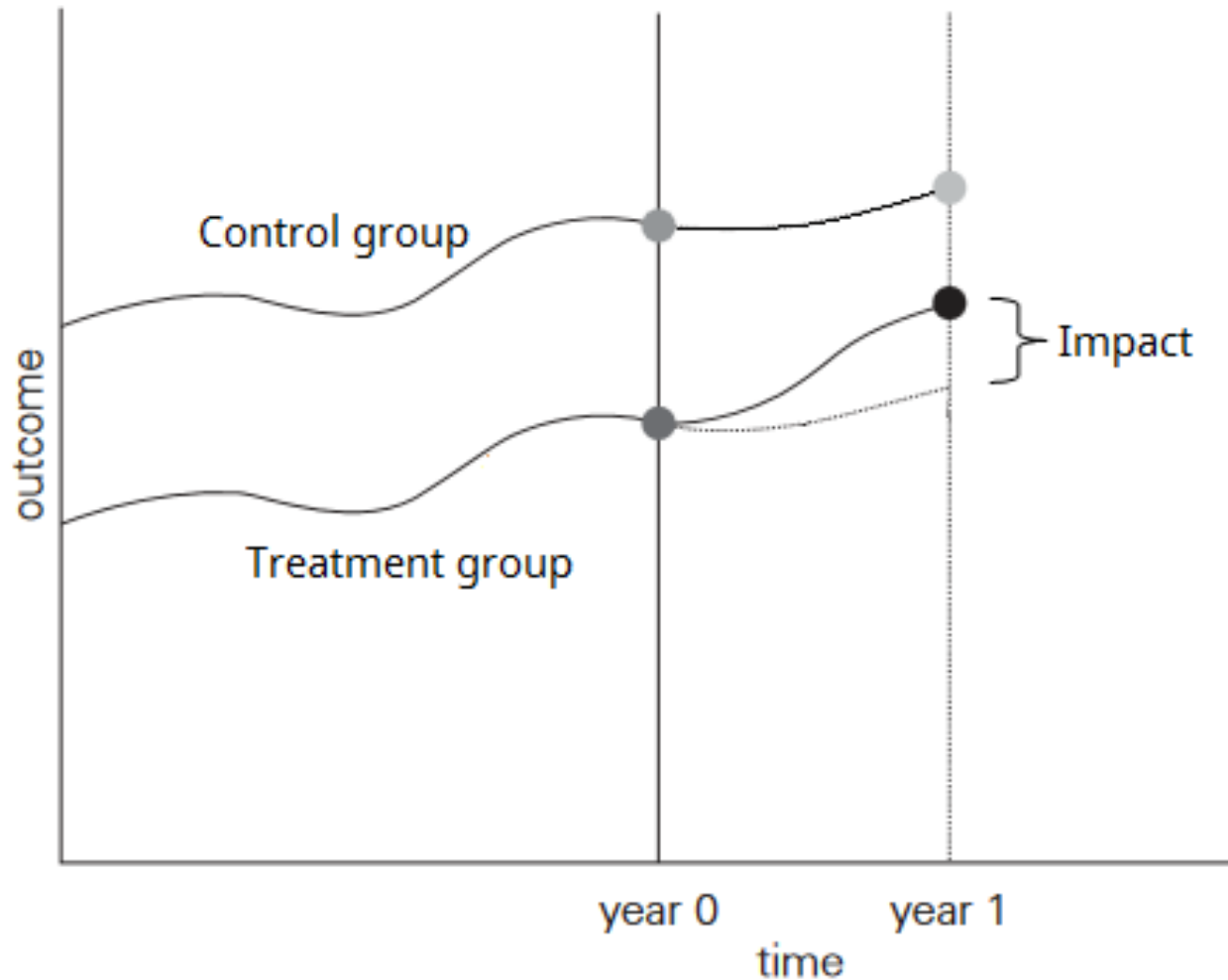
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# Quasi Natural Experiments

(Difference-in-difference)

Policy	Treatment group	Control group	Effect

Source: Eissa (1995), Avram et al. (2018), Blundell et al. (2005)

# Quasi Natural Experiments

(Difference-in-difference)

Policy	Treatment group	Control group	Effect
Cut in marginal tax rates for women with a very high earning husband (US)			

Source: Eissa (1995), Avram et al. (2018), Blundell et al. (2005)



# Quasi Natural Experiments

## (Difference-in-difference)

Policy	Treatment group	Control group	Effect
Cut in marginal tax rates for women with a very high earning husband (US)	Women with husband at 99th percentile	Women with husband at 90th percentile	

Source: Eissa (1995), Avram et al. (2018), Blundell et al. (2005)

# Quasi Natural Experiments

## (Difference-in-difference)

Policy	Treatment group	Control group	Effect
Cut in marginal tax rates for women with a very high earning husband (US)	Women with husband at 99th percentile	Women with husband at 90th percentile	Hours: Small increase Participation: Larger increase

Source: Eissa (1995), Avram et al. (2018), Blundell et al. (2005)

# Quasi Natural Experiments

## (Difference-in-difference)

Policy	Treatment group	Control group	Effect
<p>Cut in marginal tax rates for women with a very high earning husband (US)</p> <p>Out of work lone mothers with a child aged 5-15 must do job search to keep getting benefit (UK)</p>	<p>Women with husband at 99th percentile</p>	<p>Women with husband at 90th percentile</p>	<p>Hours: Small increase Participation: Larger increase</p>

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Out of work lone mothers with a child aged 5-15 must do job search to keep getting benefit (UK)	Lone mothers with a child age 5-15	Lone mothers with a child aged 0-4	

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In-work benefits for those with children increased (UK)			

Source: Eissa (1995), Avram et al. (2018), Blundell et al. (2005)

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In-work benefits for those with children increased (UK)	Parents	Adults without children	Singles: participation increase Couples: participation decrease

Source: Eissa (1995), Avram et al. (2018), Blundell et al. (2005)



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# Quasi Natural Experiments

## (Difference-in-difference)

**Eissa (1995) exploits the 1986 Tax Reform Act in US, looking at female labour supply over the 1980s**

- Women with high earning spouse saw large reductions in marginal rates
  - But little change for women with low earning spouse
- Treatment group – women with spouse at 99<sup>th</sup> income percentile
- Control group – women with spouse at 90<sup>th</sup> income percentile
- Find small increase in hours, large increase in participation
  - Can calculate uncompensated elasticity ( $\varepsilon^u$ )
- Problems:
  - Common trends? Increasing inequality
  - Group composition affected by reforms?
- External validity?

# Beyond hours and participation

**So far we've been looking at labour supply responses**

**But people can respond on other margins:**

- Intensity of effort; tax avoidance; human capital investment; pension contributions

**Affects shape of Laffer Curve**

**Can instead look instead at taxable income** - includes traditional labour supply effects, but also income shifting, avoidance, effort

**Basics of approach**

- Difference-in-difference: compare taxable income of some group affected by a reform to that of an unaffected group
- Get elasticity of taxable income (ETI) – indicating how responsive taxable income is to change in the marginal tax rate

## How much did the 50p income tax rate raise?

**In April 2010, income tax rate on those earning £150k+ increased from 40% to 50%.**

**HMRC estimated what income growth would have been for 'treated' (>£150k) group without reform**

- Using actual growth for 'control' (£115k-£150k) group

**Find that 50p rate raises £1bn more than 40p**

- But uncertain: 2/3 chance it raised between £4.3bn and MINUS £2.3bn

**Are the £115k-£150k group a good control group?**

- Common trends? Other policies at same time affect control
- No compositional change? May induce people to switch groups

## What we know, what we don't know

- **Intensive (hours worked) & extensive (participation) elasticities**
  - Can be significant for women, esp. lone mothers
  - Extensive elasticity for men very low; intensive can be larger, esp. for low educated or older groups
- **Elasticities of taxable income are larger**
  - Even more so for very high incomes
- ***How* the rich respond less well understood – shifting to capital?**
- **As is dynamics – e.g. response of human capital investment**

## Summary

### **What does economics bring in thinking about labour supply?**

- Theory: simple model illuminates importance of elasticities
- Data and econometrics: robustly estimate those elasticities

**This lets us better understand responses to taxes and benefits, which matters for public policy.**

## Further resources

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- Literature reviews
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# Bibliography

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