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 ($\varepsilon$)
    • 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 $\tau_t$ individual $i$ with characteristics and preferences $v_{it}$ over consumption $c_{it}$ and leisure $l_{it}$ maximise
  - $\max U(c_{it}, l_{it}, v_{it}) \text{ s.t } c_{it} = \mu_{it} + (1-\tau_t)w_{it}(T - l_{it})$
  - where $T$ is time endowment, $\mu_{it}$ non-labour income and $\tau_t$ 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 $(1-\tau_t)w_{it} > w^* = \frac{U_l}{U_c}$ 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 $\varepsilon^u = \frac{w}{h} * \frac{dhs}{dw}$ [%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 $\eta$ is the income effect
    - Note $\varepsilon^c$ 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 \((\mu)\)

• 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 \(\rightarrow\) selection correction
  
  – Omitted variable bias - \(w\) correlated with tastes for work
  
  – Progressive taxes \(\Rightarrow\) reverse causality \( ((1 - \tau)w \text{ depends on } h)\)
  
  – 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

  - 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

<table>
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<tr>
<th>Taxable income elasticity</th>
<th>Revenue raised by 50p rate assuming:</th>
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<tbody>
<tr>
<td></td>
<td>Indirect tax revenues unaffected (£ billion)</td>
<td>Expenditure falls as much as income (£ billion)</td>
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<tr>
<td>0.20</td>
<td>4.1</td>
<td>2.9</td>
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<tr>
<td>0.25</td>
<td>3.5</td>
<td>2.2</td>
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<tr>
<td>0.30</td>
<td>3.0</td>
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<td>0.35</td>
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<td>0.45</td>
<td>1.3</td>
<td>–0.4</td>
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<tr>
<td>0.46</td>
<td>1.1</td>
<td>–0.5</td>
</tr>
<tr>
<td>0.50</td>
<td>0.7</td>
<td>–1.0</td>
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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% => 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 Meaghir & Philips (2010) for accessible survey, and Blundell and MaCurdy (1999) for more comprehensive one
4. Bibliography