Microsimulation and Tax Reform: Lessons from the Mirrlees Review

Recent Developments in Behavioural Microsimulation
ZEW Workshop
December 2010

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Mircosimulation Evidence and Tax Design

- First, a little background to the *Mirrlees Review*
- Then a discussion on the role of evidence and microsimulation loosely organised under five headings:
  1. Key margins of adjustment to tax reform
  2. Measurement of effective tax rates
  3. The importance of information and complexity
  4. Evidence on the size of responses
  5. Implications for tax design
An Analysis in Two Steps

- The **first step** (impact) is a positive analysis of household decisions. There are two dominant empirical approaches to the measurement of the impact of tax reform...
  - both prove useful:
  - 1. A ‘quasi-experimental’ evaluation of the impact of historic reforms and randomised experiments
  - 2. A ‘structural’ estimation based on a general discrete choice model with (unobserved) heterogeneity
- The **second step** (optimality) is the normative analysis or optimal policy analysis
  - Examines how to best design benefits, in-work tax credits and earnings tax rates with (un)observed heterogeneity and unobserved earnings ‘capacity’
A optimal tax design framework

• Assume earnings (and certain characteristics) are all that is observable to the tax authority
  – relax below to allow for ‘partial’ observability of hours

Social welfare, for individuals of type $X, \varepsilon$

$$W = \int\int \gamma(U(c(h^*; T(w, h^*; X), h^*; X, \varepsilon))dF(\varepsilon)dG(X)$$

The tax structure $T(.)$ is chosen to maximise $W$, subject to:

$$\int\int T(wh^*, h^*; X)dF(\varepsilon)dG(X) \geq \bar{T}(= -R)$$

for a given $R$.

- We solve for $T(.)$ with structural estimation and simulation.
What is the Mirrlees Review?

- Review of tax design from first principles
  - For modern open economies in general and UK in particular
  - Reflect changes in the world, changes in our understanding and increased empirical knowledge

- Two volumes:
  - I. ‘Dimensions of Tax Design’: 13 chapters on specific areas co-authored by international experts and IFS researchers, along with 30 expert commentaries – free on the web and at OUP
  - I will draw on contributions by Brewer, Saez and Shephard, Adam and Browne, Banks and Diamond, Meghir and Phillips, Hoynes, Laroque and Moffitt.
  - II. ‘Tax by Design’: 20 chapters providing an integrated picture of tax design and reform, written by the editors
Increased empirical knowledge: – some examples

• labour supply responses for individuals and families
  – at the intensive and extensive margins
  – by age and demographic structure
• taxable income elasticities
  – top of the income distribution using tax return information
• income uncertainty
  – persistence and magnitude of earnings shocks over the life-cycle
• ability to (micro-)simulate marginal and average rates
  – simulate reforms
The extensive – intensive distinction is important for a number of reasons:

- Understanding responses to tax and welfare reform
  - Heckman, Wise, Prescott, Rogerson, .. all highlight the importance of extensive labour supply margin,
  - perhaps too much….

- The size of extensive and intensive responses are also key parameters in the recent literature on earnings tax design
  - used heavily in the Mirrlees Review.

- But the relative importance of the extensive margin is specific to particular groups
  - I’ll examine a specific case of low earning families (from Blundell and Shephard, 2010) in more detail in what follows
The focus here is on earnings taxation

- Leading example of the mix of theory and evidence
- Key implications for tax design
- Earnings taxation, in particular, takes most of the strain in distributional adjustments of other parts of the reform package (VAT base broadening, for example)
- I’ll return to VAT reform at the end.
• So where are the key margins of response?

• Evidence suggests they are not all the extensive margin..
  – intensive and extensive margins both matter
  – they matter for tax policy evaluation and earnings tax design
  – and they matter in different ways by age and demographic groups

• Getting it right for men
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)
Key Margins of Adjustment

• and for women …..
Female Employment by age – US, FR and UK 1977

Blundell, Bozio and Laroque (2010)
Female Employment by age – US, FR and UK 2007

Blundell, Bozio and Laroque (2010)
Female Total Hours by age – US, FR and UK 2007

Blundell, Bozio and Laroque (2010)
## Bounds on Intensive and Extensive Responses (1977-2007)

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>Men 16-29</th>
<th>Women 16-29</th>
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Blundell, Bozio and Laroque (2010)
Why is this distinction important for tax design?

• Some key lessons from recent tax design theory (Saez (2002, Laroque (2005), ..)

• A ‘large’ extensive elasticity at low earnings can ‘turn around’ the impact of declining social weights
  – implying a higher optimal transfer to low earning workers than to those out of work
  – a role for earned income tax credits

• But how do individuals perceive the tax rates on earnings implicit in the tax credit and benefit system - salience?
  – are individuals more likely to ‘take-up’ if generosity increases? – marginal rates become endogenous…

• Importance of margins other than labour supply/hours
  – use of taxable income elasticities to guide choice of top tax rates

• Importance of dynamics and frictions
Focus here on tax rates on lower incomes

Main concerns with current welfare/benefit systems

• Participation tax rates at the bottom remain very high in UK and elsewhere

• Marginal tax rates are well over 80% for some low income working families because of phasing-out of means-tested benefits and tax credits
  – Working Families Tax Credit + Housing Benefit in UK
  – and interactions with the income tax system
  – for example, we can examine a typical budget constraint for a single mother in the UK…
The interaction of WFTC with other benefits in the UK

- Low wage lone parent
- WFTC
- Net earnings
- Other income

[Graph showing the interaction of WFTC with other benefits in the UK. The graph illustrates how net earnings and other income change with hours of work.]
The interaction of WFTC with other benefits in the UK

- Low wage lone parent
- £250
- £300
- £100
- £150
- Income Support
- Income
- Net earnings
- Other income

Graph: Hours of work vs. Benefits
The interaction of WFTC with other benefits in the UK

- Low wage lone parent
  - £300
  - £250

- Local tax rebate
- Rent rebate
- WFTC
- Income Support
- Net earnings
- Other income

Strong implications for EMTRs, PTRs and labour supply
Average EMTRs across the earnings distribution for different family types

Average PTRs for different family types

![Graph showing average PTRs for different family types.](image-url)
Can the reforms explain weekly hours worked?

Single Women (aged 18-45) - 2002

Blundell and Shephard (2009)
Hours’ distribution for lone parents, before WFTC

Blundell and Shephard (2009)
Hours’ distribution for lone parents, after WFTC

Blundell and Shephard (2009)
Hours trend for low ed lone parents in UK
Employment trends for lone parents in UK

[Graph showing employment trends for lone parents in the UK from 1985 to 2008, with lines for 'College' and 'No College' categories.]
WFTC Reform: Quasi-experimental Evaluation
Matched Difference-in-Differences

Average Impact on % Employment Rate of Single Mothers

<table>
<thead>
<tr>
<th>Single Mothers</th>
<th>Marginal Effect</th>
<th>Standard Error</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Resources Survey</td>
<td>4.5</td>
<td>1.55</td>
<td>25,163</td>
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<tr>
<td>Labour Force Survey</td>
<td>4.7</td>
<td>0.55</td>
<td>233,208</td>
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</table>

Data: FRS, 45,000 adults per year, Spring 1996 – Spring 2002.
Base employment level: 45% in Spring 1998.
Matching Covariates: age, education, region, ethnicity,.. 

Can use this quasi-experimental evidence to (partially) validate the structural simulation model
Key features of the structural simulation model

Preferences $U(c_h, h, P; X, \varepsilon)$
typically approximated by shape constrained sieves

- Structural model allows for
  - unobserved work-related fixed costs
  - childcare costs
  - observed and unobserved heterogeneity
  - programme participation ‘take-up’ costs

- See Blundell and Shephard (2010)
Importance of take-up and information/hassle costs

Variation in take-up probability with entitlement to WFTC

![Graph showing the variation in take-up probability with WFTC entitlement for lone parents and couples.](image)
Preference Specifications

Preferences:

\[ U_p(c, h, P; X, \varepsilon) = \alpha_y(X, \varepsilon) \frac{c^{\theta_y(X)}}{\theta_y(X)} - 1 \]

\[ + \alpha_l(X, \varepsilon) \frac{(1 - h/H)^{\theta_l(X)}}{\theta_l(X)} - 1 - P \cdot \eta(X, \varepsilon) \]

where

\[ \alpha_j = \exp[X_j \beta_j + \varepsilon_j] \]

where the ‘cost’ of receiving in-work support is given by

\[ \eta(X, \varepsilon) = X_\eta \beta_\eta + \varepsilon_\eta \]

Also allow higher order polynomial and interaction terms.
Childcare costs

Assume stochastic relationship between total hours of childcare and maternal hours of work

$$\alpha_c(h, X, \varepsilon) = 1[h > 0].1[\varepsilon_c < -\beta_c h].(\beta_c h + \varepsilon_c)$$

Fixed costs of work

$$f = \alpha_f(X, \varepsilon)1[h > 0]$$

Consumption at given hours and programme participation

$$c(h, P; T, X, \varepsilon) = wh - T(wh, h, P; X) - p_c(X, \varepsilon)h_c - f$$
Programme participation (Take-up) model

We denote \( P^*(h) \in \{0, E(h; X, \varepsilon)\} \)

as the optimal choice of programme participation for given hours \( h \), where \( E(h; X, \varepsilon) = 1 \) if the individual is eligible at hours \( h \).

Assuming eligibility, \( P^*(h) = 1 \) if and only if

\[
U(c(h, P=1; T, X, \varepsilon), h, P=1; X, \varepsilon) \geq U(c(h, P=0; T, X, \varepsilon), h, P=0; X, \varepsilon)
\]

The optimal choice of hours \( h^* \in H \) maximises

\[
U(c(h, P^*(h); T, X, \varepsilon), h, P^*(h); X, \varepsilon, \varepsilon_h)
\]
Estimation

- 1995-1999: pre-reform estimation data (ex-ante)
- Use complete sample for ex-ante analysis of 2004 and more recent reform proposals
- Sample restricted to lone mothers aged 18-45
- Jointly estimate wages, take-up, childcare and preferences by simulated maximum likelihood:
  - Incorporate detailed/accurate model of tax and transfer system
Structural Model Elasticities – low education lone parents

(a) Youngest Child Aged 5-10

<table>
<thead>
<tr>
<th>Weekly Earnings</th>
<th>Density</th>
<th>Extensive</th>
<th>Intensive</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.4327</td>
<td></td>
<td></td>
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<tr>
<td>50</td>
<td>0.1575</td>
<td>0.280 (.020)</td>
<td>0.085 (.009)</td>
</tr>
<tr>
<td>150</td>
<td>0.1655</td>
<td>0.321 (.009)</td>
<td>0.219 (.025)</td>
</tr>
<tr>
<td>250</td>
<td>0.1298</td>
<td>0.152 (.005)</td>
<td>0.194 (.020)</td>
</tr>
<tr>
<td>350</td>
<td>0.028</td>
<td>0.058 (.003)</td>
<td>0.132 (.010)</td>
</tr>
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</table>

*Employment elasticity* 0.820 (.042)
### Structural Model Elasticities – low education lone parents

**(b) Youngest Child Aged 11-18**

<table>
<thead>
<tr>
<th>Weekly Earnings</th>
<th>Density</th>
<th>Extensive</th>
<th>Intensive</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>0.3966</td>
<td></td>
<td></td>
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<tr>
<td>50</td>
<td>0.1240</td>
<td>0.164 (.018)</td>
<td>0.130 (.016)</td>
</tr>
<tr>
<td>150</td>
<td>0.1453</td>
<td>0.193 (.008)</td>
<td>0.387 (.042)</td>
</tr>
<tr>
<td>250</td>
<td>0.1723</td>
<td>0.107 (.004)</td>
<td>0.340 (.035)</td>
</tr>
<tr>
<td>350</td>
<td>0.1618</td>
<td>0.045 (.002)</td>
<td>0.170 (.015)</td>
</tr>
<tr>
<td>Employment elasticity</td>
<td>0.720 (.036)</td>
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<td></td>
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</table>

Blundell and Shephard (2010)
### Structural Model Elasticities – low education lone parents

(c) Youngest Child Aged 0-4

<table>
<thead>
<tr>
<th>Weekly Earnings</th>
<th>Density</th>
<th>Extensive</th>
<th>Intensive</th>
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<td>0</td>
<td>0.5942</td>
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<tr>
<td>50</td>
<td>0.1694</td>
<td>0.168 (.017)</td>
<td>0.025 (.003)</td>
</tr>
<tr>
<td>150</td>
<td>0.0984</td>
<td>0.128 (.012)</td>
<td>0.077 (.012)</td>
</tr>
<tr>
<td>250</td>
<td>0.0767</td>
<td>0.043 (.004)</td>
<td>0.066 (.010)</td>
</tr>
<tr>
<td>350</td>
<td>0.0613</td>
<td>0.016 (.002)</td>
<td>0.035 (.005)</td>
</tr>
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</table>

**Participation elasticity** 0.536 (.047)

- Differences in intensive and extensive margins by age and demographics have strong implications for the design of the tax schedule... Non-monotonic in age of youngest child
- But do we believe the structural model estimates?
### Structural Simulation of the WFTC Reform:

**WFTC Tax Credit Reform**

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>y-child 0 to 2</th>
<th>y-child 3 to 4</th>
<th>y-child 5 to 10</th>
<th>y-child 11 to 18</th>
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<tbody>
<tr>
<td><strong>Change in employment rate:</strong></td>
<td>6.95</td>
<td>3.09</td>
<td>7.56</td>
<td>7.54</td>
<td>4.96</td>
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<tr>
<td></td>
<td>0.74</td>
<td>0.59</td>
<td>0.91</td>
<td>0.85</td>
<td>0.68</td>
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<tr>
<td><strong>Average change in hours:</strong></td>
<td>1.79</td>
<td>0.71</td>
<td>2.09</td>
<td>2.35</td>
<td>1.65</td>
</tr>
<tr>
<td></td>
<td>0.2</td>
<td>0.14</td>
<td>0.23</td>
<td>0.34</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Notes: Simulated on FRS data; Standard errors in italics.

– relatively ‘large’ impact

Blundell and Shephard (2010)
Impact of WFTC reform on lone parent, 2 children

Notes: Two children under 5. Assumes hourly wage of £4.10, no housing costs or council tax liability and no childcare costs.
Impact of WFTC and IS reforms on lone parent, 2 children

- Notes: Two children under 5. Assumes hourly wage of £4.10, no housing costs or council tax liability and no childcare costs.
Structural Simulation of the WFTC Reform:

Impact of all Reforms (WFTC and IS)

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<tr>
<td>Change in employment rate:</td>
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<td>5.53</td>
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<td>0.84</td>
<td>0.6</td>
<td>0.99</td>
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<td>0.71</td>
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<tr>
<td>Average change in hours:</td>
<td>1.02</td>
<td>0.01</td>
<td>1.15</td>
<td>1.41</td>
<td>1.24</td>
</tr>
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<td>0.23</td>
<td>0.21</td>
<td>0.28</td>
<td>0.28</td>
<td>0.22</td>
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- shows the importance of getting the effective tax rates right especially when comparing with quasi-experiments.
- compare with experiment or quasi-experiment.
Evaluation of the ‘ex-ante’ structural model

• The diff-in-diff impact parameter can be identified from the structural evaluation model

• Simulated diff-in-diff parameter

• The structural model then defines the average impact of the policy on the treated as:

$$\alpha_{SEM} (X) = \Pr[h > 0 \mid X, D = 1] − \Pr[h > 0 X, D = 0]$$

• Compare simulated diff-in-diff moment with diff-in-diff

$$\alpha_{SEM}^{DD} = \int\int\int f(X, \varepsilon, D = 1) dF_{\varepsilon}^{T = 1, t = 1} dF_X - \int\int\int f(X, \varepsilon, D = 0) dF_{\varepsilon}^{T = 1, t = 0} dF_X$$

$$- \left[ \int f(X, \varepsilon, D = 0) dF_{\varepsilon}^{T = 0, t = 1} dF_X - \int\int\int f(X, \varepsilon, D = 0) dF_{\varepsilon}^{T = 0, t = 0} dF_X \right]$$
Evaluation of the ex-ante model

• The simulated diff-in-diff parameter from the structural evaluation model is precise and does not differ significantly from the diff-in-diff estimate

• Compare simulated diff-in-diff moment with diff-in-diff
  – .21 (.73), chi-square p-value .57

• Consider additional moments
  – education: low education: 0.33 (.41)
  – youngest child interaction
    • Youngest child aged < 5: .59 (.51)
    • Youngest child aged 5-10: .31 (.35)
A optimal tax design framework

- Assume earnings (and certain characteristics) are all that is observable to the tax authority
  - relax below to allow for ‘partial’ observability of hours

Social welfare, for individuals of type $X, \varepsilon$

$$W = \int \int \gamma(U(c(h^*;T(w,h^*;X),h^*;X,\varepsilon))dF(\varepsilon)dG(X)$$

The tax structure $T(.)$ is chosen to maximise $W$, subject to:

$$\int \int T(wh^*,h^*;X)dF(\varepsilon)dG(X) \geq \bar{T}(=-R)$$

for a given $R$.

- We solve for $T(.)$ with structural estimation and simulation.
Control preference for equality by transformation function:

\[ \gamma(U \mid \theta) = \frac{1}{\theta} \{(\exp U)^\theta - 1\} \]

when \( \theta \) is negative, the function favors the equality of utilities. \( \theta \) is the coefficient of (absolute) inequality aversion.

**Proposition:** If \( \theta < 0 \) then analytical solution to integral over (Type I extreme-value) \( j \) state specific errors

\[ \frac{1}{\theta} \left[ \Gamma(1 - \theta) \cdot (\sum_{h \in H} \exp u(c(h; T, X, \varepsilon))^\theta - 1) \right] \]

Objective: robust policies for fairly general social welfare weights, document the weights in each case (Table 7 BS, 2010)
Implied Optimal Schedule

Blundell and Shephard (2010)
Implied Optimal Schedule

Weekly earnings

March 2002 prices

Blundell and Shephard (2010)
Implied Optimal Schedule

Blundell and Shephard (2010)
Implied Optimal Schedule

Optimal earnings schedules, youngest child 0–4

Blundell and Shephard (2010)
Implied Optimal Schedule

Optimal earnings schedules, youngest child 5–10

Blundell and Shephard (2010)
Implied Optimal Schedule

Optimal earnings schedules, youngest child 11–18

Blundell and Shephard (2010)
Implied Optimal Schedule

Optimal schedule with hours bonuses

Blundell and Shephard (2010)
Implied Optimal Schedule

Optimal schedule with hours bonuses

Blundell and Shephard (2010)
Implied Optimal Schedule

Optimal schedule with hours bonuses

Blundell and Shephard (2010)
We ask: what increase in expenditure $dR/R$ is required to achieve the same level of social welfare if only earnings is revealed?

<table>
<thead>
<tr>
<th></th>
<th>19 hours</th>
<th></th>
<th>optimal hours</th>
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</thead>
<tbody>
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<td></td>
<td>$\theta = -0.4$</td>
<td>$\theta = -0.2$</td>
<td>$\theta = 0.0$</td>
<td>$\theta = -0.4$</td>
</tr>
<tr>
<td></td>
<td>0.9%</td>
<td>0.8%</td>
<td>0.2%</td>
<td>2.2%</td>
</tr>
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</table>
Sensitivity of Optimal Hours Bonus

Bonus with measurement error, $\theta = -0.2$

Blundell and Shephard (2010)
Sensitivity of Optimal Hours Bonus

Bonus with hours manipulation, $\theta = -0.2$

Blundell and Shephard (2010)
Implied Optimal Schedule, Youngest Child Aged 0-4

Blundell and Shephard (2010)
Implied Optimal Schedule, Youngest Child Aged 5-10

Blundell and Shephard (2010)
Implied Optimal Schedule, Youngest Child Aged 11-18

Blundell and Shephard (2010)
Implied Optimal Schedule, Youngest Child Aged 11-18
Implications for Tax Reform

- Change transfer/tax rate structure to match lessons from ‘new’ optimal tax analysis and empirical evidence

- ‘Life-cycle’ view of taxation
  - ‘tagging’ by age of (youngest) child for mothers/parents
  - (also pre-retirement ages)
  - a ‘life-cycle’ rearrangement of tax incentives and welfare payments to match elasticities and early years investments
  - simulation results in *Tax by Design* show significant employment and earnings increases

- Hours rules? – at full time for older kids,
  - welfare gains depend on ability to monitor hours

- Dynamics and frictions?

- Undo distributional effects of the rest of the package…
Broadening the VAT base

• Evidence on consumer behaviour => exceptions to uniformity
  – Childcare strongly complementary to paid work
  – Various work related expenditures (QUAIDS on FES, MRI)
  – ‘Vices’: alcohol, tobacco, betting, possibly unhealthy food have externality / merit good properties ➔ keep ‘sin taxes’
  – Environmental externalities (three separate chapters in MII)

• These do not line up well with existing structure of taxes
  ➔ Broadening the base – many zero rates in UK VAT

• Compensating losers, even on average, is difficult
  • Worry about work incentives too
  • Work with set of direct tax and benefit instruments as in earnings tax reforms
## Indirect Taxation – UK case

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated cost (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zero-rated:</strong></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>11,300</td>
</tr>
<tr>
<td>Construction of new dwellings</td>
<td>8,200</td>
</tr>
<tr>
<td>Domestic passenger transport</td>
<td>2,500</td>
</tr>
<tr>
<td>International passenger transport</td>
<td>150</td>
</tr>
<tr>
<td>Books, newspapers and magazines</td>
<td>1,700</td>
</tr>
<tr>
<td>Children’s clothing</td>
<td>1,350</td>
</tr>
<tr>
<td>Drugs and medicines on prescription</td>
<td>1,350</td>
</tr>
<tr>
<td>Vehicles and other supplies to people with disabilities</td>
<td>350</td>
</tr>
<tr>
<td>Cycle helmets</td>
<td>10</td>
</tr>
<tr>
<td><strong>Reduced-rated:</strong></td>
<td></td>
</tr>
<tr>
<td>Domestic fuel and power</td>
<td>2,950</td>
</tr>
<tr>
<td>Contraceptives</td>
<td>10</td>
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<tr>
<td>Children’s car seats</td>
<td>5</td>
</tr>
<tr>
<td>Smoking cessation products</td>
<td>10</td>
</tr>
<tr>
<td>Residential conversions and renovations</td>
<td>150</td>
</tr>
<tr>
<td><strong>VAT-exempt:</strong></td>
<td></td>
</tr>
<tr>
<td>Rent on domestic dwellings</td>
<td>3,500</td>
</tr>
<tr>
<td>Rent on commercial properties</td>
<td>200</td>
</tr>
<tr>
<td>Private education</td>
<td>300</td>
</tr>
<tr>
<td>Health services</td>
<td>900</td>
</tr>
<tr>
<td>Postal services</td>
<td>200</td>
</tr>
<tr>
<td>Burial and cremation</td>
<td>100</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>4,500</td>
</tr>
<tr>
<td>Item</td>
<td>Impact</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Bread and Cereals</td>
<td>Negative</td>
</tr>
<tr>
<td>Meat and Fish</td>
<td>Negative</td>
</tr>
<tr>
<td>Dairy products</td>
<td>Negative</td>
</tr>
<tr>
<td>Tea and coffee</td>
<td>Negative</td>
</tr>
<tr>
<td>Fruit and vegetables</td>
<td>Negative</td>
</tr>
<tr>
<td>Food eaten out</td>
<td>Positive</td>
</tr>
<tr>
<td>Beer</td>
<td>Positive</td>
</tr>
<tr>
<td>Wine and spirits</td>
<td>Positive</td>
</tr>
<tr>
<td>Domestic fuels</td>
<td>Negative</td>
</tr>
<tr>
<td>Household goods and services</td>
<td>Positive</td>
</tr>
<tr>
<td>Adult clothing</td>
<td>Positive</td>
</tr>
<tr>
<td>Childrens’ clothing</td>
<td>Negative</td>
</tr>
<tr>
<td>Petrol and diesel</td>
<td>Positive</td>
</tr>
</tbody>
</table>

Source: QUAIDS on UK FES
VAT reform: effects by income

- % rise in non-housing expenditure
- % rise in income

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VAT reform: effects by expenditure

- % rise in non-housing expenditure
- % rise in income
VAT reform: incentive to work at all

Participation tax rates

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VAT reform: incentive to increase earnings
Effective marginal tax rates

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Welfare gains - Distribution of EV/x by ln(x)
Broadening the VAT base

• We simulate removing almost all zero and reduced rates

• Raises £24bn (with a 17.5% VAT rate) if no behavioural response

• Reduces distortion of spending patterns
  – With responses we find, could (in principle) compensate every household and have about £3-5bn welfare gain

• On its own base broadening would be regressive and weaken work incentives

• Can a practical package avoid this?
http://www.ifs.org.uk/mirrleesReview

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*University College London and Institute for Fiscal Studies*
The Mirrlees Review
Reforming the Tax System for the 21st Century

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