Public Policy towards Food Consumption*

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Abstract
Governments around the world are increasingly concerned about the rise in diet-related chronic disease and there has been increased interest in policy interventions targeted at changing eating habits. In this paper, we discuss the ways in which food markets might fail to deliver the optimal outcome and how this may justify government intervention. We consider how well different types of policies – information campaigns, taxes and regulations – are able to counteract these market failures and we consider some of the implementation issues associated with targeting different consumers and anticipating firms’ strategic responses.

I. Introduction
Diet-related chronic diseases are a major public health concern in most developed countries. In the UK, more than 60 per cent of adults are now defined as overweight or obese.¹ Medical research has identified associations

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¹An individual is defined as overweight if their body mass index (BMI) is over 25 but below 30; an individual is obese if their BMI is 30 or more. BMI is a measure of the relationship between an individual’s weight and their height; specifically, it is weight in kilograms divided by height in metres.
between obesity and a range of illnesses such as heart disease, stroke, high blood pressure, cancers of the colon, breast and prostate, and diabetes.\(^2\) Obesity is not the only diet-related health issue. Excessive consumption of salt, sugar and saturated fat are all linked to health problems. Excessive consumption of saturated fat can raise cholesterol in the blood, increasing the chance of developing heart disease, while eating too much salt can raise blood pressure, increasing the risks of developing heart disease and of having a stroke. Average energy intake from saturated fat is around 20 per cent higher in the UK than the recommended level, and average salt consumption is over 40 per cent above the recommended level (Food Standards Agency, 2009a and 2009b). Poor diet is estimated to account for about one-third of all deaths from cancer and cardiovascular disease in the UK (Food Standards Agency, 2009c), while nutrition, particularly in early life, is well understood to be an important determinant of outcomes in later life.\(^3\)

Addressing these public health issues is a key government policy objective in the UK and in many developed countries; for example, Crombie et al. (2005) provide a cross-country comparison of policies aimed at tackling obesity. Numerous policies aimed at improving diet have been tried and others suggested. These include policies that provide consumers with information on the nutritional value or health consequences of consuming specific foods; policies that regulate the advertising and sale of unhealthy foods; taxes on food in general and on specific food products or inputs to the food manufacturing process; and policies that seek to regulate or incentivise the firms that produce or retail foods to provide healthier foods at lower prices.

In this paper, we discuss the possible reasons why governments might intervene in individuals’ food choices, making reference to the burgeoning economic, psychological and epidemiological literatures. For the most part, consumers are best placed to decide what foods to eat – they have the best information about their preferences and tastes. However, there are some important ways in which individuals may fail to make the ‘best’ choices, and public policy may have a role to play in these areas. In terms of public policy, there is a useful distinction to be made between poor eating habits that individuals may develop and specific food products that have poor nutritional quality. There are some, but relatively few, foods that are unambiguously bad from a nutritional perspective. Most foods have some positive nutritional value; however, individuals may eat a combination of


food products that results in a poor overall diet. This makes it difficult for government to intervene effectively.

Although the problems of diet-related illness are widespread, there is some evidence that certain groups of people are more likely to have poor diets and suffer from the consequences of poor diet than others. For instance, those from low-income households are more likely to consume too much added sugar and not enough fruit and vegetables and oily fish compared with those from higher-income households (Cabinet Office, 2008). They also tend to drink more non-diet carbonated soft drinks and eat more processed meats (Nelson et al., 2007). However, other evidence, such as the Low Income Diet and Nutrition Survey (LIDNS), suggests that ‘Overall reported diets were poor in the low-income population, but they are only slightly worse than those of the general population’ (Tedstone, 2008). There is also evidence of variation across dimensions other than income; for example, children are more likely to consume processed meat and non-diet carbonated soft drinks and less likely to consume fish and fruit and vegetables than adults, and those with less education tend to have a less healthy diet (Nelson et al., 2007).

The structure of this paper is as follows. We start in the next section by discussing some of the ways in which food markets may fail, resulting in some consumers making suboptimal choices. Different consumers are likely to be affected by different market failures. This, coupled with the fact that people respond differentially to government interventions, raises a challenge when designing policies that aim to tackle the market failures. In Section III, we consider some policies that seek to do this and we discuss some implementation issues associated with targeting the correct consumers and anticipating firms’ strategic responses. We provide some concluding remarks in Section IV.

II. Possible reasons for government intervention

Most people would agree that, in general, individuals are best able to decide what foods to eat and when to eat them. The pricing mechanism is an efficient way to allocate scarce resources, and individuals are best able to trade off the costs (price and other costs) and benefits that they derive from consuming a particular food, leading them to consume the quantity and type of food that maximises their utility.

So what role is there for public policy? The case for public policy interventions rests on failings in the market that lead consumers to make decisions that are not optimal. The most obvious reasons that consumers may make suboptimal decisions in food consumption are the following:
• **Information and cognitive failures:** An individual may not have all of the relevant information needed to calculate the full costs and benefits of consumption, or they may fail to appropriately process or make decisions based on the information that they do have.

• **Externalities:** Some of the costs associated with one individual’s consumption may accrue to others, and these additional costs may not be taken into account when the individual decides what or how much to consume.

These types of market failure are present in many markets, and governments intervene in a number of ways to counteract their effects. For example, it is generally accepted that they are present in the markets for alcohol and tobacco (Bernheim and Rangel, 2005; Crawford, Keen and Smith, 2010; Gruber, 2010). Governments intervene in these markets through policies that seek to restrict product availability, increase their relative prices and educate the public of the dangers of (excessive) consumption. Other examples of policies aimed at tackling these types of market failure include taxes levied on fuel, based on the fact that the pollution caused by burning fuel affects not only the individual who makes the purchase decision, and the tax-favoured treatment of pensions, based on the idea that individuals may not be fully informed or do not fully account for the future when making saving and investment decisions.

In this section, we discuss how these market failures may be present in the market for food. We explore some potential policy responses in the next section.

1. **Information and cognitive failures**

Understanding what foods, and how much, to eat to achieve a nutritious diet is complicated for a number of reasons, potentially leading some consumers to be ill informed about their own nutritional needs, about the nutritional characteristics of a specific food product or about some of the costs associated with the consumption of certain foods, particularly when the costs are uncertain and are borne in the future. For instance, in a recent survey by the Food Standards Agency4 (2009d), 48 per cent of respondents thought that they did not need to worry about how much saturated fat they ate if they took regular exercise, were not overweight or ate lots of fruit and vegetables; this view is mistaken – excessive consumption of saturated fat can have negative health consequences for all groups of people.

Achieving a balanced diet not only relies on consuming the correct amount of calories; it also requires obtaining the appropriate proportions of

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4The Food Standards Agency is an independent UK government department responsible for protecting the public’s health and consumer interests in relation to food.
each of the macronutrients (carbohydrates, protein and fats) and sufficient quantities of vitamins, minerals and micronutrients. People do not directly select the amount of each nutrient to consume, but rather obtain them indirectly by selecting which foods to consume from the hundreds of thousands of food products available, each of which contains a different combination of nutrients. The health costs associated with deviating from a balanced diet, or eating an excessive amount of unhealthy food, are realised in the future, can sometimes be mitigated by future actions (such as exercising) and can depend on age, gender and other factors. This makes them difficult to quantify and perhaps easy to ignore. Consumers face a barrage of often contradictory or potentially confusing information about the health properties of food products.\(^5\) It is often not in the best interest of firms to reveal or highlight the health costs associated with consumption of their products, and they may also engage in promotion which has the potential to obfuscate the consequences of consumption. For example, the sponsors of the 2008 Olympics, a showcase of the world’s finest athletes, included McDonald’s and Coca-Cola – two food firms that sell products that tend to be unhealthy.

Given the complexity and quantity of information available, it may be difficult for consumers to obtain the information most relevant for them, and even if an individual has access to all of the relevant information, they may face difficulties in processing it effectively. Furthermore, it is likely that ability to process and act on information is correlated with cognitive ability. Banks and Oldfield (2007), for instance, provide evidence that cognitive ability is strongly correlated with retirement savings outcomes.\(^6\)

There is a large literature on the impact of information on consumer demand.\(^7\) Most of this literature focuses on advertising by firms, which is very different in nature and in its impact from information provided by government.\(^8\) There is also a large and growing body of economic and psychological literature on how individuals behave in circumstances where they face information or cognitive constraints.\(^9\) Armstrong and Spiegler (2007) describe three families of models that tackle these issues. The first is models in which consumers face a complex decision (for example, one with many options) and where their response is to apply some simplifying rule

\(^5\)For example, Browning, Hansen and Smed (2010) study the impact of contradictory information in the media about the health benefits and health scares associated with eating fatty fish on demand for fatty fish in Denmark. They show that contradictory messages lead consumers to be confused.

\(^6\)See also Peters et al. (2006).

\(^7\)Bagwell (2007) provides a useful survey.

\(^8\)One exception is Moschini and Meilke (1989), who study whether increasing awareness of the saturated fat content in red meat (among other factors) altered US consumers’ relative preferences for chicken over red meat.

\(^9\)Recent surveys of this literature include Bernheim and Rangel (2005), Ellison (2006) and Armstrong and Spiegler (2007); see also Kahneman and Snell (1992), Kahneman and Tversky (2000) and Loewenstein, O’Donoghue and Rabin (2003).
that only uses part of the available information to make a choice. For example, many consumers perceive organic products\(^\text{10}\) as being healthier than non-organic products, and this is one of the main factors influencing their willingness to pay more for organic foods (Griffith and Nesheim, 2008). However, this rule of thumb may be misleading; for instance, research commissioned by the FSA found that there are ‘no important differences in the nutrition content, or any additional health benefits, of organic food when compared with conventionally produced food’ (Food Standards Agency, 2009e). The second family of models is those in which individuals have systematic biases in their perception about their own future tastes or the risks associated with consumption. For example, Loewenstein, O’Donoghue and Rabin (2003) discuss evidence that people who shop when they are hungry buy more food and that people offered food when they are hungry are more likely to select unhealthy options. The third is models in which the way a choice is framed affects the individual’s decision (Kahneman and Tversky, 2000). Framing often refers to the way in which options are presented – their order or the words used to describe them. For instance, Iyengar and Lepper (2000) present experimental evidence that consumers who were exposed to larger choice sets of jam and chocolate were both less likely to purchase and, conditional on purchasing, more likely to be dissatisfied and regretful.

Lack of information, or the failure to fully process information, is likely to lead individuals to make choices that differ from those they would make if they used all the relevant information. There is substantial evidence that, in many cases, individuals make suboptimal choices (Bernheim and Rangel, 2005; Gruber, 2010). For example, consumers might not be able to weigh the short-term benefits of consumption (instantaneous gratification) against the future costs, such as negative health consequences, and this may lead them to consume more unhealthy foods than they otherwise would. Some authors refer to this kind of situation as one in which the consumer imposes an externality on themselves in the future (Herrnstein et al., 1993; O’Donoghue and Rabin, 2006). The idea is that the consumer fails to fully internalise the future costs on themselves that are associated with their current behaviour. Other authors suggest that some people may suffer from self-control problems, meaning that, despite being aware of the fact that the costs of consumption (i.e. the discounted stream of all future costs) exceed the benefits, the instantaneous nature of the benefits is enough to tempt them to consume (Laibson, 1997; O’Donoghue and Rabin, 2006; Gruber, 2010). As evidence, Bernheim and Rangel (2005) point out that in the US in 2000, 70 per cent of current smokers expressed a desire to quit completely but only 4.7 per cent managed to abstain for a period of three months or more. Those

\(^{10}\)See [http://www.food.gov.uk/foodindustry/farmingfood/organicfood/#h_3](http://www.food.gov.uk/foodindustry/farmingfood/organicfood/#h_3).
who suffer from self-control problems will also impose externalities on their future selves.

Markets in which food is sold are typified by oligopolistic competition (competition between a few large firms). For example, in the UK, the supermarket industry has been the subject of repeated competition investigations\(^\text{11}\) and the fast-food industry is dominated by a few large firms (Sault, Toivanen and Waterson, 2003). Firms in these markets have market power and the potential ability to exploit consumers’ information and cognitive failures; they will also be able to price above marginal cost, and in response to a tax may restructure prices so that taxes do not feed directly into price changes. There is a substantial literature that considers how firms behave in such circumstances, and several papers suggest that firms will try to confuse consumers (for example, Ellison and Ellison (2009) and Spiegler (2006)).

Firms in the food market may also try to exploit particular groups of consumers who are boundedly rational. For example, retailers take advantage of consumers’ lack of self-control by placing chocolate next to the checkout in an attempt to tempt consumers into purchasing. Fast-food firms often target their advertising specifically at children (for example, McDonald’s Happy Meal), while vending machines have often been placed in schools, giving children access to ‘junk food’ when they are out of sight of their parents.

Children are one group for whom information and cognitive failures are likely to be severe, as they are unlikely to possess the information or cognitive ability to make appropriate choices about food consumption.\(^\text{12}\) It is likely, for instance, that young children will be unable to weigh the momentary pleasure of consuming an unhealthy food against the long-term costs imposed on themselves in the future. This makes them more likely to succumb to the advertising of junk foods (which typically highlights how tasty the products are, without pointing out their negative health impacts), when it is not in their interest to do so (Nestle, 2006). The amount of calories that children obtain from fast-food outlets has been one cause for concern, particularly in the US.\(^\text{13}\) Of course, parents make many food choices for children and may seek to internalise the externalities that their children impose on their future selves. However, it is difficult for parents to monitor their children all of the time, and advertising may make it more difficult for

\(^{11}\)For example, Competition Commission (2000).


\(^{13}\)See Paeratakul et al. (2003) and Bowman et al. (2004), who show that individuals consuming fast-food meals have higher energy intake with lower nutritional values. See Anderson and Butcher (2006) for a survey.
parents to resist their children’s pleas for junk food. In addition, some parents may not fully internalise their children’s welfare; this is one reason why, in most developed countries, it is stipulated by law that all children must be schooled until the age of 16. Children’s cognitive constraints, coupled with evidence of the negative effects of poor diet on outcomes later in life, mean policy towards children may be particularly important.14

2. Externalities imposed on others

Another potential rationale for policy intervention is that some of the consequences of an individual’s food consumption behaviour may directly impact on others. The person choosing how much and what to consume will make a choice that equates his marginal cost of consumption with his marginal benefit (i.e. he will select the level of consumption that maximises his utility). However, he has no incentive to take account of the costs his consumption imposes on others (called ‘externalities’). As a result, the private marginal benefit of consumption will be lower than the social marginal cost (which includes both the private marginal cost and the external cost). If the consumer were to reduce his consumption by a small amount, the reduction in overall costs would be larger than the reduction in his benefit, meaning he is consuming a socially excessive amount.

The main externalities associated with the consumption of food are related to the fact that poor diet is associated with bad health, which may impose costs on others – for example, by raising public health costs. To the extent that consumers do not bear the full costs associated with healthcare, they will fail to fully internalise any medical costs associated with diminished health resulting from food consumption. In the UK, most healthcare is provided by the NHS, and therefore it is free at the point of use and funded out of general tax receipts. If certain forms of food consumption behaviour raise the costs of funding the NHS, they impose a cost on all taxpayers. Even if healthcare were privately provided, poor diet might still raise the public cost of healthcare by increasing the insurance premiums everyone has to pay, since insurers may not be able to distinguish perfectly between those who have healthy and unhealthy diets.

What is the evidence about the impact of poor diets on public health costs?

According to the National Audit Office (2001), the cost to the National Health Service in 1998 of treating health problems related to obesity was £480 million. The report points out that this is a conservative estimate and the cost could have been as high as £2.1 billion. Obesity is only one aspect of diet-related chronic disease, so this only provides a partial picture.

14For instance, there is evidence of intergenerational persistence in obesity. While some of this will be due to genetic factors, environmental factors are also likely to play a role (see Wardle et al. (2002)).
Cardiovascular disease, of which high blood cholesterol is a leading risk factor, cost the NHS £14.4 billion in 2006 – which represents a cost of just under £250 per capita (British Heart Foundation, 2009).

However, individuals dying prematurely may also reduce some aspects of public sector costs. For example, there are considerable medical costs associated with old age, meaning that, from a purely NHS cost accounting perspective, there is a potential financial saving associated with people dying quickly at a young age. In addition, there may be substantial savings in terms of public pension and welfare payments that are made to older individuals. This has been found in other areas – for example, Barendregt, Bonneux and van der Maas (1997) found the long-term effect of stopping smoking was to increase healthcare costs, as smokers tend to die much younger than non-smokers. Manning et al. (1989) suggest that the net lifetime cost that smokers impose on others is approximately equal to the amount of tobacco taxes they pay (in the US), while the costs that arise due to alcohol consumption are greater than the alcohol taxes paid.

While diet-related health problems are likely to increase NHS costs, there are many other common activities that also increase the likelihood of incurring injury, potentially increasing public health costs. For instance, skiing or playing football increases the risk of suffering a broken leg. If healthcare were privately provided, insurance premiums could potentially reflect some of the risks associated with engaging in certain behaviours, but with a taxpayer-funded health service, free at the point of use, these activities necessarily result in higher costs of public healthcare.

Another potential externality associated with diminished health from poor diet arises from lost economic output due to sickness absence, premature mortality and lower productivity. For instance, the National Audit Office (2001) estimates that the ‘indirect costs of obesity’ due to lost economic output in 1998 were £2.1 billion and that people dying prior to retirement age as a result of obesity led to the loss of 40,000 working years. Most of these costs will be internalised by individuals and therefore do not represent external costs. For instance, the income and private pension earnings that someone forgoes if they die young are primarily a cost borne by that person and their family and not by society. Nevertheless, increased sickness absence, lower on-the-job productivity, higher welfare payments and lower contributions towards government revenues are all costs potentially associated with diet-related illness and that are at least in part borne by society at large.

III. What are the policy options?

The presence of information and cognitive failures and externalities results in socially suboptimal outcomes and, in theory, welfare could be improved if
instead the socially optimal level of consumption prevailed. This provides a potential rationale for government intervention. If the government is able to counteract these market failures effectively, then welfare would be improved. An effective policy would be one that targeted a failure in the market and where the administrative costs and any inefficiencies remaining after, or generated because of, government intervention were smaller than the original inefficiency associated with the market failure.

In this section, we discuss three possible types of policy intervention – education and information provision, taxation and regulation.

1. Education and information provision

If consumers are ill informed about the consequences of having an unhealthy diet, an obvious policy response is to provide them with the information they lack, hopefully enabling them to make fully informed choices. Similarly, if consumers impose externalities on their future selves through a failure to understand the health consequences of their current behaviour, a potentially useful policy response is to educate consumers, helping to increase their ability to account for future costs of current behaviour. Unlike the policy responses discussed below (taxes and regulation), providing people with more information is unlikely to be costly to those consumers who are already fully informed and able to make utility-maximising decisions. For a discussion of how various interventions aimed at improving consumer welfare affect fully informed consumers, see Armstrong (2008).

However, if the primary source of market failure is the presence of externalities or a lack of self-control, then information provision and education are likely to be less effective. These market failures are not driven by a lack of information or education, but by a lack of incentives to internalise external costs and a tendency not to give sufficient weight to known health consequences that are realised in the distant future.

Implementation issues

One major implementation issue with information is whether to provide one simple message, aimed at a large number of consumers, or numerous messages targeted at different groups of consumers. Providing one message is likely to be less costly and is less likely to generate confusion, but it may also mean compromising on the appropriateness of the information provided to different groups.

Information campaigns aimed at altering consumer behaviour have been successful in other areas. For example, Cutler (2004) argues that the primary factor leading to a reduction in smoking in the US over the past 50 years was the widespread publicity for the Surgeon General’s report published in 1964. The report illustrated the health dangers posed even by moderate smoking.
Cutler also argues that the Mothers Against Drunk Drivers campaign in the 1980s was instrumental in reducing the prevalence of drunk driving. In the UK, the Institute of Alcohol Studies (2010) reports that government information campaigns in the 1980s and early 1990s were effective at reducing deaths from drunk driving.\(^{15}\)

In both of these cases, the message conveyed to the public was very simple – smoking causes disease and drunk driving kills children. Information campaigns aimed at altering food consumption patterns would have to carry a more nuanced message. While smoking and drunk driving are unambiguously bad for the health of partakers and those around them, calorie intake is essential for life and only has market failure associated with it at excessive levels and where calories are drawn disproportionately from unhealthy foods. Even consumption of saturated fat and salt is more complicated than smoking and drunk driving: low consumption levels carry little health risk and some products that are rich in saturated fat have positive health benefits for some consumers because of other nutrients that they contain. For example, the Food Standards Agency (2010a) advocates giving young children full-fat milk.

An effective information campaign needs to succeed in conveying a message that is consistent with improving diet but is simple enough for consumers to understand. This task is complicated by the fact that different consumers require different messages – some people consume the correct quantity of calories but obtain too many from fat, some people have a balanced diet but become overweight because they consume too many calories, and so on. Similarly, since cognitive ability and willingness to take note of government recommendations are heterogeneous across people, the government would possibly have to tailor the sophistication of its message for the group of consumers it most wants to influence.\(^{16}\) In addition, the government is vying for consumers’ attention with the potentially confounding message conveyed by food firms (which spend large amounts advertising products to persuade consumers of their quality and desirability).

Hu, Sung and Keeler (1995) provide some evidence to suggest that

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\(^{15}\)The IAS factsheet says ‘Department of Transport officials believe that recent advertising campaigns have been effective in reducing casualties. They point to a large drop in 1987 when the slant of the slogans and advertising shifted from warnings about getting caught to an emphasis on the fact that drivers who drink endanger lives – the “Drinking and Driving Wrecks Lives” slogan. Since then there have been variations on the same theme, including in 1992 a television advert that could only be broadcast after the 9pm watershed, showing a girl lying on the pavement covered with blood. … The publicity campaign is believed to have been effective. However, it is difficult to isolate the effect of publicity from the other measures introduced over the same period such as tougher laws and higher levels of enforcement’.

\(^{16}\)Adda (2007) provides evidence of heterogeneous consumer responsiveness to the health scare associated with UK beef prompted by the ‘mad cow disease’ crisis. He finds that people with especially low and especially high susceptibility to the disease did not alter their behaviour and therefore that ‘individual behaviour can partly offset potential medical gains obtained from better knowledge’ (p. 287).
advertising is effective at counteracting government information campaigns, and also that firms may resort to other tactics, such as lobbying legislators.

Trying to design one message that is appropriate for all consumers is therefore a difficult task. Ideally, the government would be able to provide personalised advice to each consumer, and such a policy is not out of the question. Technology that allows consumers to obtain relevant information is becoming increasingly available (for example, scales that measure percentage body fat and blood pressure machines). To the extent that individuals are in the best position to obtain the information, the government could encourage them through education and by implementing policies that promote the availability of technology in public places or at a reasonable price. People could also be required to undergo an annual medical check-up where their GP provided nutritional advice tailored to their needs and cognitive ability.

Another issue is whether, even with the relevant information, consumers will act on it effectively. We provide evidence that suggests that shoppers who say they are trying to buy healthy foods, trying to manage their cholesterol level or trying to give their children a healthy diet do not appear to succeed in purchasing a diet that is lower in saturated fat. (Government recommendations suggest that households should obtain no more than 11 per cent of their energy from saturated fat (Food Standards Agency, 2009a).) We use data on food purchases brought into the home\footnote{For details of the data, see Griffith and O’Connell (2009) and Leicester and Oldfield (2009).} and compare the proportion of calories purchased in the form of saturated fat for households who state that they are trying to buy healthy foods or achieve a healthy diet and for households who say this is not an aim. If consumers were well informed and acting on their beliefs, then we would expect that households that were trying to buy healthy foods would purchase less saturated-fat-intensive food. Table 1 shows that there is little variation with household aims, except for parents who strongly disagree with the statement ‘I try to give my children healthy meals’ – they tend to purchase a slightly higher percentage of calories as saturated fat than average.

One concern we might have is whether the data reflect consumers’ true intentions; perhaps consumers do not answer the questions accurately. In the final column of Table 1, we present evidence that suggests this is not the case. We consider a different dimension of shopping behaviour where it is likely that consumers do not face as much confusion and where they are much less likely to be tempted to deviate from their stated intentions. Organic foods are well labelled, it is easy to identify them and it is not very likely that non-organic foods will provide a ‘temptation’ to a shopper who wants to buy organic. We compare shoppers who state that they believe that organic foods are healthier with those who do not. Shoppers who believe that
TABLE 1
Purchasing behaviour, by main shopper’s responses to attitudinal questions

<table>
<thead>
<tr>
<th>Response</th>
<th>Average percentage of energy purchased as saturated fat&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Average percentage of expenditure on organic products&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>I try to buy a healthy range of foods</td>
<td>14.8%</td>
<td>14.9%</td>
</tr>
<tr>
<td>I am actively trying to manage my cholesterol level</td>
<td>14.8%</td>
<td>14.9%</td>
</tr>
<tr>
<td>I try to give my children healthy meals</td>
<td>14.8%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>14.8%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Agree</td>
<td>14.8%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Neither</td>
<td>14.9%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Disagree</td>
<td>14.8%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>14.9%</td>
<td>14.8%</td>
</tr>
</tbody>
</table>

<sup>a</sup>Calculated as the average percentage of their calories that households purchase in the form of saturated fat throughout the year.

<sup>b</sup>Calculated as the average percentage of total food expenditure on organic products throughout the year.

Source: Data from the UK Kantar Worldpanel.

organic products are healthier do in fact spend more of their total food budget on organic foods – 8.8 per cent for those who strongly agree compared with 0.9 per cent for those who disagree.

Current policy
The UK government has undertaken a number of information campaigns and initiatives, which have typically consisted of one simple message aimed at consumers in general. These have included the ‘5-a-day’ campaign (Department of Health, 2000), the saturated fat campaign (Food Standards Agency, 2009f) and various food labelling initiatives, such as the traffic light scheme (Food Standards Agency, 2010b).

The 5-a-day campaign encouraged consumers to eat at least five portions of fruit and vegetables each day. Evidence suggests that eating at least this much can reduce the risk of stroke (He, Nowson and McGregor, 2006); in 2008, Britons ate, on average, 3.8 portions a day (NHS, 2009). The US ran a similar campaign in the 1990s, and Weaver, Poehlitz and Hutchison (1999) conducted a randomised trial and showed that, in the US, recognition of the 5-a-day message increased in response to the advertising campaign; however, self-reported fruit and vegetable intake did not change. Evidence in the UK suggests that, as the campaign has progressed, knowledge of the 5-a-day message has increased, but that there are significant socio-economic differences – 70 per cent of people surveyed from socio-economic groups A and B had knowledge of the message in 2002, while only 39 per cent
amongst groups D and E did.18 To our knowledge, there are no studies that provide evidence of how consumption in the UK has responded to the campaign.

In oligopolistic markets (such as the UK retail food industry), firms will respond to government interventions by changing prices, advertising and so on. This can result in increased information provision having unintended consequences for some consumers’ behaviour and ambiguous effects on total consumer welfare. For instance, if the 5-a-day campaign did succeed in increasing overall consumer demand for fruit and vegetables, the profit-maximising response may be for firms to increase the price of these products.19 This increase in the relative price of fruit and vegetables may make them less affordable for some consumers, actually reducing the amount these groups consume.

Other recent initiatives include the Food Standards Agency (FSA) campaign to inform consumers about the health risks of consuming too much saturated fat and the traffic light labelling scheme. The saturated fat campaign was launched in early 2009 and includes a graphic TV advert illustrating how saturated fat consumption can clog arteries. This and print adverts aim to raise awareness of the dangers of excessive consumption and lead to reduced consumption. The traffic light labelling scheme is a voluntary scheme that aims to assist consumers in selecting a combination of foods that provide them with a healthy, balanced diet. Participating retailers and manufacturers use a prominent nutrition label that displays the quantity of fat, saturated fat, sugar and salt contained in the product. The names of nutrients of which there is a high quantity (above a defined level) in the product are displayed in red, those with a medium amount are shown in amber and those with a low amount in green. The aim is to reduce the complicated decision of obtaining the correct combination of nutrients from the thousands of food products on offer to ‘go[ing] for as many greens as you can and avoid[ing] choosing too many reds’ (Food Standards Agency, 2010b). If consumers find it difficult to assess whether a given product is healthy or unhealthy, and if the traffic light labelling makes this assessment easier, then these consumers will be able to make better nutritional choices. This in turn may encourage firms to reformulate their products to increase their appeal to the now more health-conscious consumers.

18Food Standards Agency, 2003. Social classes are A (upper middle class – higher managerial, administrative or professional), B (middle class – intermediate managerial, administrative or professional), C1 (lower middle class – supervisory, clerical or junior managerial, administrative or professional), C2 (skilled working class – skilled manual workers), D (working class – semi-skilled and unskilled manual workers) and E (those at lowest level of subsistence – state pensioners or widows (no other earner), casual or lowest-grade workers).

19In imperfectly competitive markets, the firm’s profit-maximising price depends on the elasticity of demand for its product. If the impact of an information campaign is to make consumer demand less sensitive to prices, i.e. less elastic, then the profit-maximising price will increase.
2. Taxes and other policies aimed at changing prices

An alternative set of policies are designed to change the price of food, or certain types of food, relative to other products. Such policies are primarily aimed at aligning the private marginal cost of consumption with the social marginal cost (Pigou, 1920), although they may also be aimed at raising revenue. Even if the reason that some people consume too much is a lack of information, introducing a tax may succeed in reducing consumption, and the tax itself may also convey information.

Possible forms of tax

Taxes could be levied on calories, on body fat, on specific components of food or on food in general. We discuss some possible forms.

High caloric intake relative to energy expenditure leads to weight gain. One strategy would be to tax calories, which would lead to an increase in food prices and an increase in the relative price of high-calorie food products, encouraging people to consume fewer calories. However, the externalities associated with diet-related health problems do not arise directly from caloric consumption (some calories are essential for life, and underconsumption is as much a problem as overconsumption); it is only excessive consumption relative to energy expenditure that leads to external costs. The amount of calories required varies from person to person – those who exercise a lot need more calories than those who do not. Yet a tax on calories raises the price for all consumers. Ideally, we would like to tax only overconsumption of calories, but this is clearly infeasible.

One way around this is to tax the result of overconsumption – excessive body fat. If it is the case that overweight or obese people do impose external costs, then levying a tax on them in proportion to their body fat would be an effective means of making them take these external costs into account. The tax system already distinguishes between people on the basis of their income, so why not do so on the basis of their body fat? By its very nature, body fat is difficult to conceal (more so than income), and requiring people to undergo, say, an annual body fat evaluation may provide a means of assessing people’s tax liabilities. However, while taxing body fat may make sense from an economic perspective, it is unlikely that it would be politically feasible.

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21Bonnet, Dubois and Orozco (2009) suggest that a strong effect of individual caloric intake on obesity exists. Ransley et al. (2003) and Etile (2009) find that overweight households purchase significantly more energy and fat per adult than lean households. Lakdawalla and Philipson (2002) and Cutler, Glaeser and Shapiro (2003) argue that growth in obesity in the US is primarily the result of technological changes that made food cheaper and physical exercise more expensive. Other relevant papers include Bleich et al. (2007), Wardle (2007) and Philipson and Posner (2008).
Rather than taxing calories or body fat, an alternative would be to levy tax on specific nutrients that are not beneficial at low levels and that are potentially socially costly at high levels. This targets externalities generated through excessive consumption of particular nutrients. For example, a tax on saturated fat would aim to increase the relative price of foods that are high in saturated fat and therefore encourage a reduction in consumption and in externalities associated with excessive saturated fat consumption.

One form of tax that has been proposed is a tax on specific food categories, such as fizzy drinks, crisps and chocolates. A difficulty with implementing such a policy is distinguishing between foods that are healthy and unhealthy, something that nutritionists have been reluctant to do (Hastings et al., 2003; Ashton, 2004). While most people would agree that fizzy drinks and crisps are unhealthy food products, there may be considerable difficulty in agreeing which products belong to each group. In the past, such disputes have had to be resolved in court; in 1991, McVitie’s successfully argued that a Jaffa Cake was indeed a cake, and not a chocolate-covered biscuit, and thus should be exempt from VAT.

A related proposal has been to remove the zero-rating for VAT afforded to some food products. This would have two effects. It would lead to a general increase in food prices and it would change the relative price of foods that are currently taxed under the VAT compared with those that are zero rated. The current system of applying VAT to some food categories but not others is not consistent with promoting healthy eating – for instance, in the UK, butter, red meats and cakes are zero rated for VAT, while fruit juices, bottled water and rice cakes attract full VAT.

**Impact of different forms of tax**

While providing people with more information is unlikely to directly harm those who are already fully informed, taxing products that are consumed by individuals who purchase the optimal quantity of food will reduce their welfare, as they are likely to face higher prices. There is a potential trade-off between the increase in welfare that results from encouraging some people to consume less and the welfare loss that is incurred by others in facing higher prices. In this subsection, we discuss some of the problems that might arise with the different forms of tax outlined above.

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22See, for example, Leicester and Windmeijer (2004), Chouinard et al. (2007) and Smed, Jensen and Denver (2007).

23See, for example, ‘Tax fizzy drinks to cut obesity and help NHS, says doctor’, The Guardian, 15 November 2009.

24United Biscuits (UK) Ltd (VTD 6344); a key piece of evidence was the 12-inch Jaffa Cake that McVitie’s presented to the Court.

25See Mirrlees et al. (2011, ch. 9).
A tax on calories may encourage obese people to consume fewer calories, reducing externalities; however, consumers who maintain a healthy diet will also have to pay more as a result of the tax. It is not clear whether such a tax would improve overall welfare – it would depend on the magnitude of the market failure and the proportion of consumers affected by it, among other things. In one particular setting, O’Donoghue and Rabin (2006) find that if even only a small number of consumers suffer from self-control problems, a tax may still be welfare improving.

Another possible concern associated with a tax levied on food is that it may be regressive. Low-income households tend to spend a higher proportion of their income on food, so they may end up paying a greater share of their income in tax. Indeed, some authors have shown that a form of tax on fats in food would be regressive (Leicester and Windmeijer, 2004; Chouinard et al., 2007). Does this mean that a tax on food is undesirable, as it risks undermining government objectives to redistribute wealth? What matters for redistribution is not whether one particular tax is regressive or not, but the progressivity of the tax and benefit system as a whole. If a tax is regressive, the government could compensate low-income households using other parts of the tax and benefit system.

A problem with taxes that target specific components of food (for example, a fat tax or a sugar tax) is that foods are complicated bundles of many nutrients. Targeting one ‘bad’ nutrient with a tax may succeed in reducing consumption levels of that nutrient, but may have the unintended consequence of increasing consumption of another ‘bad’ nutrient if they are negatively correlated.26 Such a policy may also lead to a reduction in consumption of products that are high in the ‘bad’ characteristic but that have positive health properties for some consumers (for example, full-fat milk and young children).

The effectiveness of any tax in reducing consumption depends on consumers’ responsiveness to the price change it induces – the less responsive people’s demand, the larger the tax required to induce a given reduction in consumption. Blundell, Pashardes and Weber (1993) estimate that the average elasticity of demand for food is −0.56. This suggests that in order to achieve a 10 per cent reduction in average food consumption, the government would have to impose a tax that generated an 18 per cent rise in food prices. While basing predictions of behavioural responses on an overall food elasticity makes sense if the prices of food products all rise together, it is potentially misleading when considering a tax that alters the prices of food products differentially. The reason is that in this case, people may substitute away from food products that are heavily taxed towards those that are lightly

26For example, Smed, Jensen and Denver (2007) simulate the impact of a series of taxes levied on individual nutrients and find that they can have undesirable consequences for the demand for other nutrients.
taxed, or not taxed at all, without reducing their overall food consumption. For instance, Griffith and O’Connell (2009) show that for butter and margarine – a relatively homogeneous product category – the saturated fat content per 100g of product varies from 0g to 57g. This means that if a tax were imposed on the saturated fat in these products, households may respond by substituting to another product, reducing the amount of saturated fat they purchase but without reducing their consumption of butter and margarine. In this case, the relevant elasticities of demand are those for the individual butter and margarine products, not the overall elasticity of demand for food.

A related point is that concern may not focus on average consumption but on the consumption of the unhealthiest groups in society. Therefore if consumers’ elasticities of demand differ significantly from the average responsiveness and, in particular, if consumers with the lowest elasticities happen also to be the least healthy, conclusions about the efficacy of a tax in reducing consumption of some harmful nutrient based on the average elasticity of demand may be misleading. For instance, Ayyagari et al. (2009) show that it is the heaviest consumers of alcohol who have the lowest responsiveness to price, suggesting that raising tax on alcohol may fail to significantly reduce consumption levels amongst the group likely to be causing most harm, despite reducing average consumption.

Another important consideration, and one that has not received a great deal of attention in the literature so far, is how firms will respond to the tax. The UK retail food market is characterised by oligopolistic competition, meaning retailers enjoy some market power and are likely to respond to the introduction of a tax by adjusting prices. Manufacturers and retailers sell many different products. In such markets, there is not a simple mapping between taxes and the resulting change in prices – in response to the tax, firms will re-optimise prices, with the result that the price of some products may increase by less than the full amount of the tax, while the price of other products may increase by more than the tax.27 This may diminish the effectiveness of the tax. Manufacturers may also respond to a tax by reformulating existing products or introducing new products into the market. If they are encouraged to remove ‘bad’ nutrients to reduce their exposure to a tax, this may help improve the tax’s effectiveness. However, if a tax on a specific nutrient induces firms to substitute it with another ‘bad’ nutrient, the tax may have unintended negative consequences.28


28Griffith, Nesheim and O’Connell (2010) model the impact of a tax on saturated fat in butter, taking into account firm pricing responses. They show that most firms respond to the tax by increasing prices by more than the tax.
Current policy
In the UK to date, there has been no attempt to levy a tax on food products with the aim of changing food purchasing behaviour, although reports suggest that the idea has been considered in the recent past.29 Some food products are currently subject to VAT, and there has been recent consideration of extending VAT to all foods.30 Specific taxes are levied on other ‘sin’ goods that have negative health implications and externalities. For example, there are excise taxes on tobacco products, alcoholic drinks and motor fuels and special aviation taxes.

In other countries, some food products are subject to VAT or general sales taxes. Caraher and Cowburn (2005) review the tax treatment of food internationally and conclude that most taxes are designed to raise income and are not designed to alter behaviour. They cite some examples where taxes have been imposed with a view to discouraging unhealthy food consumption – including a tax on soft drinks in the US states of Arkansas, Washington and West Virginia. In Denmark, the government levies a tax on sugar products, chocolate, ice cream and soft drinks.

3. Regulation
The sources of diet-related health problems are both numerous and complex, and consumers are heterogeneous in their tastes, the amount of information they possess and their receptiveness to information that is available. For these reasons, correcting the ways in which food markets fail by targeting consumers may be difficult, and it may be more effective to regulate the firms that produce and sell food products. They are much less numerous than consumers and, while consumers may act in ways that are not in their best interest (due to lack of information or failure to process information), firms are likely to act as self-interested profit maximisers.

Regulations currently in place in the UK include restrictions on ‘junk food’ advertising aimed at children and on the availability of junk foods in schools.31 The government is also seeking to encourage food manufacturers to voluntarily reformulate certain products to make them healthier. Children are arguably the most susceptible to being persuaded by advertising to consume a product when it is not in their best interests to do so, since they are the least able to account for the future costs of their current behaviour. Nestle (2006) cites evidence that food marketing ‘intentionally targets children who are too young to distinguish advertising from truth and induces

30‘Shoppers could face VAT on food’, Daily Telegraph, 6 March 2010.
31Another form of regulation is supplementation. For instance, in the US, flour is fortified with folic acid. Although discussed in the UK, the mandatory fortification of flour has not been adopted (see Committee on Medical Aspects of Food and Nutrition Policy (2000)).
them to eat high-calorie, low-nutrient ... “junk” foods’. While parents may seek to internalise externalities that their children impose on their future selves, they may not be able to do this fully, and they may be unable to make all of their children’s food decisions for them. A policy that is aimed at dealing with this failure is the ban on advertising junk food (as defined by the FSA) on television during programmes that have a 20 per cent higher proportion of viewers under 16 years old than the UK average.32

Another policy that aims to address the fact that parents may be unable to ensure that their children’s diets are consistent with their long-run welfare is the ban on junk food in schools, initially introduced in September 2008. In particular, vending machines selling unhealthy food have been banned from all schools, and statutory guidelines outlining the minimum nutrient standards for school meals have been introduced (Department for Children, Schools and Families, 2008). The idea of this policy is to restrict children’s ability to obtain unhealthy food while in school. Just how effective the policy has been at reducing children’s consumption of junk food remains to be seen, but there have been reports of enterprising children circumventing bans, by selling junk food in a school playground ‘black market’.33 Perhaps more worryingly, there have also been instances of ‘junk food mums’ passing junk food through school railings to children prevented from leaving school premises during lunch time to purchase unhealthy food.34 The actions, while probably on a small scale (and potentially exaggerated by the media), do raise the question of whether parents always have their children’s long-run welfare in mind.

Voluntary reformulations have been a popular alternative to compulsory regulation. In March 2006, the FSA published salt reduction targets for 85 food categories.35 It also recently consulted on whether to introduce recommendations on reductions in saturated fat and added sugar in biscuits, cakes, pastries, buns, chocolate confectionery and soft drinks (Food Standards Agency, 2009a). The FSA points out that food manufacturers regularly reformulate products, and it aims through the publication of these voluntary targets to influence the reformulations in a way that improves public health. Since consumers tend to value unhealthy products because of their taste rather than the fact that they contain too much salt, sugar or fat, this may be an effective policy if food manufacturers are willing and able to lower the amount of these ingredients without compromising the taste of the product.

32This was enacted by the UK government in April 2007; see Ofcom (2006).
35These targets have subsequently been revised and the food categories redefined. See Food Standards Agency (2009b).
The FSA has also consulted on voluntary reductions in standard portion sizes (Food Standards Agency, 2008). Such a change might help individuals who are motivated to eat a good diet but lack information; but it seems unlikely that stated portion sizes are a prime determinant of the amount that most people eat.

One of the major objections to a policy of encouraging voluntary reformulation is that it is unlikely to be very effective, since the recommendations are only voluntary. If food manufacturers thought that reformulating products in the ways suggested would be in their interest, then why would they not already have done so? However, firms may adhere to the voluntary recommendations if they fear that failure to comply will result in compulsory and possibly more stringent regulation in the future.

So far, UK regulation has been aimed at restricting access to, and reducing the demand of, certain groups of consumers (especially children) for unhealthy products, and encouraging firms to reformulate products to reduce the amount of certain nutrients they contain. An alternative regulatory policy is to ban the sale of certain products. If there are products that are deemed very unhealthy, banning their sale may help reduce some of the costs (both external and imposed on one’s self) of consumption. The drawbacks of this kind of policy are large: it may be costly to enforce a ban; if the product is popular with those who maintain a balanced diet, they will suffer a welfare loss; drawing the line between a product that is so unhealthy that it deserves to be banned and one that is not sufficiently unhealthy to merit prohibition will be very difficult. In addition, targeting very specific products with a ban may simply lead to consumers substituting to another unhealthy alternative. Nevertheless, there may be instances when a product is so dangerous to the health of anyone who consumes it that this form of regulation is appropriate.

IV. Summary and conclusions

Poor diet and the associated health problems are becoming increasingly prevalent in most developed countries. Governments have responded with policies aimed at influencing food purchasing behaviour, and there have been calls for further intervention. In this paper, we have discussed some of the reasons why food markets might fail, highlighting problems associated with information and cognitive constraints and externalities. The presence of market failure alone is not sufficient to justify government intervention; it also needs to be the case that the intervention will not create additional distortions or administrative costs associated with the policy that outweigh the benefits of counteracting the original market failure.

Three broad groups of policies aimed at tackling market failures in food markets have been tried or discussed – improving information provision,
altering the prices of food through taxation, and regulating food manufacturers and retailers. So far, policy in the UK has focused on providing consumers with information and on some forms of mainly voluntary regulation. Although food products are subject to differential tax treatments, this is distortionary and does not serve to incentivise consumers to opt for healthier products.

Unlike other ‘sin’ goods, which tend to have externalities and health dangers associated with any level of consumption, the market failures associated with food consumption are complex. Both the amount of calories consumed and the balance of where these calories come from determine whether an individual has a healthy diet. Indeed, underconsumption, while not the focus of our interest here, is also a serious problem. There is substantial variation in eating habits and the amount of calories people require, and people are heterogeneous in how they will respond to the policies discussed. In addition, firms’ response to these policies potentially diminishes or even reverses their ability to positively influence food purchasing behaviour, because the food industry is characterised by oligopolistic competition. For these reasons, careful consideration needs to be given to the form and likely impact of interventions before implementation.

Nonetheless, one area where the rationale for government intervention is clear is with respect to children – the people who are most likely to fail to account for the future costs of their current behaviour. These future costs include not only the health costs associated with current consumption, but also a higher future propensity to consume unhealthy foods and more generally poorer lifetime outcomes. The UK government has already implemented a partial ban on ‘junk food’ advertising aimed at children and it has restricted the availability of junk foods in schools. The effect that these policies have had on children’s eating habits merits further investigation, which will help inform whether these policies should be replaced or supplemented with other interventions.

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