Poor diets in Europe: causes and implications for policy

W Bruce Traill¹
University of Reading

Introduction
The interests of agricultural economists have broadened from agricultural production and the policy environment surrounding agriculture, downstream to food and outwards to rural environments, employment and the economy. The role of public policy continues to be a focus of attention in these new areas, in which markets fail to operate perfectly. Diet and health is a classic case where individuals maximising utility and firms maximizing profits combine to produce an outcome that is socially sub-optimal with millions of people consuming foods that ultimately make them unwell, imposing mounting costs on taxpayers through national health care systems and sick-pay. Obesity is the most visible manifestation of the problem, a direct consequence of energy imbalance (too much food, too little exercise), but diet quality matters too—western societies consume too little fruit and vegetables and omega-3 fatty acids, too much saturated fatty acids, trans fats, salt and sugar.

Externalities imposed by unhealthy eating have led public health officials and the media to talk about an obesity epidemic and warn that health care systems will be overwhelmed unless present trends are reversed. Governments are responding with a range of measures intended to persuade and cajole people to lead healthier lifestyles and firms to offer healthier foods at affordable prices. So far there has been a notable absence of success in reversing obesity prevalence trends, though diet quality has improved in Northern Europe (while worsening in the South). The enormity of the problem and lack of policy success to date, combined with a growing emphasis on evidence-based policy-making, demands a better understanding of what policies work and this in turn demands an understanding of the causes of poor diets.

Some stylised facts
Beginning with obesity and concentrating on developed countries, the evidence is that the epidemic began in the 1980s (arguably earlier in the US) since when there have been sharp increases in prevalence in all countries. The trend in prevalence of overweight is less clear but overweight and obesity combined has reached over 40% of the adult population in most OECD countries (Figure 1). Despite this consistent time trend, there are large differences among countries which appear structural rather than associated with stage of the epidemic. Anglo-Saxon countries lead the way with generally 50-60% of their adult populations overweight or obese, whereas Japan and Korea are near 20%. Northern and Southern Europe occupies an intermediate position, though with anomalies: Greece and some of the East-Central European States approach anglo-saxon levels. Mexico surpasses even the US in the fat stakes. Another anomaly is that children in

¹ This paper draws heavily on a recently published book, Mazzocchi, Traill and Shogren (2009). My thanks to the two co-authors of the book who are responsible for many of the ideas and analysis presented in the paper, but errors are my own.
Mediterranean countries have a higher prevalence of overweight and obesity than their Northern counterparts (Figure 2), though data may be less reliable.

**Figure 1a: Overweight and obesity in men 15-64 (age-standardised)**

![Graph showing overweight and obesity in men 15-64](image)

**Figure 1b: Overweight and obesity in women 15-64 (age-standardised)**

![Graph showing overweight and obesity in women 15-64](image)

*Source: OECD (2009)*
The indications are that BMI probability distributions have shifted to the right in most countries (not Italy), with most of the population becoming heavier (Figure 3), though the tail of the distributions within countries has also become ‘fatter’ with a growth in prevalence of the very obese; the fat are becoming fatter faster than the population at large (Mazzocchi, Traill and Shogren, 2009; OECD 2009). Analysis of cross-section data within countries shows overweight and obesity to be most prevalent among socially disadvantaged groups with lower levels of education, lower income and lower socio-economic status (Figure 4). The differences are most notable among women. Disadvantaged groups also show higher prevalence of smoking, alcohol and drug abuse.
For diet quality, the time series are longer and the evidence more consistent: since the 1960s there has been a convergence of Northern and Southern European diets (Schmidhuber and Traill, 2006; Mazzocchi et. al. 2008). At the beginning of the period the South consumed a healthy diet with an abundance of fruit and vegetables and fiber but low levels of saturated fatty acids and sugar while the North consumed too few of the former, too much of the latter. By the end of the period, while differences remain, the North has moved much closer to healthy eating while diets in the South have become much less healthy (though Italy is better than most—Figure 5). This has been put down to convergence of incomes, food systems and preferences in an era of globalisation.

Source: Mazzocchi, Brasili and Sandri (2008)
Explanations for Poor Diets: Rational Choice

Traditional (neo-classical) economics begins from the principle of consumer sovereignty. A household production model framework recognises that food consumption decisions affect consumer utility both directly (pleasure from eating and drinking) and indirectly (adverse health consequences of unbalanced diets and overeating). It is reasonable to think that an informed person takes her consumption decisions after balancing the pros and cons. Competition for limited household time constrains the amount of food preparation and exercise people are willing to undertake (Becker, 1965). Foregoing the immediate pleasure of eating, or suffering (for some) the immediate displeasure of cooking or exercising must be balanced against possible health benefits a long time in the future, so these decisions also depend upon preferences – the time preference or discount rate. Risk aversion also plays a role in determining the extent to which people are willing to gamble with their health.

This rational, utility-maximizing model of behaviour is the basis of the conventional wisdom among economists (e.g. Finkelstein et al, 2005): the primary causes of increased obesity are technological change which has brought down the price of food relative to other goods and notably the price of processed foods and meals away from home (these are generally more energy dense); rising incomes which have enabled people to purchase more food whilst the expenditure share of food has still fallen; reduced household time thanks to increased female labour force participation; and household technology advances which further reduce meal preparation times. Developments in medical technology may also be important: since the emergence of the obesity epidemic, deaths from obesity-related diseases such as heart disease, stroke, and diabetes have fallen sharply, so obesity has become less dangerous and normal rational people need be less concerned on health grounds about gaining weight; excess weight is a rational outcome of people’s balancing their individual risks and benefits. This paper focuses on the energy-in side of the energy balance equation, but technology and economic development have also reduced necessary energy expenditure with a sharp decline in manual labour and reliance on cars (and associated supermarket shopping) rather than feet for travel and shopping.

According to the rational choice paradigm, obesity-inducing lifestyles are just an adaptation to external factors, preserving the overall goal of maximizing utility. If one wants to decrease obesity or improve diet quality because of its externalities, it is the external conditions that would have to be changed – food prices, prices of medical care, (also the cost of sport and recreation activities).

While the standard economic model of demand is reasonably convincing at explaining trends, it is more difficult to explain cross-country differences in obesity, though cultural differences in attitudes to food, obesity, risk aversion and time preference are likely important. Good empirical analysis has been handicapped by a lack of detailed time-series data in all but the US and lack of comparability of data across countries (Loureiro and Nayga, 2005; Mazzocchi and Traill 2009).
Limits to rationality—market and behavioural failure

Imperfect and asymmetric information are standard examples of market failure particularly relevant in the diet and health context. Especially when buying processed foods people are unable to judge levels of saturated and trans fats, sugar and salt. The food industry is said to over-use these ingredients as they contribute to flavor, processing functionality, and are relatively cheap. Nutritional labeling (of processed foods and, potentially, meals eaten out), is the obvious policy response but, to be effective, requires a high level of nutrition education and a willingness to devote the time when shopping to reading and reacting to labeling information. Recent ‘front of pack’ schemes (e.g. traffic lights) are an attempt to overcome the latter problem, nutrition education in schools is proposed to encourage the ability to choose a healthy diet and standards are a possible response if people remain unwilling or unable to make informed choices. Standards may be compulsory, but governments have been more inclined to work collaboratively with industry to voluntarily reduce levels of ‘harmful’ nutrients. Firms may benefit if they are able to promote these products as healthier than competitors’ offerings.

Economic models have been extended to incorporate habitual behaviour and addiction (e.g. Becker and Murphy 1988; Becker 1962), both relevant to food choice, but empirically unproven and controversial. Another adaptation of the economic concept of rationality was the bounded rationality approach proposed by Simon, 1982, which recognises the complexity of everyday decisions and suggests people use simplified decision criteria (heuristics) which may be a response to the costs of obtaining full information and result in people choosing from a sub-set of possible alternatives, for example relying on brand reputation to limit their choice set. Policy-makers can also take advantage of bounded rationality, for example promoting the heuristic that healthy eating equates to consuming more fruit and vegetables.

Neo-classical economics postulates discounting of future costs and benefits in a consistent manner whereby, although individuals’ discount rates may differ from one another, they are invariant over time. However, behavioural economists have shown this not to be the case; for example Shafir (2008) argues that people may prefer one apple today to two apples tomorrow but prefer two apples in 31 days to one apple in 30 days. It has been suggested that the observed inconsistencies in discounting represent a problem of self-control, the inability of some people to resist immediate gratification (called hyperbolic discounting in economics). The temptation afforded by cheap, convenient, delicious but unhealthy food and drink leads some people to make choices they will later regret and to postpone adopting a healthy eating and exercising regime (Cutler, Glaeser and Shapiro 2003). This interpretation also points to a solution, commitment, that individuals or policy makers can employ. For an individual, announcing an immediate diet or exercise regime to friends and colleagues increases the (psychic) costs of giving in to temptation and continuing one’s present unhealthy lifestyle; policy makers might consider allowing food stamp recipients to make food orders in advance—such choices are more likely to be healthy than those made by the hungry shopper tempted by the instant gratification offered by the boundless (unhealthy) delights on offer in the supermarket (Mancino and Andrews, 2007).
There are many other examples from behavioural economics of divergence from economic rationality, including the importance of self-identity, cognitive load, cognitive dissonance and framing (how information is presented rather than its content alone) in influencing choices – all drawing on concepts borrowed from psychology.

As a relatively new science behavioural economics remains controversial, particularly in relation to its policy implications. Frijters (2008) summarises the problems: according to behavioural economics people do not know what they want, who they are, where they come from and where they are going, they can’t work out anything complex so rely on emotions but don’t want to be told they are stupid so resist information at odds with their established beliefs. He argues that, given our present understanding, we do not know how to incorporate these various behavioural irregularities into models of choice or policy advice. We do not even know which are important and there is a danger they will be used to justify interventionist policies that are not evidence-based.

Psychologists’ models such as the Theory of Planned Behaviour, recognise the importance of social norms (what friends, family and significant others expect of us) as an influence on behaviour. Influencing purchases directly through manipulating preferences and indirectly through manipulating social norms are seen as appropriate policy tools and social marketing is the most widely used policy instrument (e.g. 5-a day, salt reduction). Economists have difficulty comparing welfare implications when utility functions change, but can hardly argue against the outcome if people choose a healthy diet because it maximises their new utility function. The relevant policy question is whether the costs of the intervention are greater or less than the value of the public health benefits. It is widely assumed too that children are more susceptible than adults to persuasion by clever advertising and are more influenced by peer pressure; the advertising of junk foods is widely blamed for poor diets of children—from which the policy response to ban junk food advertising to children automatically flows.

Psychologists, nutritionists and public health researchers have identified a range of other behaviours that are at variance with economists’ notions of rationality. These are often observed in the context of controlled experiments, notably the observation that people eat more when offered larger portions of packaged or restaurant food (Nestle 2000), leading to calls on industry to reduce portion sizes. The problem is that outside the controlled environment people may compensate for their earlier behavior; the evidence of secondary data provided by Cutler, Glaeser and Shapiro (2003) supports this view, suggesting calorie intake in the US has increased because people snack more rather than eat larger portions during regular meals.

Finally, the supply side of the equation should be mentioned. It is widely believed, primarily by non-economists, that people eat what is made available to them rather than that producers make available what people want to eat. Studies are quoted that show people eat more fast food in areas with a higher density of fast food restaurants, more processed foods when shopping in supermarkets, more junk food when it is readily available in vending machines, more calories when food is presented in larger portion
sizes and that people in deprived areas do not have access to fruit and vegetables, hence their low consumption of these products. Economists may counter that firms respond to market signals and establish restaurants and supermarkets where there is a demand for their products, so it is not surprising to find high consumption associated with high density of restaurants/stores. Similarly, larger portion sizes are a competitive response to consumer demand. Larger portions also tend to have a lower unit price (and a markedly lower marginal price, so when choice is available it is rational that the larger portion size would be chosen). Lower unit prices may reflect lower costs or market power. Some have suggested this too could be regulated (Which? 2009).

There are not always markets, for example in schools (hence the demand for governments to set standards for healthy school lunches), hospitals and even in workplace canteens. Even when choice is possible, making the unhealthy choice inconvenient (e.g. banning vending machines in schools) may be effective. ‘Choice editing’, for example supermarkets selling only fair-trade coffee or refusing to sell GM food, can have a dramatic impact on consumption when people have no strong preferences which would drive them to seek an alternative outlet selling their preferred food.

**What is the evidence base to support evidence-based policy making?**

At the macro level (national/regional) which interests economists, policy making in relation to diet and health is relatively new so the evidence base for what is effective is limited; evaluation is complicated not only by the paucity of policies but the difficulty in obtaining relevant data. Obesity is particularly troublesome because a policy intervention targeting and successfully changing energy input or output takes several years before people’s weight reaches a new equilibrium; during such a period a host of uncontrollable factors inevitably confound identification and measurement of policy effectiveness. Economists’ best natural experiments may be cross-sectional where different policies have been employed in populations which are, in other respects, approximately homogeneous or where other factors can be controlled, such as the States in the US or Provinces in Canada. Failing that it may be more realistic to measure the impact of interventions on food consumption where some measures, for example taxes, might have a rapid impact, though even here there is likely a distributed lag in response. Policies that rely on changing attitudes, for example social marketing, may take very much longer for their effects to fully feed through, smoking being a prime example.

In cataloguing policies a useful starting point is the classification in Mazzocchi, Traill and Shogren (2009), reproduced below, which defines measures as market or information oriented.

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2 A Robert Wood Johnson (2009) issue report presents many examples of increasing portion size in the US, notably 20 years ago a typical coffee was 8oz which with milk and sugar contained 45 calories, today a typical coffee, a 16 oz mocha with milk and syrup contains 350 calories. The calories in a typical Caesar salad have also doubled to 790.
Table 1: List of nutrition policy instrument classified by type of intervention

<table>
<thead>
<tr>
<th>Policy instrument</th>
<th>Immediate Objective*</th>
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<tbody>
<tr>
<td><strong>Information measures</strong></td>
<td></td>
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<tr>
<td>Information campaigns</td>
<td>Increase consumer awareness and influence attitudes</td>
</tr>
<tr>
<td>Advertising regulations</td>
<td>Limit/ban advertising of unhealthy foods (especially when targeted to children)</td>
</tr>
<tr>
<td>Nutritional education programs in schools</td>
<td>Increase awareness and knowledge of nutritional requirements and health consequences</td>
</tr>
<tr>
<td>Labeling rules</td>
<td>Promote informed choice by signposting healthy and unhealthy nutrients</td>
</tr>
<tr>
<td>Nutritional information on menus</td>
<td>Promote informed choice in eating-out situations</td>
</tr>
<tr>
<td>Regulating health and nutrition claims</td>
<td>Define rules and monitor the use of nutrition and health claims in promoting and labeling food products</td>
</tr>
<tr>
<td><strong>Market intervention measures</strong></td>
<td></td>
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<tr>
<td>Tax on unhealthy nutrients or foods</td>
<td>Reduce consumption of unhealthy foods</td>
</tr>
<tr>
<td>Price subsidy for healthy nutrients or foods</td>
<td>Increase consumption of healthy foods</td>
</tr>
<tr>
<td>Regulate liability of food companies</td>
<td>Monetize negative externalities of production/sale of unhealthy foods</td>
</tr>
<tr>
<td>Food standards</td>
<td>Setting nutritional standards for processed products to limit the access to unhealthy nutrients or promote consumption of beneficial nutrients</td>
</tr>
<tr>
<td>Facilitating access to shopping areas for disadvantaged consumers</td>
<td>Address the issue of store dispersion in low-income areas by facilitating access to supermarkets for disadvantaged categories.</td>
</tr>
<tr>
<td>Regulate catering in schools, hospitals, etc.</td>
<td>Improve the nutritional profile of meals, especially those under public control</td>
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* Final objective of all interventions is to improve diets and/or reduce obesity to improve public health

Information measures have been the most frequently used. Nutrition labeling is ubiquitous in Europe and new EU legislation governs health claims. Social marketing is becoming commonplace, notably in promoting fruit and vegetable consumption but also reducing salt consumption; and advertising restrictions to children are gaining popularity. The HOPE project (2009) identifies school catering as the healthy eating measure mentioned most frequently in policy documents in Europe.

**Information measures**

The evidence on information measures, summarized in Mazzocchi, Traill and Shogren (2009) is that social marketing is more effective at changing attitudes and awareness than behavior; private advertising does have an influence on children’s food consumption (by category as well as brand), suggesting that banning junk food advertising to children should improve their diets; nutrition labeling is a necessary condition for informed choice and does influence shopping behavior (Grunert and Wills, 2007), but may have perverse outcomes if healthy options are shunned because consumers anticipate inferior
taste; education (knowledge) is weakly positively associated with healthier eating (Kan and Tsai 2004) but, unsurprisingly, is more effective when targeted at the obese than normal weight people. Some implications:

- if uninformed or uneducated people overestimate the risks of unhealthy diets they may respond by eating less healthily once informed and educated. There is no \emph{a priori} hypothesis to specify which direction the response would be. It is unsurprising that most researchers find weak empirical relationships between information, education, and diets. However, information is valuable because it enables people to make informed choices even if it does not improve their diets.

- information measures are intended to enable people to make private decisions that maximize their individual welfare. If the problem with obesity is the externality by which medical and productivity costs are imposed by the obese on the rest of society, these measures will provide the whole solution. Most people do not consider social welfare when making private decisions.

- it is desirable to examine policy effectiveness by population quantiles rather than estimate a mean response. For example, one might expect information on the health risk of obesity affects those most at risk; that is, overweight and obese persons more than under- or normal-weight ones.

- More generally information measures should be targeted, which involves identifying what motivates specific groups of consumers’ diet choices. For example, Traill et. al (2009) find young people who, we have noted, eat least healthily, are more motivated by the impact of their behavior on their appearance than health—thus the genius of the Danish ‘6 a day’ campaign which promotes fruit and vegetable consumption as a means to improve sexual attractiveness. Likewise efforts to increase fruit and vegetable consumption would be advised to identify factors or groups with lowest intakes since they are most likely to benefit from enhanced consumption. Unfortunately Boukouvalas et. al. (2009) find no discernable characteristics of low fruit and vegetable consumers, who exist in all socio-demographic groups.

- it is important when evaluating information interventions that account is taken of market forces. If supply is inelastic, higher demand leads to higher prices rather than higher consumption, which might worsen health inequalities (Mazzocchi et. al. 2009).

\textbf{Market intervention measures}
Direct use of taxes and/or subsidies to promote healthy eating appeals to economists and has begun to be more openly touted as a politically feasible option, notably the debate in the US about soda taxes (soft drinks have been closely linked to obesity and taxing high calorie soda could be expected to induce a switch to low- and calorie-free versions which are close substitutes).
Taxes and subsidies are mechanisms to make consumers pay the true social cost of their food. The direct economic effect of a tax is that consumers lose welfare because they pay higher prices and consume less of the taxed goods than they would at market prices. Producers also lose revenue because they sell less and at a lower price. These losses are balanced by a gain in tax revenue and a gain in public health (the objective of the intervention). For subsidies the situation is reversed: consumers, producers and public health all gain, but the taxpayer loses because the subsidy must be paid.

Low income consumers are most responsive to prices—their price elasticities are higher than those of wealthier consumers. This implies they would bear a greater share of the tax burden and receive a lower share of the subsidy—intervention would be regressive. But because low income consumers respond most to fiscal incentives, they would adjust their consumption more than the rich and gain most in terms of reduced health risks; the health benefits of taxation might be progressive even though the economic effects are regressive.

Mytton et al. (2007) investigate extending Value Added Tax to certain categories of food. They employ own and cross-price elasticities for foods from the existing literature and combine the implied consumption effects of the tax regimes with data from the literature showing the effects of intake of different fatty acids on cholesterol levels, and the impact of this and salt intake on the annual numbers of stroke, ischemic heart disease and coronary heart disease deaths. They conclude that small health benefits can be achieved, but unexpected results are possible; for example they find that taxing saturated fats results in increased salt intake and higher mortality overall.

A study on Danish consumers considers a tax on saturated fats, a tax on sugar, and subsidies on fibers as well as revenue-neutral combinations of these fiscal instruments (Smed et al. 2007). These authors estimate a set of demand elasticities and permit these to vary over 6 age groups and 5 social class groups. They find a modestly sized revenue-neutral combination of taxes on saturated fats and sugars combined with a subsidy on fibers reduces saturated fat consumption substantially, particularly in the two lowest social class groups. Sugar consumption is reduced by a smaller amount but by most in the three lowest social class groups; fiber consumption rises substantially in all social class groups. This is achieved at the same time that the lower social class groups experience a fall in total food expenditure.

Cash et al. (2005) estimate that a 1% price subsidy on all fruit and vegetables could prevent nearly 9,700 cases of heart disease per year in the United States. They calculate the cost of such policy intervention in terms of expenditure per life saved, on average $1.29 million, is below the common evaluations of the value of statistical life which suggests the subsidy would be beneficial for society.

In conclusion, there is growing interest in the use of fiscal measures to improve diets and make the prices people pay for foods reflect their true social costs. There is also a growing body of research which suggests judicious selection of the targets of taxes and subsidies can overcome criticisms of their being regressive and ineffective. We view this
as an important avenue for further economic research which may lead, in future, to real policy implementation. In the US, food stamps were introduced to make sure the poor could afford an adequate diet, but have been accused of contributing to obesity (USDA, 2006) because they encourage increased consumption by disadvantaged groups who would, even without the programme, be most obese in today’s world. It has been suggested such consumer subsidies (vouchers) should be tied to the purchase of healthy foods, perhaps limited to fruit and vegetables. A limited programme was introduced in April 2009 in the UK for women on benefits if pregnant or with children under four. The programme is too young to have been evaluated. VAT on food is applied in some countries, not others, and in some countries it is applied on only some food categories (e.g. UK). In principle differential VAT rates could be applied to ‘unhealthy foods’, for example snack foods or soft drinks, or only ‘healthy’ foods such as fruit and vegetables may be zero rated. Apart from practical difficulties in agreeing what is healthy and unhealthy, VAT rates are probably too low to induce substantial behavior change.

Debates about freedom to choose an unhealthy lifestyle are put to one side when it comes to children and most developed countries intervene to influence food availability to children. It is difficult to separate influences of parents, the environment in general and the school-specific environment to evaluate the impact of school interventions on children’s food consumption, but what limited analysis there has been suggests that the school environment is important, at least for those pupils who, for one reason or another are at risk of weight gain (Anderson and Butcher, 2004; Collins and McCarthy 2005). It also seems that there is an important cultural component to the sorts of interventions that are acceptable, and desirable. It is unlikely the Japanese or Korean approaches which emphasize traditional foods, inside and outside schools would be acceptable elsewhere. Japan has had regulations on school food in force since 1954 which set strict limits on calories from fat in meals, as well as banning vending machines and restricting students from eating or buying food, drinks, or chewing gum while at school or while traveling between school and home (Dalmeny et. al., 2003).

A difficulty with school lunch interventions when lunches are not compulsory is that children (with help from their parents) can vote with their feet and take packed meals instead. A kind of fiscal incentive to encourage children to take healthy school lunches was introduced in Glasgow in 2005 (Fuel Zone, 2009). It rewards them or their schools for participation with points that can be used to buy cinema tickets and electronic consumer products (e.g. iPods). It is reported uptake of school meals has doubled to 60%.

Discussion
In determining whether the obesity epidemic and poor diets more generally merit a government response one must consider: (i) whether poor diets are a result of market or behavior failure or is the result of rational choice by informed consumers and (ii) whether individual decisions impose costs on the rest of society. In both cases cost-benefit analysis is needed to ensure intervention is justified.
Market failure can result from consumers having imperfect information about diet and health or through externalities costs imposed on the rest of society. Evidence suggests poor diets cannot be changed by information policy alone; improved information is essential for informed choice, but may not promote healthier eating. Yet the majority of interventions have focused on information including nutritional labeling, education, advertising restrictions and social marketing. There are several reasons for the failure or limited success of most information policies. First, people already know poor diets have harmful long term health consequences so they do not respond to confirmation of that knowledge (Kuchler et. al. 2005). In fact it is quite possible the harmful effects of obesity have been publicly overstated, at least with respect to the risk of premature death, in which case more accurate knowledge about risks could lead to more obesity. Second, healthy foods may be viewed by consumers as less tasty, so a low fat, sugar or salt label has, in some cases, led to higher consumption of the ‘genuine’ full flavour version (e.g. Teisl et. al. 2001) Third, social marketing, to be effective, has to be well-targeted to provide an appropriate message to those specifically at risk. This implies the need for market research into the values, attitudes and behaviour of the at-risk groups so that appropriate messages can be developed, mimicking the approach of commercial marketers (Stead et al, 2007).

Given unhealthy eating imposes externalities (medical costs/productivity)$^3$ the true social cost of unhealthy diets is not reflected in the market price. The ‘fat tax’ concept has often been dismissed as relatively ineffective because wealthy consumers are not very responsive to food prices; regressive because poor consumers spend the largest share of their incomes on food, particularly ‘cheap’ energy-dense food; and unfair because the tax falls on those who are not obese as well as on those who are. One response to the first criticism is that previous studies have investigated only low-level taxes, usually at VAT rates. It is generally accepted that cigarette taxes have been effective (Goel and Nelson, 2006) and they are applied at much higher levels, as are taxes on alcohol. The evidence suggests that people respond to large incentives. Judiciously chosen the financial burden of fiscal interventions need not fall disproportionately on the poor—who would benefit most in health outcomes from these measures. However judicious use of tax revenue to subsidise consumption of healthy foods (which surveys suggest would be acceptable to consumers) is made difficult by governments’ resistance to the concept of ring-fencing.

Public health analysts believe randomized control trials to be the gold standard in determining what works, but the real world is not controlled in the way of an experiment: notably people modify their behavior in unpredictable ways; and markets balance demand and supply in ways that may moderate the effectiveness of policy (e.g. an increase in demand for fruit and vegetables from a social marketing campaign may raise their price if supply is inelastic).

It is perhaps trite to say we need to further develop the evidence base, but we do. We have seen that we don’t know much with any degree of certainty about what works and

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$^3$ This is not universally accepted—there has been some conflicting evidence on the lifetime medical costs of poor diets if overweight people die younger and more quickly, but the balance suggests higher lifetime as well as annual medical costs of obesity.
what doesn’t. In this regard we have high hopes for a new EU funded project EATWELL\textsuperscript{4} whose goals include reanalyzing food consumption data to assess the effectiveness of past interventions where possible. In the meantime, we can identify some preliminary basic findings.

As we begin to come to terms with the causes and consequences of unhealthy diets and the effectiveness of measures to improve public health through better diets, the goal-posts are shifting. Sustainability has become a major issue for policy makers concerned about climate change, water shortage, fish stocks etc. Calls in the UK are for sustainability labeling, sustainable as well as healthy government procurement and the encouragement of consumers to purchase a ‘low impact’ healthy diet. Developing the evidence base for a new range of interventions should keep economists in work for some years to come.

\textsuperscript{4} An FP7 project with full name Interventions to promote healthy eating habits: evaluation and recommendations. The project, co-ordinated by the author at the University of Reading with partners in Italy, Denmark, Belgium, Poland and Germany, began in April 2009.
References:


Fuel Zone www.fuelzone.co.uk


