Public policy design, labour supply, and estimation
Further resources

- Short IFS video (3 ½ mins) covering similar issues (https://www.ifso.org.uk/publications/7045)
- LSE video/podcast (1 ½ hrs) “Taxing the rich: A history of fiscal fairness in the Untied States and Europe” (http://www.lse.ac.uk/website-archive/newsAndMedia/videoAndAudio/channels/publicLecturesAndEvents/player.aspx?id=3607)
- EconTalk podcasts (1hr):
- Literature reviews
  - 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 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?

Receipts/spending as a share of GDP

- **Total expenditure**
- **Total receipts**
- **Benefit spending**

Source: OBR, March 2018 EFO
What choices have other governments made?

Replacement rates (income out of work / income in work)

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

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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:

\[
\varepsilon^u = \varepsilon^c + \eta
\]

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

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Quasi Natural Experiments
(Difference-in-difference)

Source: Adapted from World Bank, *Impact Evaluation in Practice*
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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\textsuperscript{th} income percentile
• Control group – women with spouse at 90\textsuperscript{th} 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

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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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Bibliography

• Blundell, R., Brewer, M., Shephard, A., 2005. Evaluating the labour market impact of Working Families' Tax Credit, HM Revenue and Customs