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Heath Promotion and Food Choice in the South Pacific

Phillip Hone*

Abstract

Obesity is major economic and social problem in the developing countries of the South Pacific. Health authorities in the region are relying on public information and education programs that encourage an appropriate diet to deal with this growing problem. The analysis in paper shows that the cost effectiveness of these information programs can be enhanced through a greater understanding of the food production and market systems for targeted foods.

1.Introduction

In recent years public health policy in the South Pacific Region has become focused on the trend towards increased obesity. The increase in the prevalence of obesity is evident throughout the Region with SPC (2001) estimating that more than 50% of the adult population in 10 island states in the region are overweight or obese. However, obesity is most marked in the Cook Islands, Nauru and Samoa where it has been estimated that more than 70% of the adult population in each of these countries is

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either over weight or obese (SPC 2002). This is a significant problem for these countries as obesity is closely linked to non-communicable diseases such as heart disease, type 2 diabetes, hypertension and some cancers. These diseases are now imposing a substantial cost, both economic and social, on local communities in the region and the trend in obesity levels is consistent with the incidence of these diseases continuing to grow overtime (Inoue and Zammet 2000, Coyne 2000). This cost takes the form of the value of labour lost from the labour market due to death or disability, personal suffering and the cost of treating these diseases. For example, Dalton and Crowley (2000) have estimated that in Tonga around 60% of the public health budget is currently spent on the treatment of non-communicable diseases associated with obesity.

In the developing countries, such as those of the South Pacific Region, this growth in health costs has serious budgetary consequences (Khaleghian 2003). These countries are capital poor and the opportunity cost on these public funds is high as funds spent on dealing with non-communicable diseases are diverted from strategically important areas such as law and order, other health programs, education, economic infrastructure development and welfare policy.

In response to these problems the countries of the region, both collectively and individually, have begun to explore ways of halting and possibly reversing the trend towards increasing obesity. Preventative strategies are currently being explored with the help of organisations such as the World Health Organisation and individual aid donor countries (WHO 2003a).

This paper explores some of the issues associated with the development of a cost effective health strategy to deal with the underlying causes of obesity in the region. Specifically, the analysis focuses on the importance of developing health promotion strategies that are consistent with the basic characteristics of agricultural production systems and agricultural product markets. It will be shown that an understanding of these characteristics, or system parameters, is essential if health policy analysts are to maximise their contribution towards solving this important social and economic problem.

In the next section of this paper (Section 2) the underlying causes of obesity in the region are analysed and a behavioural model is developed to shed light on the way public policy can influence the growth in obesity. In doing so, the role for health promotion in the obesity policy mix is defined in a wider policy context. The importance of understanding the agricultural production and marketing system for the development of health promotion strategies is analysed in Section 3 and some basic conditions to guide policy makers are derived. Finally, the policy implications of this analysis are highlighted in Section 4.

2. A behavioural model

The trend towards increased obesity in the South Pacific is caused, in large part, by changes in people's physical activity and food consumption rates. Diets of wide sections of the population have changed markedly over time. The importance of nutrient dense foods, such as taro, has declined. These foods with high nutrient density, which were staple items in the traditional local diet, have tended to be

replaced by calorie rich foods with low nutrient density, such as mutton and rice (Owen 1999, Coyne 2000). This trend has been fuelled by growth in incomes and improvements in transportation systems that have made a wider array of consumption goods available in the region (Gibson and Rozelle 2000). Cultural changes and food promotion by manufacturers and importers of high calorie foods have also influence consumption patterns.

This increase in per capita calorie intake has occurred at a time when the extent of physical activity undertaken by people in developing countries has probably been decreasing (WHO 2003b). As people have moved from demanding physical work in rural areas to sedentary jobs in towns and urban areas the overall level of physical activity could be expected to fall. This trend is likely to continue as the process of urbanisation works through the South Pacific.

Moreover, the cultural bias against being overweight has not been as strong in the South Pacific as it is in developed countries. It could even be argued that the traditional Fijian perception of size as an indicator of status and wealth serves to encourage even greater obesity.

Underpinning all these factors is a less than perfect understanding of both the implications of personal choices on obesity and the implications of obesity for personal health and well being.

The diagram in Figure 1 represents a simple portrayal of the obesity policy dilemma in Fiji. This diagram represents obesity as an essentially behavioural issue. It is

assumed that individuals prefer high calorie foods and dislike physical effort. The curve MPB represents the marginal private benefits that individuals derive from recreational eating and or avoiding exercise. In effect it shows that people derive a personal benefit from expanding their Body Mass Index (BMI).

Body Mass Index is a standardised measure of nutrient status in a population. It is calculated as:

Score = weight (kgs)/Height^2 (metres).

Individuals with scores of 25 <30 are generally classed as overweight while scores of > 30 indicate someone is obese.

The marginal private benefit declines as ones BMI expands and is exhausted once the individual's BMI reaches J. This means there are no positives from allowing your BMI to grow beyond J.

Insert Figure 1 about here

While there are positives associated with an increasing BMI there are also negatives. The curve MPC represents the perceived value of those private costs in the absence of any government intervention. Once an individual's BMI reaches D, they will perceive that higher BMI scores come at a personal cost. This cost could be lost enjoyment from physical activity, reduced employment activities, loss of self-esteem, or the possibility of increased disease risk.

Social norms regarding weight can have a significant impact on the height of the curve MPC. In countries where large size is viewed as a positive status symbol, the MPC curve is going to be further to the right than in societies where being over weight is seen as socially undesirable.

Given this information a rational person would manage his/her diet and exercise so as to achieve a BMI of F. At this BMI, the incremental private cost of increasing an individuals BMI would be just equal to the private benefit that they perceive they gain from actions associated with the tendency to increase an individual's BMI. One could expect that people would not plan to grow beyond F as the private costs of doing so would exceed the benefits that come from the associated extra food and/or relaxation. If they found themselves beyond F, perhaps due to some miscalculation, they could be expected to take actions to try to reduce their BMI back to F.

MPC represents an individual's perception of the private costs of obesity in the face of less than perfect information about the consequences of obesity. If the individuals were fully informed they would realise that the true marginal costs of obesity are higher. MPC* represents the fully informed perception of private costs.

With full information, individuals would not plan to exceed a BMI of E. The effect of the new information is to make individuals aware that if their BMI exceeds B, rather than D, they will begin to suffer private costs[1].

[1] In some societies there may be a problem with uninformed individuals choosing a BMI below the informed private optimal level. In these case MPC* would be to the right of MPC.

The shift from F to E is the policy response that could be expected to come from an active and effective education and information policy. Instruments such as public education, branding, and food nutrition labelling have been pursued in many countries with this objective in mind. At the regional level, there is an active program of educating schoolteachers in basic nutrition principles (Deo 2003). In addition the Secretariat of the Pacific Community has a program to promote nutrition in the region (SPC 2003). At the individual country level governments fund an array of measures such as nutrition field staff that operate at the local community level. There are also specific community education programs that target problems such as diabetes.

This paper is concerned with the objective of shifting from F to E in the most cost effective manner. However, it should be noted that E is not the socially optimal point where there are external costs that fall on the wider community. These externalities could include those medical expenses that flow from obesity related diseases that end up being met by the wider community rather than the patients. In terms of Figure 1, these cost are reflected in the vertical distance between MPC* and MSC*. In this case the true social optimum is a BMI of C where MPB equals MSC*. No amount of education or information will close the gap between E and C. The policy instruments to achieve this must involve internalising the costs to the wider community and could include “fat taxes”, changes to the way health services are funded and prohibition of some foods. (These and similar policies are canvassed by Khaleghian (2003).) The examination of this class of policy is beyond the scope of this paper.

It is not clear what impact could be expected from an education and information program in the South Pacific. The expected impact will depend in part on the extent to which the following conditions are met:

- that information imperfections are corrected;
- that the correction of those information imperfections raises demand for “good food” - “good lifestyles” relative to “bad food”-“bad lifestyles”.

This involves identifying and understanding key information deficiencies and developing communication programs that fill those information gaps in a cost effective manner. Careful planning and clever promotion strategies are important in this regard.

In developing countries, education levels and the extent of understanding about nutrition and exercise are probably lower than in most developed countries. Given that the effectiveness of public information programs is likely to be negatively correlated with the existing public health information base, it would be expected that the impact of public health eduction on food demand would probably be higher in the developing countries of the South Pacific than in developed countries.

The achievement of a shift in the demand away from foods associated with obesity towards foods associated with a health nutrition status is a necessary but not sufficient condition to move form F to E in Figure 1. Importantly, this change also needs the shifts in the demand curves to be translated into actual consumption changes and this is more likely to occur with some foods than others. However, the propensity for demand shifts to translate into consumption changes can only be assessed when one understands both the wider food production and food demand systems.

3. Health promotion within an agricultural production and marketing system

The extent to which any consequent change in food demand is translated into actual consumption shifts rests primarily on the responsive of both food producers and food consumers to changing food prices. When the production of desirable foods is largely unresponsive to price changes, shifts in demand in favour of nutritionally desirable foods will have little impact food consumption. Under these conditions, the extent of any demand shift motivated by health policy will tend to be translated into higher prices for nutritionally beneficial foods rather than higher consumption. How these higher food prices influence final consumption will, in turn, depend on how consumers respond to any policy induced increase in price. In effect, the prospect of increasing the consumption of beneficial foods due to education or information initiatives rests on the targeted foods having a relatively high own price elasticity of supply and/or a relatively low own price elasticity of demand.

Empirical estimates of either the elasticity of demand or the elasticity of supply for nutritionally beneficial foods (or any foods) in the South Pacific are virtually non-existent.

Consider Figure 2 where the current demand for taro is consistent with the demand curve D1 and the relationship between taro prices and taro supply given by the curve

S1. The current market price is p1 and the current level of production and consumption is Q1.

Insert Figure 2 about here

A “successful” promotion/education campaign aimed at influencing consumers to switch to taro from mutton flaps could shift the taro demand curve from D1 to D2. That is, consumers will now be willing to buy more taro at any given price than they were before the campaign. For example at the existing market price p1, consumers would be willing to expand consumption from Q1 to Q4.

The real success of this campaign will ultimately not be determined solely by the effectiveness of the program in changing people’s preferences. It will depend just as much on how producers respond to the changed demand conditions.

This can been seen from Figure 2 by comparing the outcome of the demand shift under different supply scenarios. If the supply decisions of taro producers are reasonably responsive to higher taro prices the true supply curve for taro might be S1. If this were the case the effective health promotion campaign could be expected to increase consumption from Q1 to Q3. This is a fair way short of the quantity of taro that consumers would be willing to consume if prices stayed constant at p1, but suppliers would not increase production at all if prices stayed at that level. The only way to induce higher taro production is to offer higher taro prices, and the act of increasing taro prices tends to cut back on consumption. P2 Q3 would be the market

outcome if S1 represents the true relationship between prices and taro producers' willingness and ability to supply taro.

On the other hand, if the true taro supply curve were S2 (that is, taro producers are not as willing or able to respond to higher prices) the same information campaign would only lift taro consumption to Q2. This small final consumption response reflects both the extent that taro prices have to rise to call forth more taro production and the market response of consumers to these higher prices.

Therefore it is clear that both the cost effectiveness and nutritional effectiveness of a health education or health promotion campaign will rest firmly on the resulting supply response. The less responsive are producers to taro prices increases the smaller will be the consumption impact for any campaign and/or the higher will be the budgetary cost of achieving any consumption change target.

Similar arguments can be made concerning the price elasticity of demand. The more responsive consumers are to price changes the less effective will be information programs. That is, the higher the elasticity of demand, the more any supply induced increase in price will tend to stifle final consumption.

The impact of the relative sizes of the own price elasticities of demand and supply on the effectiveness of health promotion and agricultural research can be seen more formally through an examination of the following stylised market model for a food item that is seen as beneficial to the health of consumers – say taro.

$$Q_d = \alpha P^{\in d} H^{\in h}$$
$$Q_s = \beta P^{\in s} R^{\in r} \quad (1)$$

(2)

Where

Q_d = quantity of Taro deman

Q_s = quantity of Taro supplied

P = price of Taro paid by consumers and received by producers

H = health promotion expenditure aimed at increasing Taro consumption

R = Research aimed at reducing the cost of producing Taro

$\in d$ = own price elasticity of demand for Taro

$\in h$ = elasticity of demand for taro with respect to health promotion expenditures

$\in s$ = own price elasticity of supply for Taro

$\in r$ = elasticity of Taro supply with respect to cost reducing research and development.

α = other factors influencing the demand for Taro (such as income)

β = other factors influencing the supply of Taro (such as weather)

Expressing equations (1) and (2) in log form and totally differentiating to yield equations expressed in terms of percentage changes gives:

$$Q_d^* = \in dP^* + \in hH^* \quad (3)$$

$$Q_s^* = \in sP^* + \in rR^* \quad (4)$$

where * indicates percentage change.

Re-arranging equations (3) and (4) to put P^* on the left hand side of each equation and then solving simultaneously for Q^* under the assumption that the market is in equilibrium and quantity supplied is equal to quantity demanded yields

$$Q^* = \frac{\in d}{\in d - \in s} \in rR^* - \frac{\in s}{\in d - \in s} \in hH^* \quad (5)$$

Equation (5) confirms that the impact that health promotion expenditures can be expected to have on the actual consumption of taro is going to be determined by the effectiveness of the health campaign in expanding the demand for taro ($\in h$) plus the responsiveness of both consumers and producers to taro price changes ($\in d$ and $\in s$ respectively).

The impact of the consumer and producer responsiveness to taro price changes on how much impact the health promotion expenditures will have on taro consumption is given by the expression

$$-\frac{\in s}{\in d - \in s}$$

Given that $\in d$ can reasonably be expected to be a negative number (higher prices reduce consumption) and $\in s$ is likely to be positive (higher prices cal forth higher production), this overall expression takes a positive value. This value is reduced as the responsiveness of consumers to price changes increase and is increased as the

responsiveness of producers to price changes increases. At one extreme, as $\in S$ approaches infinity, the expression approaches unity and the full extent of the demand shift due to health promotion will be achieved. At the other end of the spectrum $\in S$ approaches zero the expression approximates zero and none of demand shift will be translated into actual consumption changes. In this case the demand shift will be reflected in higher taro prices, not higher taro consumption.

The possible plausible impacts of varying values of $\in S$ and $\in d$ on the impact of health promotion expenditures are illustrated in Table 1.

Insert Table 1 about here

Clearly the range of consumption outcomes can be highly sensitive to values of the market parameters $\in S$ and $\in d$. For example, with a low price elasticity of supply 0.1) and a high price elasticity of demand (-2.0) only 5% of any successful demand shift would be translated into a consumption change.

The values of these parameters can be expected to differ markedly between products and probably between countries. The value of the price elasticity of supply will be sensitive to the resource base that the product requires for production and the length of time over which the impact is to be evaluated. For example, the longer the time period considered the more scope there is for producers to acquire resources and expand production in response to improved profitability. However, regardless of the time period the availability of key resources such as suitable land could constrain supply response.

On the demand side the there is evidence that the income of consumers can be an important determinant of the price elasticity of demand for individual food items. In low-income societies, food takes up a high proportion of family income. Therefore, relatively small changes in prices can be expected to result in high demand responses.

We have no data on these basic market parameters for taro (or other important food types) in the South Pacific.

The same principles would be involved in assessing the impact of health promotion funding in reducing the consumption of bad food. The second term in equation (5) would include the same parameters but the term $\in h$ would be negative rather than positive making the whole of the second term negative. The expression that determines how much of $\in hH^*$ is translated into actual consumption falls remains $-\frac{\in s}{\in d - \in s}$.

Good foods and bad foods can differ markedly in terms of their supply characteristics and demand attributes. To the extent that bad foods are often manufactured and/or imported while good foods are typically locally produced and lightly processed it seems reasonable to assume that the price elasticity of supply for bad foods is likely to be somewhat higher than that of good foods. On the other hand, it is not clear if good foods would have more or less responsive demand curves than bad food. However, to the extent to which bad food is imported, it will tend to have a very high price

elasticity of supply and therefore, any success policy makers have in reducing the demand for bad food is likely to be translated into falls in consumption.

Interestingly, under those conditions where health promotion advertising is least effective (high elasticity of demand and low elasticity of supply) cost reducing research and development in tend to be more effective in expanding consumption. This is revealed in the first term in equation (5). The relationship between the market parameters and the impact of new technology on consumption is given by the following expression.

$$\frac{\in d}{\in d - \in s}$$

As $\in d$ approaches infinity or $\in s$ approaches zero, the expression approximates unity and the entire shift in the supply curve from research and extension is translated into higher consumption levels.

The above analysis has implicitly assumed that the market parameters are not influenced by the nature and extent of either health promotion expenditure. This assumption need not hold and it provides another strategic dimension to the policy problem.

4. Policy implications and conclusions

Good health promotion policy rests on an understanding of agricultural production systems and markets as well as an understanding of the gaps in people's understanding of nutrition. Specifically we need to understand how farmers and consumers respond to price changes in food prices. In some cases encouraging consumers to increase their consumption of good food through health promotion campaigns will be ineffective regardless of how good the campaign. When the price elasticity of supply is low and price elasticity of demand is high, nutrition policy that relies on filling information gaps or persuading consumers to increase consumption of a food will be either ineffective or very high cost.

These issues are likely to be particularly important in situations such as in the South Pacific, where the policy objective is to increase the consumption of locally produced goods. The ability of the agricultural sector to supply these goods becomes critical. Where supply for a desired food is very inelastic and/or demand is highly elastic, policies that grow supply may be more cost effective than policies that grow demand.

Unfortunately, information on these responses is very difficult to obtain. At this stage we know little about the slope of the supply curve for food production in the South Pacific. Therefore, the formulation of an effective health promotion strategy is largely guesswork rather than sound policy. Extensive time series data sets covering production and price are difficult to obtain and of questionable accuracy. The prevalence of smallholder production and subsistence production systems means official surveys often underestimate true production and consumption.

From a policy perspective, priority needs to be given to projects aimed at measuring these market parameters in this region.

It is quite conceivable that one of the impacts of a program to promote the consumption of taro could be, intentionally or other wise, a reduction in the value of the price elasticity of demand. This would tend to make health promotion more effective, but it would tend to reduce the extent to which research and development expands consumption. This emphasises the need for health promotion and agricultural research strategies to be considered together as there is potential for nutritional gains in one area to be offset by losses in the other.

Even when the market parameters are favourable to the use of public information programs, there is a limit to what these programs can achieve. Public information programs that improve the understanding of people about the causes and implications of obesity will only motivate people to aim for food and exercise programs that will maximise their own wellbeing (point E in Figure2). This means that if obesity results in public costs not borne by the individual consumers, they will aim for a BMI score that is higher than the socially optimal level.

In the developing countries of the South Pacific, where public capital is a very scare commodity, the cost of caring for a rising number of citizens with non-communicable diseases associated with obesity is high. The cost of diverting more public funds into these health problems is less funding for other health programs, lower funding for education, less investment in development infrastructure and lower funding for law and order. These costs could become substantial as obesity grows over time.

If it is not politically, fiscally or socially desirable and/or feasible to force individuals to meet most of their health costs, there are limited policy options open to governments to curb the growth in obesity. An obvious step would be to restrict promotion that advocates socially undesirable activities and to encourage the promotion of socially desirable activities. For example, the imposition of restrictions on the advertising of certain foods on children's TV programs has been widely suggested in some countries as have programs promoting an active lifestyle. These policies would tend to shift the MPB curve to the left and therefore move the private BMI target towards the socially optimal level. However, restricting advertising is politically difficult and its impact is untested. The promotion of healthy lifestyles is not as politically difficult but its likely impact on target groups is far from clear.

The options for the future are not obvious but using price incentives is likely to be worth considering where consumers and or producers are highly responsive to relative changes in food prices.

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Figure 1
A Behavioural Model of Food Intake and Physical Activity

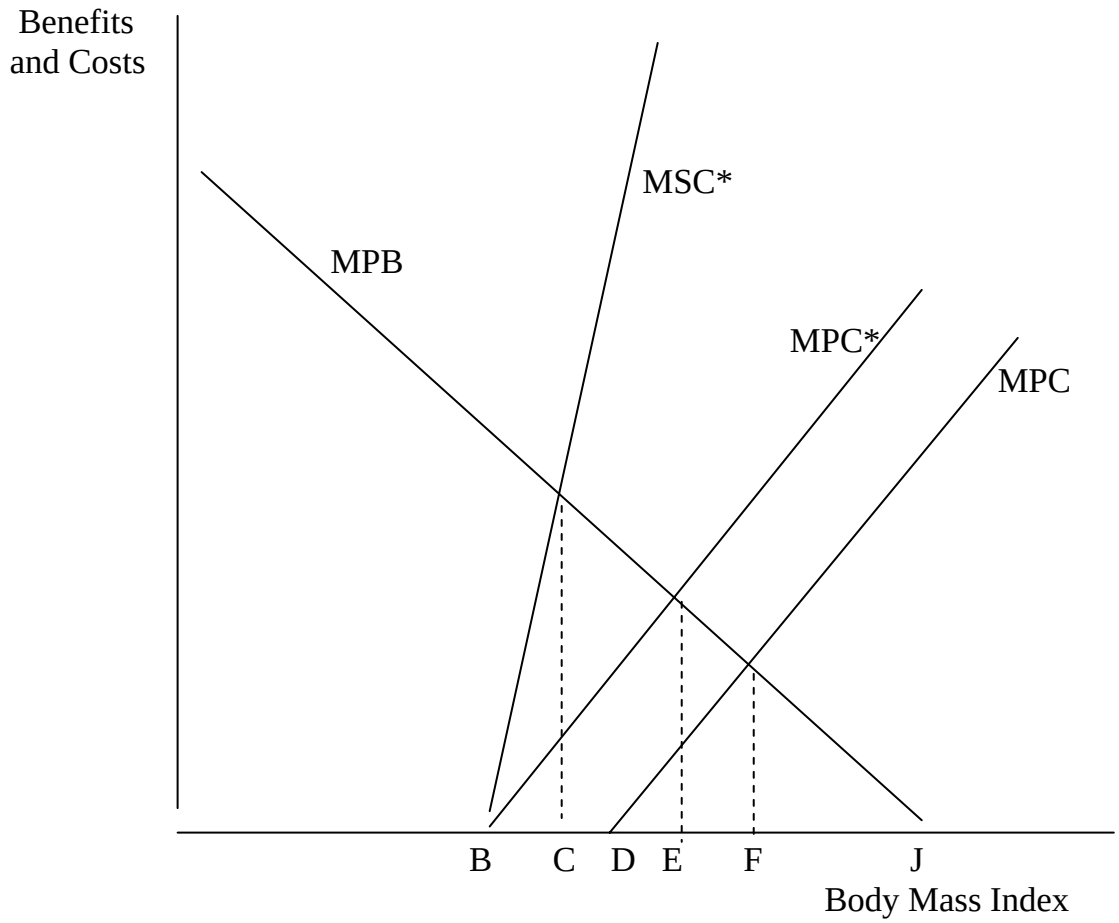

Figure 2
Impact of Supply Response on the Effectiveness of Health Promotion

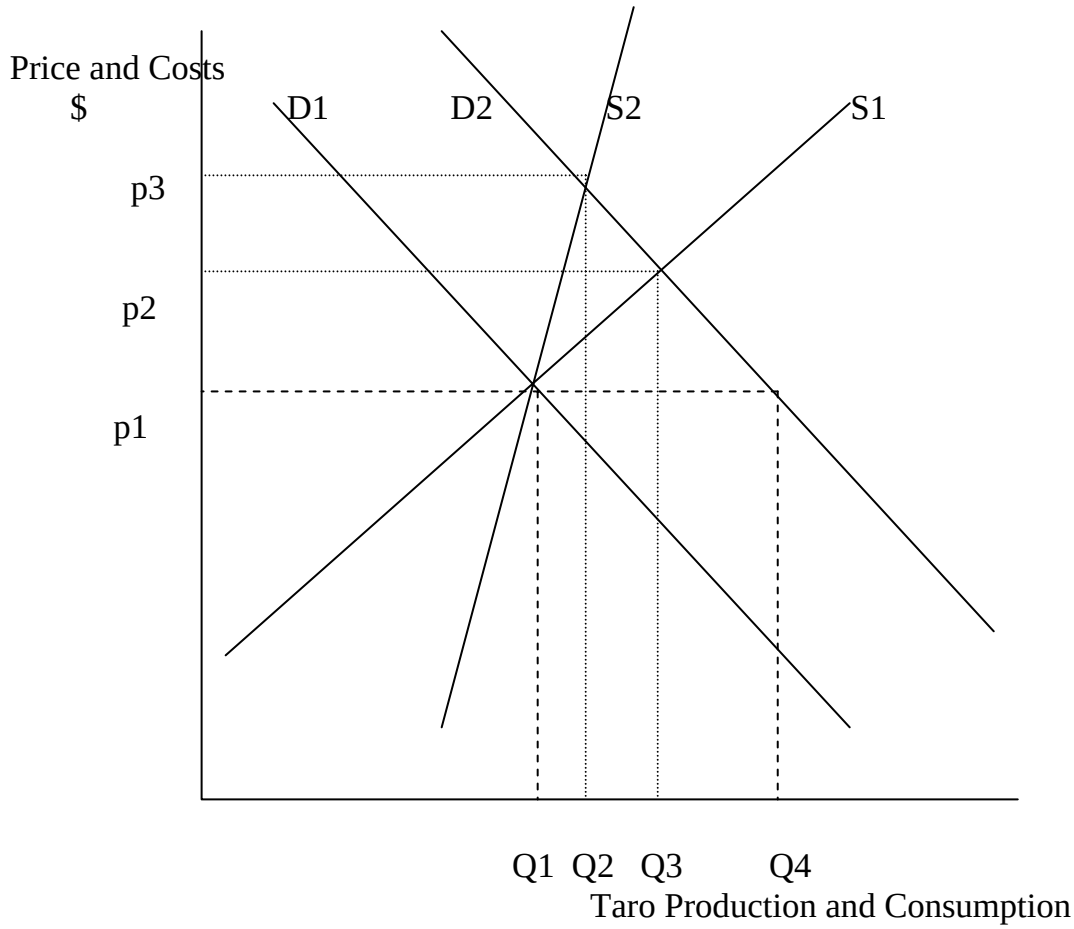

Table 1
The Percentage of Demand Shifts Translated into Consumption Changes

		Price Elasticity of Demand			
		-0.5	-1.0	-1.5	-2.0
Price Elasticity of Supply	0.1	17	9	6	5
	0.5	50	33	25	20
	1.0	67	50	40	33
	1.5	75	60	50	43