



Institute for
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Labour Supply, Taxes and Benefits

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Introduction

- Effect of taxes and benefits on labour supply a hugely studied issue in public and labour economics – why?
- Significant policy interest in topic
 - How should we design the tax and benefit system to encourage individuals on the margins of the labour market into employment?
 - What are the consequences of raising top income tax rates?
- Central to understanding interesting labour market phenomena
 - Substantial increase in employment rates among women
 - Role of LS in driving business cycle fluctuations
- Plan for this lecture
 - Outline simple static model of labour supply with proportional taxes
 - Discuss alternative methods of identifying effect of taxes on LS
 - On the way, introduce some empirical work in the field

Basic notions

- How should we measure labour supply?
 - Extensive margin: whether to work or not
 - Intensive margin: how much to work. Just hours? What about effort?
 - Individual or joint family decision?
 - “Quality adjusted” labour supply (human capital, education and training)
- How should we think about effect of taxes on labour supply?
 - Income and substitution effect
 - Summarise reaction of LS with elasticity measure (ϵ)
 - Focus here: intensive margin in a static framework
 - But many elasticity concepts: important to think about what the relevant one is
 - Differences between estimates can often be attributed to data measurement issues - the importance of selecting covariates (see Blundell and MaCurdy, 1998)
 - Long run vs short run estimates

A static model of labour supply

- With proportional taxes τ_t individual i with characteristics and preferences v_{it} over consumption c_{it} and leisure l_{it} maximise
 - Max $U(c_{it}, l_{it}, v_{it})$ s.t $c_{it} = \mu_{it} + (1-\tau_t)w_{it}(T - l_{it})$
 - where T is time endowment, μ_{it} non-labour income and τ_t is the tax rate
 - Yields labour supply function $h_{it} = h^s((1-\tau_t)w_{it}, \mu_{it}, v_{it})$
 - Under certain conditions, have interior solution for hours of work
- Have possible corner solution: zero hours
 - Work only if $(1-\tau_t)w_{it} > w^* = U_l/U_c$ evaluated at $h=0$
 - Taxes unambiguously reduce probability of working versus $\tau_t = 0$

Effect of taxes on labour supply

- Uncompensated (Marshallian) elasticity defined as $\varepsilon^u = w/h * dhs/dw$ [%change in hours when net of tax wages increases with 1%]
- Compensated (Hicksian) elasticity (substitution effect)
- By Slutsky have $\varepsilon^c = \varepsilon^u - \eta$ where η is the income effect
 - Note ε^c determines distortionary costs of taxation
- How do we go about identifying these effects of interest?

Estimating the elasticity directly

- Model suggests hours worked are a function of marginal net-of-tax hourly wages $(1-\tau)w$ and other income (μ)
- So why not just get some cross-sectional data and run regression of

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

- Problems?
 - Selection: only observe wages for individuals in work
 - Running regression only on observations with positive hours means can bias estimates: low wage earners must really like work -> selection correction
 - Omitted variable bias - w correlated with tastes for work
 - Progressive taxes => reverse causality ($(1-\tau)w$ depends on h)
 - Measurement error: results in attenuation bias
 - Non-hours response (see later)

(Quasi) Natural Experiments

- Variation from tax reforms provide potential solution to these issues
 - Policy might act as exogenous source of variation, changing tax rates for some ‘treatment group’ but not another ‘control group’
 - Diff-in-diff approach : compare labour supply responses of ‘treated’ group to that of ‘untreated’ group
 - Key assumption: common trends (and no group compositional change)
- Lots of work exploiting the 1986 Tax Reform Act in US
 - E.g. Eissa (1995): high income women saw large reductions in marginal rates -> income and substitution effect
 - Treatment: Married women 99th percentile, Controls: from 75th percentile
 - Find small increase in hours, large increase in participation for ‘treated’
 - Problems: differential shocks, assortative matching, other reforms, group composition affected by reforms
 - See Blundell, Duncan & Meghir (1998) for a more credible approach

Discrete choice (structural) models

- Discrete choice models used to estimate labour supply in the presence of non-linear budget sets
 - e.g. decision is to work full-time, part-time, or not at all
 - Can identify “deep” labour supply parameters of interest
 - Once behavioural parameters have been uncovered, we can potentially simulate effects of hypothesised policy reforms
 - But requires (restrictive) assumptions on preferences and error terms
- Example: Brewer et al (2006)
 - Examine effect of 1999 WFTC reform in UK on labour supply of mothers
 - Find reform increased employment rate of lone mothers by around 5ppt but slightly reduced labour supply of couples with children
- See Blundell et al. (2007) for survey of approach

New tax responsiveness literature

- Individuals might respond on margins other than hours/employment
 - Intensity of effort; human capital investment; income shifting
- New tax responsiveness literature: look instead at taxable income
 - Taxable income a proxy for total effort: includes various channels
 - ETI: if net-of-tax rate $(1-\tau_t)$ rises by 1%, taxable income rises by X%
 - Feldstein (1995): ETI a ‘sufficient statistic’ for welfare analysis (under some conditions)
 - But ETI is not a “deep” economic parameter – see Saez et al. (2012) for a good critical overview
- Basics of approach
 - Summary parameter indicating how responsive taxpayers are to changes in their marginal tax rate
 - Compare taxable income of some group affected by a reform to that of an unaffected group

Example: the 50p rate of income tax debate

- Budget 2009 announced introduction of 50p rate of income tax for those with incomes above £150,000 from April 2010
 - Affects less than 1% of adults
 - At the time, HMT scored measure as increasing tax revenues by £2.7bn a year post-behavioural response (£6.8bn pre-response)
- In Budget 2011, the Chancellor asked HMRC to produce a report on how much 50p rate was raising
 - Suggested yield of £1 billion using revised estimate of the ETI
 - Revised estimate based on work exploiting the reform
- Revenue yield sensitive to estimated ETI

Revenue yield highly sensitive to the ETI

Taxable income elasticity	Revenue raised by 50p rate assuming:	
	Indirect tax revenues unaffected (£ billion)	Expenditure falls as much as income (£ billion)
0.20	4.1	2.9
0.25	3.5	2.2
0.30	3.0	1.6
0.35	2.4	0.9
0.40	1.8	0.3
0.45	1.3	-0.4
0.46	1.1	-0.5
0.50	0.7	-1.0

Source: Browne (2012) IFS Green Budget

How did the HMRC estimate the ETI?

- HMRC produced estimate of income growth in 2009–10 and 2010–11 among those with incomes above £150k in the absence of the 50p rate, using information on:
 - income growth among the group with incomes between £115k and £150k in 2009–10 and 2010–11 and
 - stock market growth 2009–10 and 2010–11
- For this estimate to be unbiased, requires income growth among those with lower incomes to be unaffected by reforms. Unlikely:
 - If people reduce their income below £150k in response to 50p rate, would increase total income of this lower income group
 - Lower income group may also be affected by other policies introduced at the same time or differently by economic shocks
- Affected individuals might bring income forward to 40p regime:
 - HMRC estimate suggests £16bn to £18bn shifted forward to 2009–10
 - Particularly important for individuals with dividend income

HMRC estimate of the ETI

- HMRC estimate of the elasticity of taxable income
 - Central estimate of 0.48: if net-of-tax rate rises by 1%, taxable income rises by 0.48% \Rightarrow 50p rate raises £1 billion relative to 40p
- But estimates produced by their model are very imprecise
 - Standard errors suggest that only two-thirds chance that true elasticity in the model is between 0.14 and 0.81
 - And as we saw, revenue estimates are highly sensitive to the ETI
- Overall, reasonable attempt using approach
 - Similar to IFS central estimate of 0.46 (based on tax cuts in the 1980s)
 - But estimated parameter depends on avoidance opportunities: suggests government can (to an extent) increase the revenue maximising rate by reducing avoidance opportunities
- See Saez et al JEL 2012 for critical review of literature: mean reversion, anticipation effects, re-allocation over the lifecycle

Recent work on tax credit and benefit cuts and the new NLW

- As part of his deficit reduction plan the Chancellor aims to eliminate the deficit between 2015 and 2020
- Government plan £12bn cut to annual benefit spending by end of the parliament
 - Cuts to UC for those in work [the cuts to tax credits from April 2016 proposed in the summer Budget were rolled back in the 2015 Autumn statement]
 - A four-year freeze to most working age benefits and tax credits
 - A cut in credit amounts for new claimants with children from April 2017 - especially for families with 3+ children
- Introduced a higher minimum wage for adults aged 25 and over, the new “National Living Wage” (NLW)

Effects on work incentives?

- Cutting out-of-work benefits induces individuals to work more (lower income, they get to keep more if they move into work)
- The cuts to in-work benefits will weaken incentives to work
- The new NLW will also affect households earnings
 1. Labour supply effect
 - If there is not a strong income effect then a higher NLW will induce individuals to work more hours (substitution effect)
 2. Labour demand effect
 - Firms will want to hire less workers/offer less hours (unless productivity increases)
- In total, the tax and benefit reforms, the new NLW and the move to Universal Credit will, on average, strengthen work incentives slightly
 - Different for different groups (e.g. Lone mothers)

Summary

- Understanding effect of taxes on labour supply crucial for many areas of policy and bigger questions about labour market trends
- But identifying behavioural responses and LS parameters difficult
 - Endogeneity and selection hamper standard OLS approach in x-section
 - Hard to find credible treatment-control groups for experimental design
- Yet relative consensus on labour supply responses
 - Prime-aged males very unresponsive in intensive and extensive margin, but taxable income elasticities around 0.2-0.6
 - Married women more sensitive, particularly on extensive margin
 - Presence and age of children in household important
 - See Meagher & Philips (2010) for accessible survey, and Blundell and MaCurdy (1999) for more comprehensive one

4. Bibliography

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