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# **The use of economics in the evaluation of nutritional problems and policy**

by Tim Ensor

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**THE USE OF ECONOMICS IN THE EVALUATION  
OF NUTRITIONAL PROBLEMS AND POLICY**

**by**

**Tim Ensor**

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## The Author

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## SUMMARY

Nutrition has recently assumed a far greater importance as individuals are increasingly concerned with what they eat. Environmental and global issues has stimulated a growing awareness about the effect of chemicals and intensive farming methods while on an individual level growing affluence has meant that price is no longer of upmost importance to many consumers who concentrate instead on the variety and dietary quality of food. At the same time the poor, both in the industrialised economies and in LDC's continue to find it difficult to maintain basic nutritional levels. This is despite the expectation that agricultural technology could relieve such problems. There are therefore important nutritional issues to be addressed both of quality and quantity and how these affect health status, productive capacity and individual welfare.

Economists have contributed to this evaluation by analysing nutritional problems both of quantity and quality. A framework within which nutrition policy is evaluated can be constructed from economic theory that considers the possible justifications for intervening in markets and the methods of undertaking such action. The aims of this review are: firstly, to show how economics has contributed to the study of nutrition; secondly, to examine how an economic framework can be used to analyse the efficacy and desirability of policy intervention; and finally to look at potential areas for further study.

## INTRODUCTION

Nutrition concerns have recently assumed a far greater importance as individuals are increasingly concerned with what they eat. This review has two main aims. Firstly to show how economics has already contributed to the study of nutrition. The literature looked at is necessarily selective and examines the demand and supply of nutrition, together with its impact on productivity. Studies from both developed and developing countries are examined in order to demonstrate the differences in issues as well as to highlight some of the similarities.

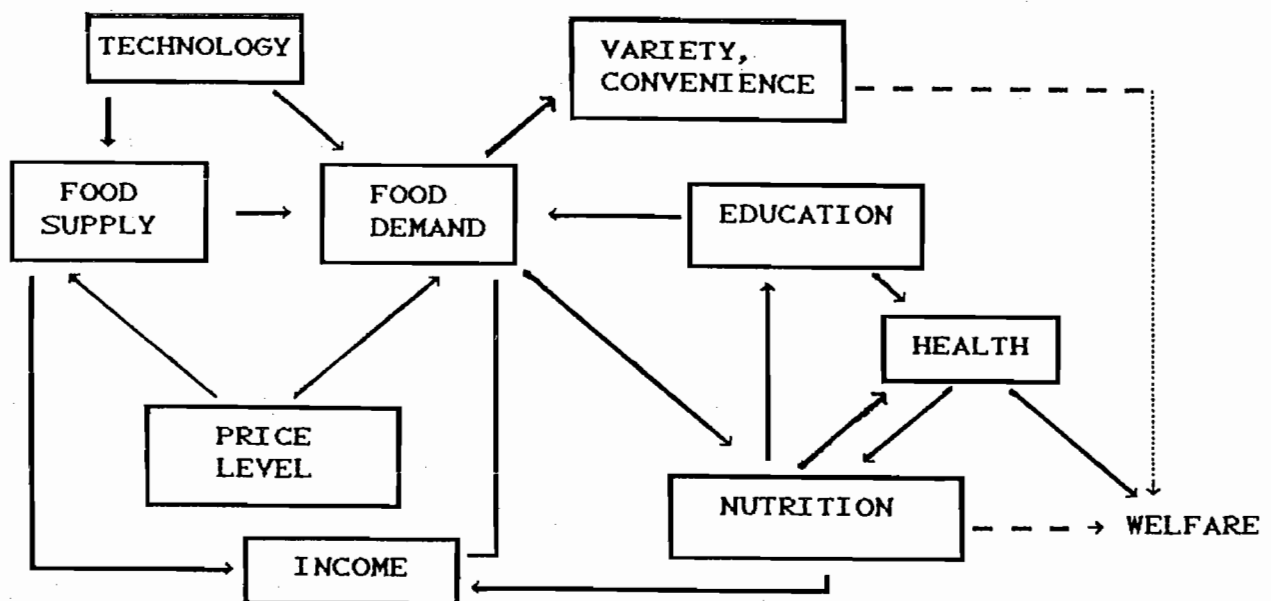
The second purpose is to demonstrate how an economic framework might be used to analyse the efficacy and desirability of policy intervention. This section is aimed primarily at the UK though much of the theory discussed has application to policy in other developed economies. The discussion raises many issues which could be examined in future research some of which are discussed in the conclusion.

An economic approach to nutrition defines the way in which the pattern of resource distribution and price incentives influence the standard and variety of nutrition within a population. At the simplest level it can be viewed as a process whereby food is produced, marketed and eaten by consumers, subject to a number of economic variables such as price and income and social variables such as age, sex and class. Nutrition is far more than food consumption, the correct balance being made up of a large number of different elements, the requirements for which vary with age, climate, sex and occupation. It is all too easy to dilute these complex processes into one simple indicator of nutritional status, such as food or calorie consumption and it is perhaps this approach that

Dwyer and Mayer (Mayer & Dwyer eds, 1979) are alluding to when they criticise economists for having too narrow a perspective. Economics does have more to offer the study of nutrition than simply a description of how calorie consumption relates to national income.

The main function of economics is to provide a framework within which the various interactions that contribute to nutrition can be assessed; this is illustrated in the diagram. It shows some of the different markets that determine the resources that are allocated to nutrition which will be considered in more detail in the first two sections.

An Economic View of Nutrition



The first of these is the demand for food, clearly an important element of nutrition. Poor nutrition might stem either from an inability to purchase sufficient food or from a choice about food preferences that takes into account other characteristics of consumption. Preferences may also arise from a lack of product information and this will be examined in the policy section. On the supply side the connection between a good diet and productivity is examined together

with the impact of new technology upon producers. The interaction of supply and demand determines final consumption levels, with prices varying to ensure that the two are equal. The nutrition market also has important connections with other markets such as education and health.

## 1. NUTRITIONAL DEMAND

At the microeconomic level demand analysis is used to examine the pattern of food consumption and its contribution to nutritional or other requirements. Conventional economic theory usually analyses the behaviour of a consumer in terms of welfare or utility. Goods a consumer is endowed with (inherited assets and labour) can be brought or sold in order to achieve the highest possible level of welfare. Central to the analysis of consumption of a good is a discovery of the determinants of demand. Typically these will include the price and income level of the consuming individuals but also other characteristics such as age, sex and occupational class thus building up a picture of tastes (Thomas, 1972). It will also include the effect of health education or awareness upon demand patterns.

This relationship can then be used to discover the effect on demand of a change in these factors. If demand changes a great deal in response to these factors then it is termed elastic; if it changes only a little it is inelastic. The notion of elasticity is crucial to a full understanding of the effects of policy changes and external shocks. Additionally the price of one product has an impact upon the demand for another if the two are partial substitutes or complements. In the former case the demand for one food rises as the price of the substitute increases, an example being margarine and butter. In the latter case a rise in the price of one food leads to a fall in demand for the other good,

an example here being Turkey and Cranberry sauce! Reducing prices of those foods that are considered beneficial may lead to a rise in demand for both healthy and unhealthy foods. The nutritional and health consequences are thus ambiguous.

It is important to realise that all these effects act together when considering the impact of policy. For example if demand is price inelastic then raising its price, through taxation, will not deter consumption very much. However the use of demand models is not restricted to pricing policy. By discovering the impact on demand of health education or industry advertising, the researcher can discover to what extent consumption is deterred or promoted by these actions and thus determine policy effectiveness and cost efficiency. Additionally if only consumption is examined it might be observed that the policy of reducing fat consumption has failed since overall levels have remained stable. However a full demand analysis might show that while the health advice was being heeded, the simultaneous rise in incomes led to a rise, *ceteris paribus*, in consumption ensuring that levels stayed constant. Other policy options can also be analysed within the context of such a model though consideration of the supply side is also needed in order to evaluate the response of producers to a particular policy. For example, to what extent producers absorb or pass on to the consumer the cost of any improved product labelling enforced by legislation.

The scope for this type of analysis is limited, to the extent that nutrition is derived from particular nutrients and food may have other characteristics such as convenience or taste that affects consumers choice. It would seem appropriate to move analysis away from the simple estimation of food demand towards the demand for nutrients in order to study patterns of poor nutrition and overnutrition (though the later is frequently a function of the former). Other demands might be considered such as the demand for nutrients and this is

what is examined in the demand for diet variety, section 1.2. The human capital literature of section 1.3 examines the offsetting choices a consumer may make in deciding between a good and an enjoyable diet. Before this it is important to realise that food is a basic need in much the same way as health care is though perhaps even more important. This is where the theory of exchange entitlement provides useful insights into nutritional inequalities. Though this is presented as a demand issue it is more properly the interaction of demand and supply for food which leads to a certain demand for nutrition.

### 1.1 Exchange Entitlement

Classical economic theory traditionally views goods as having similar properties of substitution. Thus a rise in the relative price of one good is likely to precipitate a substitution towards cheaper alternatives. As such no good is absolutely necessary, though varying elasticities of demand do allow for the fact that some are more necessary than others. The exchange entitlement literature (Sen, 1981) recognises that though, at high levels of income, a fair degree of substitution exists between necessary goods, at low levels some goods may assume a pivotal position in household expenditure.

Where as Sen looks broadly at food, Desai (1984), in an effort to present Sen's model in a more general framework, made a narrower comparison between two types of food, fish, which might be considered as a relative luxury, and rice, the necessity. The main argument is that because of its relative abundance rice can give more calories or nutrition per dollar than fish. The point of exchange entitlement is that a rise in the relative price of rice means that many are no longer able to satisfy even their basic nutritional requirements, since the fish traders are unable to trade fish at a price that would ensure they had this

minimum (assuming they cannot live on fish alone). A position of no exchange then arises amongst some sections of the community.

In such a situation it is quite conceivable that a situation of food availability or, as in the case of the Irish potato famine, food exports, could co-exist with famine. Sen himself cites the case of the 1943 Bengal famine when a situation of industrial expansion in the urban areas, in support of the war effort, co-existed with rural poverty and starvation. Urban wages were guaranteed, in real terms, so that the subsequent rise in food prices arising from the boom effected those without exchange entitlement over the pivotal food commodities. These included all those unable to exploit the rising food prices such as the landless labourers. It is thus quite possible to have a relatively prosperous, but unlanded, group suffering as a result of famine as their production declines in value but food prices rise, while those on low incomes but with access to land or basic food do not suffer.

Rangasami (1985) has developed, rather than refuted, the Sen model by observing that nutritional requirements are not rigid in the short run, and that it is quite possible for individuals to survive on only 50% of their recommended calorie requirement for quite a while. Kula (1988) criticised the theory, arguing that it is usually some external influence, which leads to food availability decline, that is the cause of famine and not so much the shifts in entitlement. This, however, is to misunderstand the situation since there must be some exogenous shock that lead to shifts in entitlements in the first place. This may either be supply or demand induced. Indeed Kula cites the case of a war situation which is at the heart of Sen's own analysis, an example of boom conditions leading to famine rather than the conventional view that it is caused by economic depression.

The conclusion is that households ability to withstand famine depends less upon the availability of food and more upon the type of arrangements that exist to ensure it is still able to afford basic nutrition. This situation is highlighted by a reporter from Oxfam reporting from a famine situation in Burkino-Faso. He describes a redundant famine in one village but where "just three miles away from the village was a town where there was plenty of food..if you had money to pay for it" (Chris Brazier in New Internationalist, September 1985). The study of entitlement also raises wider policy issues about the efficacy of famine relief. Crucially there may be a trade off between short run help to prevent starvation and the longer run dependency that such aid creates, as indigenous food producers are unable to maintain production given high costs and the relatively low price induced by food aid (see Cassen, 1986). In this situation there is even a collapse in the entitlement of those with land producing food.

Thus by analysing how different groups are effected by changes in relative prices, it is demonstrated how poor nutrition is more often caused not by lack of food but by the inability to demand it.

While exchange entitlement is mainly of value to developing countries there may be some merit in using the theory to consider the command over food of low income groups in the UK. The Health Educational Authority (1989) recorded the reactions of low income households to changes in perceived nutritional patterns. This revealed that a poor diet, as well as being connected to educational levels, is also closely related to the inability of low income households to purchase cheap food, accessible to higher income groups, because of the need to travel to the supermarket. The alternative is low choice and higher price local stores. Crucially different groups are affected in different ways by changing food

production, distribution and consumption patterns in a similar way as in developing countries, though for different reasons.

## 1.2 Diet Variety

While satisfying basic calorie requirements may be the over-riding consideration in developing countries, diets in the developed world go far beyond this basic need for survival. If this were not the case the amount spent on food would be unlikely to rise once the society had reached a basic calorie consumption. Silberberg (1985) discusses the approach, first used by Stigler (1945), that examines the demand for meals rather than for the nutrients or foods themselves. He argues that as income levels rise the proportion of expenditure spent on pure nutrition falls while the value of food as a consumption good in its own right (and over and above its nutrient value) rises. As with the productivity literature a production function approach is used which describes how an output reacts to changes in the basic inputs. This is extended by Shonkwiler et.al. (1987) in examining three characteristics of meals, the number, the quantity of food in each and the quality of the meal. As might be expected the quality is a luxury element of the function once basic calorie levels have been satisfied. As income levels rise so does the demand for variety, a result supported by Lee (1987) who shows, additionally, that variety increases with household members but at a decreasing rate.

An issue not discussed in these studies is whether the demand for variety and non-nutritional dietary elements might ever conflict with the basic nutritional quality of the diet. This is partially addressed by Shah (1983) who finds that in order to make the diet more exciting individuals are willing to trade nutritional quality for variety even at fairly low income levels. Consequently

attempts to raise nutritional levels by increasing real income may not alleviate poor nutrition as individuals prefer instead more palatable but less nutritious diets, such as hamburgers or chips, when they are able to afford them. This may be especially true for those on low incomes where food might be regarded as a cheap form of pleasure, as those on higher incomes gain satisfaction from more expensive pastimes and so are more willing to eat healthier foods. Policy in this case should, Shah suggests, be aimed at improving the palatability of good food so that more is consumed. This shows the importance of correctly evaluating the economic variables that determine the characteristics of health and nutrition. Diet and highly processed foods clearly possess a convenience and leisure value that override their nutritional value and expense. This point will be returned to in the next section.

### 1.3 Human Capital theory

Human capital theory looks at the demand for health, examining to what extent an individual invests in his future by consuming such things as health care and good nutrition. The individual may for example choose to run down his or her health stock in order to increase his income for present consumption (Cropper, 1977). Thus those on low incomes might trade health for wealth by going into relatively highly paid, but more dangerous, occupations such as coal mining. In the nutrition field the individual may decide to sacrifice good nutrition, which increases his health stock, for immediate consumption, say fast food, if alternative, but healthier, pleasures demand a greater amount of resources (Muurinen & Le Grand, 1985).

Actual studies in this field are, however, scarce and more general references refer mainly to investment and dis-investment in health stocks. There are some

human capital nutritional studies in developing countries. For example Khan (1984) examines how households may be plunged into a vicious circle of poverty whereby poor nutrition leads to poor health which leads to time off work, lower income and a lower command over a good diet. The model is tested on data from Bangladesh economy and it is shown that investment in education on health and nutritional standards can lead to a better use of the household's capital stocks thus releasing the individual from the vicious circle. However little has been written on nutritional choice in developed countries and there is scope for further work on the use of human capital theory in explaining the present resilience of some groups to change their dietary references.

## 2. NUTRITIONAL SUPPLY

The other side of the nutrition market is supply and a major contributor to this is the food industry. Economists frequently analyse an industry with reference to three categories. Firstly its structure; how many firms in the industry, the overall size of the market and the number of brands of a particular product. Secondly its conduct. This examines how a firm reacts to other firms, whether they act competitively or together to set production thereby maintaining its price. These issues are extensively discussed in the literature on oligopoly (an industry with a small number of firms) and reviewed in Schmalensee (1988). Finally, performance indicators where such things as the level of profit and production the firms manage to achieve and the size of the labour force they employ are examined. A full analysis of the nutrition or food industry in these terms has not been attempted but it is possible to produce some picture of the composition of the industry. In many ways the conventional paradigm is inappropriate because of the great complexity of the food industry and its emphasis, anyway, on food as the exclusive component of nutritional supply.

Food production is made up of three distinct industries; the agricultural industry, the food processing industry and the retailing industry. The structure of these are very different. Whereas the agricultural industry is made up of a large number of competing firms whose price is supported by policies of the Common Agricultural Policy, the food processing industry and increasingly the retailing industry is dominated by a small number of firms controlled by some of the worlds largest multi-national conglomerates. For example, of the top 25 companies listed in the Times 1000 industrial companies (1989-90), five were food retailers or producers. While the five firm concentration ratios (percentage of output produced by the top five companies) are rather less than in the 99% in the tobacco industry, they are still quite high with, for example, 70% for fish processing and 64% for ice-cream and sugar confectionary (Census of Production, 1987).

In terms of conduct there is evidence that the industry is becoming less concentrated. All food categories have experienced a fall in the concentration ratio since 1980. Vegetable processing has fallen from 39% to 33% while meat processing has fallen from 32% to 26.5%. This suggests that the industry is becoming more competitive though the recent takeovers, for example Rowntree by Nestle, might indicate otherwise. The interests of the parent companies that own these firms are diverse. The UK's biggest company, Unilever, has interests ranging from detergents through to ice-cream. Unilever, in common with many other food processors, has also endeavoured to vertically integrate many of its product lines. It has, for example, interests in cocoa, tea and palm-oil plantations which it then processes to become chocolate, tea bags and margarine. Where the market is not vertically integrated the small number of buyers of raw materials, compared to producers, mean that the food market is largely

monopsonistic in that producers must compete with each other to sell their product to a few large firms. The output of these products is diversified into a large number of different, but similar, brands all of which are aimed at their own niche. Because of the uncertainty about their acceptability large numbers of such brands are launched most of which fail to capture a significant part of the market and are subsequently withdrawn (see Glaister, 1974). Therefore it is probable that whereas farmers do suffer as a result of changing nutritional patterns the industry can diversify in order to prevent profits falling.

The retailing industry is also becoming more concentrated and it is noticeable that Gateway, Marks & Spencer, Tesco and Sainsbury are all among the top 25 companies. These companies retail many products under their own brand label thus bringing an extra value added element to such products with a guarantee of good quality at a low price. One possible research area here is to discover to what extent manufacturers react to consumer preferences, as in the demand for a varied diet literature referred to earlier, and to what extent they lead them. This is a perennial question in industrial economics, yet one that would appear especially pertinent given the brand proliferation apparent in the food industry. Certainly there is scope for a full study of the nutrition industry since little work has been aimed at putting the food industry into an industrial economics context and its diversity and complexity makes this an especially challenging task.

## **2.1 Green revolution and technology**

An economic study of the supply of nutrition enables the consideration of the effects of new technology upon nutrition availability. In recent months a great deal has been said about the impact on food provision of

genetically engineered strains of seed. It is now possible, through a variety of techniques, to change the genetic structure of a grain in order that it can withstand certain pesticides or even kill certain types of insect (Prentis 1984). General spraying then becomes possible without killing the crop that the chemical aims to protect. Many other strains are also planned. Publicity, by chemical manufacturers, has centred around the possibility that such strains might be used to reduce or eradicate the incidence of world famines.

Economics has a role to play in evaluating such claims and particularly in examining the impact on food markets. For this task economics literature on the previous agricultural miracle, the Green Revolution, might prove valuable. In this case new strains of seed were bred (rather than engineered) that were capable of taking greater quantities of fertilizer without toppling over, that allowed a shorter growing season and that maximised the photosynthetic activity of the leaves. While production has indeed risen in many countries those on low incomes have often benefited little from the new technology (Bliss & Stern, 1982). A number of studies have tackled this problem (Falcon, 1970; Lipton 1978) by examining the impact upon producers. The higher yielding varieties not only cost more but also allowed the greater application of fertilizer and water implying an increasing reliance on high cost inputs which requires a large quantity of scarce foreign exchange. Clearly such investment was beyond many of the smaller farms who were unable to take advantage of the production gains from such varieties. At the same time those that did use the varieties were able to produce at lower cost so that smaller landowners were faced with a declining price and income. Large farmers are also inherently more able to take risks about new crops (Lipton, 1968) and it is this, together with the lack of credit available to small farmers, that exacerbate the inequalities (Ladejinsky, 1970).

Thus even in countries where food production has risen benefits have been unevenly spread amongst the farming community. Indeed it is quite conceivable that the exchange entitlement, and thus their command over food, of smaller farmers might fall as prices decline and as rental values rise in response to increased productivity. The use of genetic strains may well have similar effects since it is likely to be available to a relatively small number of landowners as its development is coming mainly from commercial organisations such as ICI. Also the increased use of pesticides with some strains has consequences for the nutritional value of such crops at a time when many developed countries are beginning to reduce their overall use. It is important then that the full implications of this technology be investigated through thorough economic and nutritional evaluation. Lower price food may mean that urban non-producers and foreign buyers benefit at the expense of the low income tenant farmers. Again the problem of exchange entitlement could lead to situations of high production but low consumption and poor nutrition.

### **3. PRODUCTIVITY AND NUTRITION**

An issue that relates to how nutrition interacts with other markets is the effect of good or bad nutrition upon productivity. Economic studies on this aspect come mainly from the developing countries since the main issue is likely to be nutrition availability rather than nutrition quality. Maturu (1979) examined the historical experience of the German workforce leading up to, and during, the second world war. He argued that the lack of a sufficiently nutritious diet led to fatigue that reduced the productivity of the workforce. On the other hand increases in the calorie intake raises productivity. The relationship is quite a simple one and little attempt is made to test it beyond casual

examination of data.

Bliss and Stern (1978) take the analysis further by presenting a production function that shows the efficiency with which the body converts calories into energy retained by the body for work. This depends upon the body weight of the individual, and rises first with increasing but later diminishing marginal productivity at higher levels of nutrition or calorie intake (over-nutrition leads to little increase in productivity). As expected, an increase in nutrition is most productive for those already under-fed, a result confirmed by Dasgupta and Ray (1987). The function allows the individual to use up fat stocks or to reduce work outside his/her employment in order to maintain productivity in the face of low nutrition levels. Conversely extra nutrition might be absorbed into non-productive activity. The connection is essentially a long-run phenomenon since in the short run a worker might be able to maintain productivity even at low nutrition levels (see also Rangasami, 1985). Thus it might be expected that employers would pay permanent workers more than casual ones in order to capture the benefits of the long-run productivity rises from the increased nutrition level. Also employers might pay the workers in food to ensure that their nutrition is raised (though workers could then reduce the amount consumed at home).

Evidence from Palanpur in India (in Bliss & Stern, 1982) for this proposition is mixed since many other factors are involved such as the payment of higher wages to those in uncertain employment given the risk aversion of most low income groups. Certainly there is much potential for further production function type research, particularly in developed countries where the nutritional relationships are even more complex with a much wider variety of foods sold and with a large number of nutritional related diseases that might affect

the productive capacity of the worker. The worker is also generally more highly trained so that the implications for the firm of losing such an investment are correspondingly higher.

#### **4. NUTRITIONAL POLICY**

In this section the relationship between food, nutrition and policy intervention is discussed. Justifications and methods of intervention are examined in the context of the model presented in the last sections. The report of the multidisciplinary committee on The Nations Health published in 1988 called for a pricing policy that might be used to support healthy consumer choices. This arose from the NACNE report which recommended a reduction in saturated fats and an increase in dietary fibre. In other words policy is used to reduce the consumption of harmful food in much the same way as has been advised for tobacco or alcohol consumption.

##### **4.1 Justification for intervention**

A large literature has grown up on the resource costs of a variety of diseases and increased risk factors have been calculated for a wide range of diseases that are diet related (Amler & Dull, 1984). These range from the well known, yet still doubtful, connection between cholesterol and heart disease to psycho-physical complications such as chocolate addiction. Perhaps the most obvious area for economic analysis is the evaluation of costs from poor nutritional patterns both in lost production and also in resource costs to the health service. For example Laing (in Turner (ed), 1981) examined the resource costs for a number of diet related illnesses, costing each according to the daily inpatient cost. Similar studies have been done in the US such as Rice et.al.

(1985) who calculated the direct and indirect costs of diet related illness. Such diseases range from varicose veins to rectal carcinoma. It should be stressed that many other confounding factors exist such as heredity and occupation, and the diet related costs can only be apportioned once these are taken into consideration, something this study fails to do.

Many other studies focus upon specific diseases that have strong diet related consequences. For example, in another study, the economic costs of hyperlipidaemia associated with heart disease were estimated (OHE, 1987). Only basic inpatient and primary care costs are calculated yet even this leads to a figure of over \$389 million for 1985. The moral hazard (overuse that arises because consumers do not have to pay the full cost of services) of a free health service might be offset by clear policies that discourage this kind of overnutrition. Some studies are concerned with the best way to alleviate a condition eg prevention through dietary information or other medical intervention, through the use of cost-benefit or more usually cost-effectiveness techniques to compare different policies. However to use any of these in the nutrition field it will be necessary to determine what part of the impact of diet upon health is the result of distortions in markets other than health.

From an economic perspective there are wider questions here that examine the rationale that allows a government to intervene in individual choice. It has been argued, for example, that, if an individual is fully informed about the consequences of his actions, to restrict his right to do as he pleases reduces his welfare and this includes even his right to harm himself through a poor diet (see Culyer, 1971a & 1973). For example Binns (1988) discusses the application of thiamine to beer to reduce the incidence of Wernicke-Korsakoff syndrome

in chronic misuse of alcohol. However the decision to drink to excess might be regarded as a rational decision between alcohol consumption and good nutrition and to fortify beer would simply lead an individual to increase his beer consumption to reduce his excess stock of health! Binns indeed finds such behaviour though attributes it to a different reason, ie the perceived signal that beer is a healthy product. Similarly just because a particular food additive is harmful is not necessarily a justification for preventing its consumption.

The first, and possibly most important, justification for intervention is where inflexibilities in one market mean that equilibrium is not achieved in others. The fact that medical care might be over utilised since its provision is free at point of delivery does not necessarily justify a user charge being imposed if other considerations mean that this would be inequitable or even inefficient. However it does mean that because care is readily available individuals take less care of their health through poor nutrition, lack of exercise or dangerous employment. As a result intervention becomes necessary to adjust consumers dietary preferences. In order to do this it is necessary to compute the cost of poor nutrition, since the level of intervention depends on how far the optimal level of health demand has been distorted.

Apart from distortions caused by the health market another reason for intervention may arise if the actions of one individual affect the welfare of another without compensation. For example vaccinating an individual has clear benefits to the community beyond that protection given to the individual alone. In this case it would be optimal to intervene and ensure that the number of vaccinations were greater through the use of subsidies or free provision. The presence of externalities in the nutrition field are less clear since the consumption of food mainly affects those that eat it (and their immediate family).

Some small scale examples may include the link between some additives and hyperactivity causing anti-social behaviour. While this situation is properly addressed by policy it is hard to imagine that such effects are all that common.

The final justification is if nutrition is considered a merit good ie a good that policy makers place greater emphasis on than does society as a whole. Thus policy makers might have some knowledge that if the population were to have, and assimilate rationally, would change their behaviour. Hence it is argued that "if the consumer knew certain facts or concepts which society considers crucial for everyone to know about ..demand would shift upwards" (De Ferranti, 1985 page 51). In the absence of this knowledge the state is able to intervene. Such a view has obvious problems since it could give the state carte blanche to intervene in any way it desires (Culyer 1971b). Because of this such an argument is to be used with caution, though it is quite often cited as a justification for intervention in child health since the mother must make a choice about the child's health without always knowing what is best for the child's welfare. So the child is provided with free or subsidised milk and free dental care until it gets older.

The other criticism of the merit good argument is that the information should instead be made available. However, since there is a clear lag in the dissemination and assimilation, intervention might be seen as a temporary measure until consumers change their behaviour voluntarily. So, for example, nutritional evidence suggests (often conflictingly) that a reduction in saturated fats would reduce the incidence of many diet related illness. If this information is difficult to communicate then some intervention may be justified such as promoting non-saturated alternatives. However the distinction between lack of information and a rational decision to disregard such information, or

indeed to determine that the cost of obtaining the information is greater than the benefits obtained, is a small one. In addition the consumption of a good might be addictive or habit forming (the distinction between which is not clear, Ashton & Stepney, 1982) and the intervention might be designed to stop people consuming after they have begun and are unable to stop. However while there may be an argument here to intervene in well known addictive markets, such as the tobacco market, it is less clear whether it would be socially acceptable to restrain the consumption of coffee, sugar or chocolate for similar reasons!

#### **4.2 Means of intervention**

Given these possible justifications for control it is now possible to consider a framework for nutrition policy. At the abstract level this is quite straight-forward. The costs of poor nutrition are assessed that reflect the resource costs of health care and any externalities or merit arguments goods. These then reflect the potential benefits from policy intervention. The costs are the lost benefits to the consumers of reducing their consumption of the foods affected. This is of course in contrast to the view of some nutritionists who consider such eating habits harmful and therefore as a potential benefit of restriction. However it is the assumption of economics that consumers choose goods rationally that maximise their own welfare ie consumers mostly know what is best for them. In order to assess the impact of the policy upon nutrition, and the welfare changes that result, it is necessary to derive the demand for nutrition. Because the composition of good nutrition is complex it is easier to measure demand by observing food expenditure. However it is important not to lose sight of the many different aspects of nutrition by concentrating too much on any one input.

The scope for public policy is threefold. To use prices or subsidies to control demand, to regulate the industry ensuring that products are clearly labelled with the ingredients or by demanding a higher quality of production, and to restrict the use of particular additives etc, and to educate society in their understanding of good nutrition. In practice a combination of policies will probably be needed. For example more explicit labelling may well be unhelpful if consumers do not have the information necessary to understand the implications of the product contents. The most appropriate type of policy intervention chosen will depend upon the type of market failure that exists. In the case of a merit good or bad it may be appropriate to tax or subsidise a good for a while until consumers have assimilated the necessary nutritional information. With the resource cost or externality case some kind of permanent tax or subsidy is required or even legislation governing a particular product if it is particularly harmful. This will be the case if the optimal social level of consumption is zero or near zero.

#### **4.3 The costs of intervention**

There are costs involved in any policy intervention and these must be included in the cost-benefit equation. With health education costs are the resources going into the campaign plus the cost of any mis-information generated from scares about the safety of the product. With legislation about packaging the costs are largely internalised as producers pass on the costs to the consumers. In effect the consumer pays for information about safety, an added value to the product (see Oi, 1973). However there is a cost if risky products are no longer available at low price for those prepared to risk them (in a rational substitution of health for consumption). This will be a social cost but one that is very difficult to impute value to. Finally, taxation and subsidies have

quite clear costs (negative in the case of taxation) but also hidden ones. For example a tax implemented for a short time may be difficult to remove or change if the government becomes dependent upon it for generating revenue. While this last policy may be the most effective, it is one that governments have been unwilling to use. Even in the tobacco industry the real price has fallen over the last ten years as successive chancellors have preferred to use the tax as an important form of revenue (Godfrey et.al. 1986). Hence it is perhaps more realistic to suppose that information and regulation will be used to promote policy and to evaluate possible interventions on this basis.

#### 4.4 External Constraints

It should be remembered that consideration of nutrition cannot be made in isolation of factors outside the UK food market. For example food policy is at present dominated by the policies of the European Community's Common Agricultural Policy (CAP). The aims of this policy are to maintain the incomes of the farming community and to ensure that an adequate food supply exists in the EC in the event of armed conflict (El-Agraa 1987). Since price support has mainly been aimed, for example, at items such as butter and red meat it may have partly induced the switch in consumption towards margarine and poultry. Thus some of the current nutritional objectives may be satisfied, albeit at very high cost. It is within this environment that any future nutritional policy must function.

A second constraint is the potential conflict of interests within government whereby one department (Ministry of Agriculture, Fisheries and Food) represents both consumers and producers. It would appear unlikely then that a food or nutritional policy would be worked out dispassionately within such a

department that objectively examined all the possible justifications for intervention particularly if the CAP is less effective in maintaining agricultural subsidies.

Finally the present concern with environmental issues may well have considerable implications for the agricultural sector in encouraging techniques that have low social cost to the environment. It appears that this would encourage a healthier but more expensive diet with food low on chemical additives and of higher quality.

## 5. CONCLUSION

The scope for the study of the economics of nutrition is wide and this review has attempted to reflect the great diversity of issues involved. Policy analysis has been restricted to the developed countries yet policy issues in developing countries are also crucial and include the impact on production of food aid and the results of sudden cuts in food subsidies in South American countries, in response to IMF style stabilisation packages (Richards, 1986). However while the scope is wide the study of nutrition by economists, especially in respect to policy, has been relatively narrow and a wide research agenda awaits exploration.

Quite a clear research programme arises from a discussion of policy in the last section. This would be along the lines of that already done for goods such as alcohol and tobacco and discussed in Godfrey (1989) and Maynard & Jones (1987). While nutrition however is far more complicated than either of these goods, in broad outline the economic analysis is similar.

A first stage would be the construction of an empirical market model using a wide variety of econometric modelling techniques. This would show how different food affects nutrition status and how nutrition itself affects the demand for medical care.

Secondly, within such a framework the impact of various policies could be considered. For example the effect of health education or new controls on food quality. Both of these policies clearly have implications for both demand and supply as the industrial structure is adapted to absorb or even counter the policy effects. The model could also facilitate the consideration of food preference patterns, for example to what extent individuals choose, and to what extent they are forced into, poor nutritional patterns or demand them through lack of information.

Finally the framework constructed could be used to analyse whether policy is desirable though it should be stressed though that economic decisions cannot be made in a vacuum but require contributions from other social sciences such as social policy and psychology and of course from nutritional and medical science, in order to incorporate behavioural and physiological research into the framework that is developed. It is only by utilising such an interdisciplinary framework that the many diverse and complex strands that make up current nutritional patterns can be comprehensively examined.

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