Microeconomic analysis of prices, food and nutrition

Rachel Griffith

Institute for Fiscal Studies and University of Manchester

November 2012
Introduction

- Large scale research programme to help understand possible policy responses to the growth in diet related disease
- Research funded by
  - European Research Council (ERC) Advanced Grant
  - Economic and Social Research Council (ESRC)
- Objectives are to
  - help clarify the rationale for and objectives of government intervention
  - help improve the evidence base on the effects of various policies options and policy design issues
Why should the government intervene?

- In general, individuals are best placed to make choices over food purchases and consumption, and the market will lead to the best outcome.

- However, there are some reasons to believe government may have a role in improving diet:
  - Information failings
  - External costs of consumption
Potential information failings

Some consumers are ill informed about:

- their own nutritional needs
- the nutritional characteristics of a specific food product
- some of the costs associated with consumption of certain foods

In particular because:

- costs are uncertain and are borne in the future
- information can be complex and there can be a lot of it, meaning it may be difficult to identify the most relevant information
- some consumers may not have the time or ability to process the information effectively
Potential external effects of consumption

- Individual may not take account of costs of their behaviour on others
- Diet related disease may impose costs on others
  - might raise public health costs
  - might lead to increased sickness absence, premature mortality, lower productivity
- Most of these costs are borne by the individual, but some may accrue to others
What policy levers are available to government?

- Policy can target both supply and demand of food products

- Policy levers:
  - Education and information provision
  - Regulation
  - Fiscal measures
  - Cash transfers
Education and information campaigns

- Attempts to directly mitigate the problem of *imperfect information*
- Examples: ‘5-a-day’, ‘Change-4-life’ campaigns
- Questions we are investigating:
  - how responsive are consumers? are some consumers more responsive than others? are ill-informed consumers responsive?
  - what supply-side responses are there?
Regulation

- Direct intervention to alter nutritional characteristics of products or information provision
- Examples: salt reformulation (voluntary regulation), advertising bans, nutritional information and labeling
- Questions we are investigating:
- how effective are they? what the supply responses? who do they affect? what do they cost?
Food taxes

- Idea is to change the relative price of foods to lead consumers to substitute towards healthier alternatives
- Examples: Danish and New York ‘fat taxes’, other governments considering possible introduction, e.g. French surcharge on palm oil, Irish fat tax

Questions we are investigating:
- how responsive are consumers to these price changes? are some consumers less responsive than others? what supply responses might we expect, e.g. how much of the tax will be passed-through onto prices?
Cash transfers

- There is a well known socioeconomic gradient in diet
  - households from higher socioeconomic groups have better diets, on average, than those from lower socioeconomic groups

- Cash transfers might help alleviate this; examples: food stamps in the US, benefit payments

- Questions we are investigating:
  - Are differences in diet due to differences in income levels (in a causal sense)? differences in demographics and education levels? differences in preferences for healthy foods? different in prices faces?
Some specific ongoing projects at IFS

- Ongoing projects so results are at a VERY preliminary stage

1. 5-a-day campaign
   - what impact did it have? how lasting was the effect?

2. Food taxes
   - pass-through of a fat tax in the UK butter/margarine market

3. The socioeconomic gradient in diet
   - how does an increase/decrease in income affect nutrition quality of a household’s diet?
   - Income and diet over the recent recession

4. Regulation
   - The impact of banning advertising on crisps: would it lead to a reduction of crisp purchases, or just reallocation between brands?
   - Salt reformulation and information campaign
(1) the 5-a-day information campaign

- World Health Organization recommends eating at least 5 portions of fruit and vegetables as means of reducing chronic disease.
- 5-a-day campaign aimed to increase consumption of fruit and vegetables.
- Mean portions purchased range from 2.9 to 3.2, well below recommended 5 a day.
- Very low for households with kids, below 2 portions per person per day.
(1) Mean portions of fruit+veg purchased
(1) Retail price index for Fruit and Vegetable
## (1) Purchases of fruit and veg portions

<table>
<thead>
<tr>
<th>Dep var: purchases of fruit and veg portions</th>
<th>(1) purchases of fruit and veg portions</th>
<th>(2) purchases of fruit and veg portions</th>
<th>(3) purchases of fruit and veg portions</th>
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</thead>
<tbody>
<tr>
<td>(Aug 2004- Nov 2010)</td>
<td>-0.0283***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0034)</td>
<td></td>
<td></td>
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<tr>
<td>(Aug 2004- July 2006)</td>
<td>0.0555***</td>
<td>0.0894***</td>
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</tr>
<tr>
<td></td>
<td>(0.00384)</td>
<td>(0.00387)</td>
<td></td>
</tr>
<tr>
<td>(Aug 2006 - Nov 2010)</td>
<td>-0.0980***</td>
<td>0.276***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00370)</td>
<td>(0.00689)</td>
<td></td>
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</tbody>
</table>

**Price fruit**: -1.451***

**Price veg**: -0.702***

**Observations**: 1,076,736

**Number of hhno**: 32,530

**HH Effects**: Yes

**Month**: Yes

Note: An observation is a household month.
(2) Food taxes

- Idea is that increasing price of unhealthy food will lead consumers to substitute towards healthier alternatives
- Effectiveness of policy depends on
  - Which goods are subject to tax
  - How peoples’ consumption responds to price changes
  - How effective the tax is at changing price
(2) Food taxes - which goods?

- Many causes of poor diet - imbalance of calories, excessive salt, sugar and saturated fat consumption, insufficient fruit and veg consumption ...

- Suggested targets include
  - Particular nutrients (e.g. saturated fat, sugar)
  - Groups of goods deemed to be unhealthy (e.g. soft drinks)
  - VAT reform
(2) Food taxes - how do consumers respond

- A price increase typically leads people to reduce consumption of the taxed good.
- May also lead to change in consumption of other products:
  - Increased price of strawberries may increase demand for raspberries
  - And reduce demand for cream
- Size of these effects will determine nutritional impact of any price changes:
  - Measured by the price elasticity of demand:
    - Change in demand for good A with respect to a 1% price increase for good B
(2) Food taxes - how do consumers respond

- We can look at the effect of a tax on demand for broad food groups, but similar products are generally seen as closer substitutes for each other
  - if the price of full fat milk increases most consumers would switch to semi-skimmed milk before moving away from dairy
- And products within food groups can have very different nutritional contents ...
(2) Food taxes - variation in saturated fat in butter/margarine
## (2) Food taxes - elasticities across most popular butter/margarine

<table>
<thead>
<tr>
<th>Country Life 250g</th>
<th>Clover 500g</th>
<th>Flora Light Low Fat 500g</th>
<th>Flora Light Low Fat 1Kg</th>
<th>Can't Believe 500g</th>
<th>Utterly Buttely 500g</th>
<th>Lurpak 500g</th>
<th>Tesco Value Butter 250g</th>
<th>Lurpak Lighter 500g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country Life 250g</td>
<td>-2.481</td>
<td>0.044</td>
<td>0.043</td>
<td>0.045</td>
<td>0.032</td>
<td>0.030</td>
<td>0.042</td>
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<td>Clover 500g</td>
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<td>-2.719</td>
<td>0.050</td>
<td>0.072</td>
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<td>0.052</td>
<td>-2.667</td>
<td>0.068</td>
<td>0.034</td>
<td>0.032</td>
<td>0.052</td>
<td>0.021</td>
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<tr>
<td>Flora Light Low Fat 1Kg</td>
<td>0.014</td>
<td>0.054</td>
<td>0.048</td>
<td>-2.602</td>
<td>0.030</td>
<td>0.029</td>
<td>0.023</td>
<td>0.013</td>
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<tr>
<td>Can't Believe 500g</td>
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<td>0.048</td>
<td>0.045</td>
<td>0.056</td>
<td>-2.536</td>
<td>0.033</td>
<td>0.042</td>
<td>0.024</td>
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<tr>
<td>Utterly Buttely 500g</td>
<td>0.018</td>
<td>0.048</td>
<td>0.045</td>
<td>0.057</td>
<td>0.035</td>
<td>-2.558</td>
<td>0.041</td>
<td>0.024</td>
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<tr>
<td>Lurpak 500g</td>
<td>0.016</td>
<td>0.050</td>
<td>0.045</td>
<td>0.029</td>
<td>0.028</td>
<td>0.026</td>
<td>-2.444</td>
<td>0.014</td>
</tr>
<tr>
<td>Tesco Value Butter 250g</td>
<td>0.020</td>
<td>0.038</td>
<td>0.039</td>
<td>0.034</td>
<td>0.032</td>
<td>0.030</td>
<td>0.030</td>
<td>-2.165</td>
</tr>
<tr>
<td>Lurpak Lighter 500g</td>
<td>0.016</td>
<td>0.050</td>
<td>0.045</td>
<td>0.031</td>
<td>0.028</td>
<td>0.026</td>
<td>0.017</td>
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</tr>
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*Estimates from Griffith, Nesheim and O'Connell (2010)*
(2) Food taxes - response of firms

Often assumed introduction of £1 tax mechanically results in £1 increase in price

But conditions under which this is true are very restrictive

How firms choose to adjust prices in response to tax depends on

- Structure of tax
- Portfolio of products produced/sold by firm
- Intensity of competition among firms
(2) Food taxes - impact of tax on saturated fat in butter/margarine on prices
(2) Food taxes - summary

- Impact of food taxes are complicated
- Response of consumers and firms are key to understanding impacts
- Both are complex and vary depending on what good the tax is levied on, what form the tax taxes and a number of factors specific to the industry
(3) The socioeconomic gradient in diet

- Quality of diet and socioeconomic status are correlated
- Is this correlation caused by differences in income? or by other factors such as households having different preferences or facing different prices?
- We estimate a model of food demand to separate out these effects
- We find (preliminary) evidence that differences in preferences are responsible for most all of the socioeconomic gradient in diet
  - in the short run at least an increase in income seems to lower the nutritional quality of households’ diet
(3) Income and diet over the recent recession

- Over the recent recession households experienced a decline in income and a contemporaneous large increase in the price of food and changes in relative food prices.
- There was a substantial decline in expenditure on food (around 4%) - higher for DE households than AB.
- Households compensated by purchasing cheaper more calorie dense foods - AB did this more than DE.
- Nutrition improved in some dimensions - lower salt, higher fibre.
- Nutrition declined in other dimensions - higher fat and more sugar.
(4) The impact of banning advertising on crisps

- Estimate model of demand and supply in market for crisps using transaction level data
- Use model to simulate counterfactual equilibrium in which advertising is banned
- Very preliminary results suggest:
  - Banning advertising would reduce overall crisps demand by a small amount
  - Main effect would be to shift demand between brands (from major brands to generic brands)
  - Firms that advertise a lot reduce price, other firms increase prices
(4) Salt

- Concern about overconsumption of salt led the government to take a two-pronged approach:
  - Reformulation
    - the government worked with food manufacturers and retailers to reduce the amount of salt that goes into food during production
  - Public awareness campaign
    - inform consumers of the issues and provide them with guidance on how to reduce their salt intake

- There has been a substantial decrease in salt
- How much was driven by reformulation and how much by changes in preferences leading consumers to substitute towards lower salt products
Some other ongoing projects at IFS

- Comparison of food purchasing behaviour in the US, France and the UK
- Long term trends in calorie consumption and physical activity in the UK
- Impact of nutrition labeling on purchase behaviour
- Impact of minimum price and of banning multi-product offers on alcohol purchases
- Impact of Healthy Start vouchers