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## Can the 'Fat Tax' Carry its Weight?

Carl Bakker

**ABSTRACT.** Obesity is a rising problem in America and is blamed for externalities such as increasing health care costs. Some have proposed taxes on “unhealthy” foods so as to internalize the externalities and to generate revenue to subsidize “healthy” foods. I examine several such proposals and conclude that taxes based on perceived externalities from the obese are not the best options. Other solutions such as increasing awareness and nutritional programs would be better.

### I. Introduction

Appearing overweight and not fulfilling the stereotypes of what we 'should' look like are problems. *Aesthetic* problems. Increasing health care costs, premature death, and at-work struggles in stair climbing are problems. *Obesity* problems. While correlated, there is a difference. That difference is *me*.

Industrialization and technological change have generated much higher levels of productivity. They have also created a more sedentary lifestyle. Americans are cooking for themselves less because of the convenience of the drive-through. They no longer clean their houses when they can pay someone once a week to clean it for them. Children no longer play football with friends when it is clearly more entertaining to watch pixels on a screen accomplish the hard work. The increase in obesity-related diseases in America is slowing the growth rate of life expectancy and increasing the demand for health care. This affects me. If a firm's productivity falls because of obese employees, I am affected. If health care costs are driven up because of obesity related problems, I am affected. While an individual's exercise habits or activity levels may be outside of any sort of policy jurisdiction<sup>1</sup>, policymakers can act to internalize externalities.

Is there an efficient policy for the government to pursue in the fight against obesity? Politicians and economists are currently debating the answer to this problem, weighing the options to find the most efficient policy. Although there are many options to evaluate, the purpose of this paper is to address a tax on certain foods, often referred to as a 'fat tax'. There are many ways this policy can be structured and implemented; the issue has been narrowed here to an evaluation<sup>2</sup> of: (1) a tax on either total

fat content or on saturated fat content, (2) a tax on added sugars, (3) a subsidy on fiber or other specific nutrients, and (4) a tax/subsidy system based upon the SSCg3d scores of both healthy and unhealthy foods.

The paper also mentions other possibilities, such as the effects of stigmatizing labels and the privatization of health care. I finish by addressing possible objections to these policies. As with the implementation of any tax, there are many issues to address: intensity (or level) of the tax, its regressive or progressive nature<sup>3</sup>, who is taxed and who benefits, what to use the resulting revenues for, as well as the resulting efficiency in reducing potential externalities such as related health care costs. It is important to note, however, that we intend to internalize externalities, *not* to prohibit obesity. The goal of this paper is not an aesthetic issue; people can still choose to be obese. This paper objectively evaluates the current obesity issues, not through the declaration of “I am affected!” but rather asks the question, “*Am I affected?*”

## **II. Background**

### **A. HOW MANY ARE AFFECTED?**

According to the Center for Disease Control and Prevention (2009a) over 72 million American adults, over one third of the adult population, is obese. Obesity rates are on a consistent rise. The number of obese adults has doubled since 1980 and the number of obese children has tripled.<sup>4</sup> This created an estimated 117 billion dollars in health care costs for obesity-related problems in the year 2000 alone, as well as an estimated 27% of all health care costs from the years 1987 to 2001. While many have debated the reasons behind this trend, no single factor can take all of the blame. Stefan Mann (Mann 2008, 163-164) does believe, however, that increased domestic productivity coupled with insufficient nutritional awareness is the underlying cause. Demand theory shows that as food prices diminish through increased productivity more food will be consumed. Coupled with the decrease in physical activity due to technological change, one can see why obesity has found its way into American homes.

Economists such as Mann also believe that our society’s secularization has negatively affected obesity (Mann 2008, 171-172). Many of the world religions warn against overeating (gluttony) and even

emphasize fasting. To most religions, overindulgence is a sin; in today's society, even those who label themselves as devoutly religious are less diligent when it comes to gluttony.

## B. CALORIC BALANCE AND GENETICS AS FACTORS IN OBESITY

Obesity is currently defined as having a BMI<sup>5</sup> of 30 or higher (Center for Disease Control and Prevention, 2009b). Similarly, being overweight is defined as having a BMI between 25 and 30. The direct causes of overweight and obesity are controversial, as some claim genetics have a major role and some claim that obesity is more heavily rooted in the 'calories in vs. calories out' equation.

A calorie is the common unit of energy acquired through food intake and used through energy expenditure (Center for Disease Control and Prevention, 2009b). Caloric balance is a flow variable. If you take in more calories than you use as energy, the excess calories will be stored as body fat, or 'adipose' (solid fat tissue). If you use more energy than you acquire from your food intake you will be in a caloric balance deficit and will burn body fat as fuel. Our bodyweight is the stock variable. The longer you spend in a caloric deficit, the more body fat you will burn. Staying in caloric excess for extended amounts of time will do exactly the opposite. The key to a healthy lifestyle is to balance these things. It is important to never spend an extended amount of time in either mode, as both are detrimental to health.

Science shows that genetics does play a role in fat storage. The argument is about the extent to which genetics affects obesity. Many claim that the human genome still has much of the same genetic makeup as our distant ancestors; traits that helped Neanderthals survive in prehistoric times are causing our deaths in these post-industrial times (Center for Disease Control and Prevention 2009c). Previously, when seasons changed and herds migrated, humans had to survive long periods of time with little to no food; natural selection rewarded the ability to hold on to body fat that could be used as fuel. Now man is sedentary and our genes have not adapted to our new circumstances. Another issue is the variation in human genetics among people. Bouchard (1990) has found that as much as 40% of the variance in metabolic rates is due to differences in genetic makeup (Bouchard 1991, 1563S-1564S). Yet Stefan Mann points out that "nobody will gain weight from a zero-calorie

intake. Therefore, every individual, regardless of his or her genetic makeup, is still free to decide in favour or against the consumption of excess calories “ (Mann 2008, 166). The variation of genetic makeup across the population creates problems in policymaking because “one size fits all” does not apply.

Regardless of genetics, however, everyone can make an effort to live a healthy life. While variances in genetics may cause someone on a 2000 calorie (per day) diet to lose weight and another person to gain fat, our caloric balances can be adjusted individually to help the situation. This is the inspiration behind fat taxes. While calories come from different nutrients (fats, proteins, and carbohydrates), a calorie is a calorie; it will either be stored or be burned.

### C. IMPACT OF DIETARY CARBOHYDRATES

Carbohydrates are important both to athletes and sedentary individuals, as they deliver glucose to the muscles as well as the brain. Adequate (but not over-abundant) levels of blood carbohydrates are necessary for both intense exercise and a sharp focus (Magee 2008). The body’s primary source of energy is glucose (sugar). Food is converted into glucose in the bloodstream or in the liver, depending on the nutrient involved. In a study on the differences of fat and carbohydrate intakes, Brachey et al. (1995, 21-23) found that the body prefers to use carbohydrates as fuel, as they are the more readily converted into glucose in the blood stream. They also reported that the more carbohydrates one eats the less fat the body oxidizes (burns). When carbohydrates are ingested, the blood sugar levels rise (at varying speeds depending on the type of carbohydrate) and give the body an energetic state. The faster the levels rise, however, the faster they fall (Magee 2008). Sugar, for example, is a fast-digesting carb; after eating a large piece of cake the body feels energetic for a time, followed by what is commonly called the “sugar crash” in which the body feels sleepy and lethargic.

### D. IMPACT OF DIETARY FAT

Fat is often blamed for the obesity epidemic in America. It is important to understand, however, how fat works in the body and why it is a necessary nutrient to make an educated decision in regards to policies. Each gram of fat contains nine (9) calories as opposed to four (4) calories per gram of either protein or carbohydrates. Fat itself is not the villain

simply because it has more calories. Americans have become as carbohydrate-heavy as they have fat-heavy. As Brachey (1995, 21-23) and her colleagues have confirmed in their studies, the body prefers to burn only the carbohydrates when the carbohydrates are in abundance. This seems to be the deciding factor of why dietary fat is stored. Fat from animals such as the prehistoric mammoth was energy dense food that allowed for caloric excess. Caloric excess led to fat storage. Fat storage meant energy that could be used at a later time when food was scarce. Carbohydrates from the fruits and vegetables found along the prehistoric trails were more abundant and readily available and therefore became the (genetically adapted) preferred source of energy by the body.

Fat, as a nutrient, provides many benefits that either protein or carbohydrates cannot<sup>6</sup>. Certain fats are useful in reducing inflammation and lubricating our joints to protect from injuries. Fat surrounds our internal organs and acts as a cushion to protect against high-impact events; this is especially important for pregnant women trying to protect a baby. Saturated fats even promote healthy testosterone levels in males (when eaten in moderation). At nine (9) calories per gram, fats also supply much needed energy for the human body-especially athletes. The body can only store a certain amount of energy in the muscles; when this energy runs out, as it does during athletic competitions, the body reverts to burning fat as fuel. For the sedentary population, fat both helps to keep our blood sugar levels stable (promoting slower absorption rates of nutrients and making it less likely that food will be stored as fat) as well as boosting the “good” cholesterol, or HDL. HDL helps clear out the “bad” cholesterol, or LDL, in your blood stream to allow for improved blood flow and reduced risks of cardiovascular and heart diseases.

#### E. IMPACT OF DIETARY SODIUM

Dietary sodium is an essential part of life. It helps the body function by regulating muscle contraction and relaxation, as well as playing a key part in the transmission of nerve impulses<sup>7</sup>. Only about 12% of the sodium in our diet occurs naturally; 11% is added during cooking or as topping for foods, while 77% comes from the various methods of processing and preserving foods (think hotdogs, canned food of any kind, crackers, microwave dinners, and cheeses). Sodium is often overlooked by many calorie-counters, athletes, and even dieticians. The issue is not the effect on fat storage; it is instead the effect on our blood and our heart.

Your kidneys serve as the main regulator of the body's sodium levels. When your sodium levels are high, your kidneys will pass the sodium into your urine to be excreted; when low, your kidneys act as a storehouse for the scarce resource and ration it out as it is needed. Problems arise when sodium comes in at a rate your kidneys cannot keep up with. As stated on the Mayo Clinic Website:

If your kidneys can't eliminate enough sodium, the sodium starts to accumulate in your blood. Because sodium attracts and holds water, your blood volume increases. Increased blood volume, in turn, makes your heart work harder to move more blood through your blood vessels, increasing pressure in your arteries. Certain diseases such as congestive heart failure, cirrhosis and chronic kidney disease can lead to an inability to regulate sodium. (2008)

In other words, too much sodium can raise your risk for high blood pressure and related diseases.

Sodium is devoid of calories and commonly thought of as a negligible factor in the obesity equation. When coupled with obesity, sodium is an extremely dangerous factor and needs to be accounted for in the policy-making decisions centered on obesity. The nutritional experts and clinicians at Rochester's Mayo Clinic, as well as the food guide pyramid, recommend between 1500-2400 milligrams (mg) per day of sodium. If you're a high risk person (suffering from high blood pressure, cholesterol problems, or obesity), it is recommended that you stick to the lower area of this range, as it helps to avoid associated problems as well as reversing some present cholesterol and blood pressure problems faced by some high-risk obese individuals.

### **III. Possibilities for the U.S. Government**

#### **A. TAXES ON TOTAL FAT/SATURATED FAT CONTENT**

Denver, Jensen, and Smed (2005) used price elasticities of demand for various foods to run econometric models on different taxation methods to determine an optimal policy. These models were run assuming the majority of foods have a price elasticity of demand with an absolute value of greater than one (determined from a variety of government statistical sources as well as previous empirical research). They found that a tax on

total fat content was relatively effective in reducing caloric intake, and served to level out and equalize the intake across all age groups and social classes (Denver 2005, 9-10). But they advised taking the results with a grain of salt: while there was a decrease in overall caloric intake, the resulting change in the composition of diets was a shift from high-fat-content to high-added-sugar-content (Denver 2005, 11), which is equally detrimental.

A similar model run by Chouinard et al. assumed relatively inelastic demand for various foods. Their mean daily consumption of fat began at 77.61 grams and decreased to 76.94 grams after a 10 percent tax ; this was less than a one percent decrease (Chouinard et al. 2007, under 'WELFARE EFFECTS OF A FAT TAX'). They felt that the results may be different due to the public's awareness of being taxed. They claim that people are less likely to buy a taxed good when choosing between two evenly priced goods because of a 'tax premium' (Chouinard et al. 2007, under 'WELFARE EFFECTS OF A FAT TAX'). Although opposed to the fat tax as a means to reduce bodyweight, they report the tax as an effective way to increase revenues to be put towards nutritional education programs (Chouinard et al. 2007, under 'CONCLUSIONS').

Gray et al. conducted empirical studies in 2007 to estimate the effects of various food taxes on cumulative social health, titled 'Could Targeted Food Taxes Improve Health?'. They used a hypothetical VAT (value added tax) on principle sources of saturated fats and predicted the resulting effects on the health of society (Gray et al. 2007). While many believe that taxing saturated fat would lower the overall fat intake and make us healthier, their studies showed the contrary. Taking into account both price elasticity and cross-elasticity effects, they found three downfalls to taxing saturated fats. First, the increased cost of dairy decreased the consumption of dairy complements such as fruits and vegetables. Second, consumption of both poly- and monounsaturated fats (those linked to lower levels of cholesterol and improved cardiovascular health) decrease along with saturated fats. Poly- and monounsaturated fats separate at room temperature, while saturated fats do not. Removing saturated fats from the poly- and monounsaturated fats causes this separation and must be replaced with some type of thickening agent or consistency agent. This process can be costly and unprofitable, likely reducing the use of all fats as opposed to only reducing saturated fats. Third, the substitution effect leads to a higher consumption of sodium through the addition of salt during processing and during cooking for



preservation of flavor in place of fats (Gray 2008, under 'RESULTS'). Placing these three factors together, they concluded that for saturated fats, "such a tax would have a detrimental effect on mortality from cardiovascular disease" (Gray 2008, under 'DISCUSSION') due to the negative effect on cholesterol levels.

#### B. TAXES ON ADDED SUGARS

A Philadelphia-based group from surrounding Universities and Departments of Medicine ran a test on 132 severely obese subjects to determine the effects of either a low-carbohydrate or a low-fat diet on the obese (Chicano 2003, 2075). The subjects had a BMI of 35 or higher and were separated into either a low-carbohydrate group or a low-fat group. The low-carbohydrate group was taught the benefits of a low-carbohydrate diet and the low-fat group was taught the benefits of a low-fat diet. The groups were taught separately. The low-carbohydrate group was instructed early on to limit their carbohydrate intake to no more than 30 grams per day (no restriction placed or taught for fat intake); the low-fat group was instructed to create a 500 calorie per day deficit with less than 30% of all calories coming from fat (i.e. 1500 calories x .3 = 450 calories from fat, or about 50 grams of fat per day). The subjects' weight and waist size were recorded monthly.

Dietary assessments of the subjects showed that the low-fat group had created a significant caloric deficit and had come close to meeting the recommended dietary outlines from the National Heart, Lung, and Blood Institute. The low-carbohydrate group, however, lost an average of 4 kilograms more than the low-fat group (Chicano 2003, 2076-2077). Both groups also decreased their triglyceride levels and increased insulin sensitivity<sup>9</sup>. The researchers reported that in subjects with similar beginning and ending weights, the low-carbohydrate dieters had higher overall caloric intakes (Chicano et al. 2003, 2078). This implies that low-fat diets may not be as effective as low-carbohydrate diets. This does not imply, however, that the carbohydrate group ate more; the carbohydrate groups actually had lower levels of average total caloric consumption (Chicano et al. 2003, 2081).

As carbohydrate levels fall, the body begins to draw energy from fat, be it in the blood (recently eaten) or from bodily stores. Low-carbohydrate diets are also hard on the muscular system and can cause muscle tissue to waste away, called catabolism. This loss in muscle

causes a decrease in the individual's resting metabolism. Although the six month study showed in favor of the low-carbohydrate group, a decrease in muscle mass and resting metabolism relative to that of the low-fat group could mean less weight loss over time for the low-carbohydrate diet. Because of their relatively higher amounts of muscle, the low-fat group may experience a more consistent weight loss and eventually pass the low-carbohydrate group in overall weight loss. As they did not assess metabolisms after the study and had no reports on weight levels beyond that time period, they concluded that more long-term testing would need to be done to determine whether a low-carbohydrate diet is healthy as a long-term diet choice (Chicano 2003, 2079-2081).

Another point not addressed by Chicano et al. (2003) was the effect of a low-carbohydrate diet on those not categorized as obese. Carbohydrates, protein, and fats are all essential for a growing child. To implement a tax aimed at creating specifically low-carbohydrate diets as opposed to moderate diets may also result in disaster for the opposite end of the spectrum (anorexics, bulimics, etc). Already in the situation of eating too few calories, to almost entirely omit a nutrient such as carbohydrates when our society is still unsure of the long-term effects could cause further damage to the body. This damage could be irreversible and could possibly increase overall mortality rates. More research must be done. Considering the possible effects on a growing body, though, I do not feel any optimism for a policy towards low-carbohydrate diets.

Brachey et al's (1995) research used blood tests and scales to determine factors of obesity on different overfeeding diets. Although overeating is the primary cause of obesity, Brachey et al. intended to find whether excess carbohydrates or excess fat had a greater role. Testing both lean and obese men, they found that overconsumption of carbohydrate calories increased carbohydrate oxidation (energy from carbohydrates burned by the body) and their bodies retained on average 75% of the excess calories. Overconsumption of fat calories did not lead to increased fat oxidation and their bodies retained as much 90-95% of the excess calories (Brachey et al. 1995, 19, 22). They concluded that although it takes overeating to cause weight gain, an excess in fat calories leads to a greater weight gain than an excess in carbohydrate calories (Brachey et al. 1995, 26-27).

There is an important difference between the two previous studies: as

opposed to the Chicano study, Brachey and her colleagues tested both lean and obese men. The differences between the obese and the non-obese were negligible, but their results reflected the effects of different diets on a greater range of body compositions. While Brachey's (1995) study was not as large as Chicano's (2003), an important implication was that neither fat nor carbohydrates should make up a dominating portion of a diet; a low-carbohydrate diet is not as effective as many low-carbohydrate fad diets claim to be. Chicano et al. also admitted that the higher levels of overall weight loss in the carbohydrate group was more likely due to decreased overall calorie consumption than dietary composition (Chicano et al. 2003, 2081) .

Due to their empirical results of a tax on fats, Denver, Jensen, and Smed (2005) included in their research an assessment of a tax on added sugars. They found that a tax on added sugars would result in an increase in saturated fat as an overall proportion of the individual's diet. Although a tax on added sugars would have the greatest effect on the lower social class (having the highest initial consumption of added sugars) the health cost of the resulting increase in saturated fats and a negligible decrease in sodium would far outweigh the benefits of the tax (Denver, Jensen, and Smed 2005, 11-12).

Lusk, Schroeter, and Tyner (2005) came to the same conclusion as Denver, Jensen, and Smed in regards to a tax on added sugars. They also took into account subsidy possibilities and the resulting effects on society. The purpose of their research was to identify the relationship between both income and food prices on bodyweight (Lusk, Schroeter, and Tyner 2005, 5). Their model derived total energy expenditure (TEE)<sup>10</sup> for America and determined an equation for the optimal intake of food (Lusk, Schroeter, and Tyner 2005, 16-19). Using this equation and previous studies on cross-price elasticity and substitutes, they found that a minor subsidy on diet soft drinks would result in a decrease in weight due to a shift from non-diet to diet sodas (Lusk, Schroeter, and Tyner 2005, 27). Tefft's (2006) studies ran a reduced form linear approximation and reported that a tax on non-diet sodas will not only increase revenues due to expenditures on these items, but may also account for a significant decrease in overall snack food consumption (Tefft 2006, cited in Cash and Lacanilao 2008, 5). This is likely due to both the effect of carbohydrates on blood sugar levels<sup>11</sup> and the complementary effect that 'salty' and 'sweet' foods have. Although Tefft's (2006) studies were in regards to a tax, the results were decreased snack food and non-diet soda

consumption. If the relationship holds, a similar subsidy that shifts consumption from non-diet to diet sodas should also reduce snack food consumption.

The subsidy on diet sodas should work as effectively as taxing non-diet sodas; either outcome increases the relative cost of non-diet soda. In their studies Lusk, Schroeter, and Tyner (2005) bring up an extremely valid point: a tax causes incomes to decrease. While the specific income-elasticity of various foods may differ, the income-elasticity of exercise is high (Lusk, Schroeter, and Tyner 2005, 16). When people must give up leisure time, one of the first things eliminated is exercise.

If a tax on added sugars causes an increase in saturated fat consumption and a decrease in exercise, overeating will become more likely. From the diet composition studies (Chicano et al. 2003 and Brachey et al. 1995) it can be concluded for obese individuals that low-carbohydrate diets are an effective means of weight loss when combined with a caloric deficit. When in caloric excess many problems can arise from a low-carbohydrate and high-fat diet. A tax policy should push neither very low carbohydrate nor very low fat, but instead create moderate and well-rounded low-calorie diets. Obesity is not a problem faced by 100% of the population and the long-term effects of low-carbohydrate diets are still in the early stages of research.

### C. FIBER/NUTRIENT SUBSIDIES

Another model run by Denver, Jensen, and Smed (2005) assessed a fiber<sup>12</sup> subsidy. Contrary to the majority of other findings, they concluded that a subsidy on fiber would most likely increase caloric consumption due to the relative decrease in the price of healthier foods. They estimated that the price per calorie to society would fall and a greater amount of food would be purchased if income was held constant (Denver, Jensen, and Smed 2005, 9-10).

The results Lusk, Schroeter, and Tyner (2005) found, however, advocate a subsidy focused on foods and drinks recommended by dietary guidelines. They concluded that a subsidy on diet sodas would significantly decrease the consumption of non-diet sodas (Lusk, Schroeter, and Tyner et al. 2005, 28). The subsidy, making non-diet soda relatively more expensive, is much the same as taxing non-diet soda without the theorized increase of saturated fat intake. Sugary foods are made relatively more expensive than non-sugary foods; the price of fatty

foods will not decrease relative to sugary foods. Taking income elasticity<sup>13</sup> into account, the researchers also concluded that a nutrient subsidy would decrease weight (Lusk, Schroeter, and Tyner et al. 2005, 24-25) due to a relative increase in income and therefore overall time spent exercising.<sup>14</sup> It is important to note the difference in the findings of a subsidy for non-caloric items like soft drinks as opposed to a subsidy for healthier foods, as the food subsidy increases the overall consumption of calories while the diet soda subsidy would not.

#### D. TAX BASED ON SSCg3d SYSTEM/"BEST OUTCOME"

The SSCg3d system is a point system used to determine how healthy or unhealthy foods are. Eight different factors are individually taken into consideration for each food: saturated fat, sodium, energy density, non-milk sugars, fruit and vegetable content, polyunsaturated fats, iron content, and calcium content. For each food, each individual factor is given a score ranging from negative ten (-10) to ten (10) points. The points are added up to determine the food's total score, which can be either positive (unhealthy) or negative (healthy) (Gray 2008, under 'SSCg3d').

After their conclusions of a tax on saturated fats, Gray et al. ran empirical tests for a tax based on the SSCg3d system. The value added tax was applied to foods that scored in the 'less healthy' category of greater-than-or-equal-to nine (9) points. Corresponding subsidies were applied on the opposite end of the spectrum. Similar to the tax on saturated fats, substitutes and complements create a *slight* increase in serum cholesterol (Gray 2008, under 'RESULTS'). This model, however, targets sodium intake much more efficiently than the saturated fat tax. The decrease in sodium corresponds to a reduction of 2100-2500 deaths from cardiovascular diseases each year compared to a no-tax scenario (Gray 2008, under 'RESULTS' and 'DISCUSSION').

The SSCg3D system was developed after the failure of most other fat tax scenarios. Although still in its infancy, the SSCg3d seems to be among the most detailed of the current models. It covers a variety of factors and possibilities with very few anomalies. The anomalies, such as walnuts being in the unhealthy category or fried rice in the healthy category, must be worked out if they are to add weight to their results. There is little to no discussion on the effects on the price per calorie and its effect on total caloric consumption, however. It is possible to assume

that the overall taxes will be close to equivalent with the subsidies, leaving the overall effect on food prices unchanged, though the effect may actually vary across nations or regions. It is also possible that the SSCg3d system, aimed at taxing more of the calorie-dense foods and subsidizing the less calorie-dense foods, may increase the overall cost of a calorie. This would decrease overall caloric consumption. The complexity of the system might also signal an increased cost of implementing and regulating. More research and outside evaluations of the system is needed.

#### **IV. Objections**

##### **A. THE EFFICACY OF GOVERNMENT INTERVENTION**

Government intervention is often seen as a 'slippery slope' and resisted by the public. If people are given a set of prices and create a corresponding budget constraint, it is sometimes assumed that they make purchases to maximize their utility. Should the government be allowed to step in and dictate (or at least direct) consumption levels? Not if we allow (and even expect) adults to take care of themselves. Neoclassical theory would tell us that people will consciously weigh the perceived pros and cons to every bite of food, and that government intervention can *only decrease total utility* by limiting our options. While *laissez faire* is often seen as the fair and popular policy option, government intervention might actually put us on higher indifference curves because of inaccurate perceptions. Economists Sunstein and Thaler explain one idea in their book *Nudge* (2009) that they term 'Libertarian Paternalism'.<sup>15</sup> They use Libertarian Paternalism to counter irrational decisions based heavily on emotion or immediate circumstances (Sunstein and Thaler 2009, 6-7). The book is centered on tactics (that they call nudges) that would not affect rational decision-makers, though, and a tax is not a nudge. The examples given, however, show that people knowingly make decisions they will regret later. Policy action is not inefficient here.

Thaler gives an example of a cocktail party at his house, where a bowl of nuts is placed on the table. Rationally, one would eat until hunger had been sated. Although the *humans*<sup>16</sup> sitting around the table continued to eat until the bowl was removed, they afterwards *thanked* Thaler for removing the bowl of nuts (Sunstein and Thaler 2009, 40-41). As humans, we are subject to willpower and emotions.<sup>17</sup> When hungry,

we are less likely to make the same food purchases as we would when sitting at our desk writing our grocery list. Like Sunstein's and Thaler's example, when the bowl of peanuts is sitting in front of us, it is quite likely that we will take a handful whether or not we had wanted a handful of peanuts before they were set out. If we know the rational decision, but are unable to be consistent in certain circumstances, allowing the government to step in could raise our total utility.

Some people, however, *are* rationally increasing their utility. Engel's Law says that as income increases, the proportion of income spent on food decreases, as does the marginal benefit of food with increased consumption (Drenowski 2003, 839). Drenowski states, "To Engel's Law should be added the observation that the diet [composition] changes as well" (Drenowski 2003, 839). What Drenowski means is that countries with higher per capita incomes rely much more on fast-food and restaurants as their income allows for convenience (Drenowski 2003, 839). Lower-income classes in higher-income countries generally spend a greater proportion of time working and therefore rely more on the convenience of cafeteria-style meals, fast-food, and pre-made meals. These people place a higher marginal value on time saved by not cooking than on the increase in cost of purchasing fast food. People should not be punished for this.

The rebuttal comes from Lusk, Schroeter, and Tyner (2005). They explain that people do not make the immediate choice to be obese but are lacking the correct feedback. The immediate positive feedback of taste and nourishment overrides the negative feedback of weight gain because of a time lag (Lusk, Schroeter, and Tyne 2005, 26-270). People make 'rational' decisions based on the immediate feedback, which tells them that time has been saved and that fast-food tastes good. Fast-food is not the enemy; it *does* save time that people value. But by implementing a tax on unhealthy foods we can give incentive for fast-food chains to switch to healthier and cheaper alternatives. While the obese are the ones to suffer physically from obesity, 117 billion dollars in related health care costs and increased costs to employers are felt by society. This strongly implies an externality.

Another issue is in the matter of what psychologists and philosophers have termed *akrasia*, or 'weakness of human will' (Mann 2008, 169). When something tastes good, the rational mind says, 'more must be better'. Although the government does not seek to punish for making rational decisions, many seem to be unaware of the law of diminishing

marginal utility. The adverse effects of obesity imply that obesity falls on the negative part of the marginal utility curve, where adding more food (and ultimately body fat) only serves to lower one's health at a greater rate than the taste buds are stimulated, therefore decreasing total utility. Here is where the government could step in and, by raising prices via taxation, seek to reduce consumption.

## B. TAXING FAT

Whether a tax should be levied on fat is another issue. Fats, from items like peanut butter and olive oil, are an essential part of the human diet. Both would see high taxes and would likely be substituted away from unless some form of rebate or tax exemption is created for certain fats. Fats are also essential in moderation for growing infants. For example, it would be unwise to tax whole milk for its fat content when it is recommended for infants. A single mother living paycheck-to-paycheck will have a hard time affording what is necessary for her growing child. A possible rebate for mothers with children could be implemented that refunds the tax amount. A higher rebate could also work as a form of subsidy since the whole milk is now considered a healthy food. These options risk the plague of politics; lobbyists would push for certain nutrients to be subsidized or for certain rebates based on personal connections with food producers. Politics and nutrition are a bad combination.

Regular price changes will also lead to uncertainties in consumer decisions. As Leicester and Windmeijer (2004) stated in their evaluation of a fat tax in the UK:

...ideally, we would like to tax *overconsumption* of fat, but this would be a practical impossibility. Some foods, such as butter, are almost entirely fat and so would attract high taxes by their very nature...Manufacturers may also frequently change their production processes, causing the fat content of foods to change, which may lead to prices having to be altered regularly. (2004, 8-9)

A subsidy on foods, whether to a specific nutrient or the SSCg3d system, also gives incentives to producers to alter their products to meet subsidy criteria and maximize profits. Research, development, re-labeling, and



subsidy incomes all affect producers' pricing decisions. A confused consumer is an unhappy consumer.

Kuchler, Tegene, and Harris (2004) evaluated taxes and subsidies on different levels of elasticity of demand for certain unhealthy foods (e.g. chips, soft drinks, salty snacks, etc). Their findings concluded that a tax would have little effect on the demand for most snack foods, but a tax rate as low as one percent (1%) can increase revenues to over 100 million dollars per year (Harris, Kuchler, and Tegene 2004, 9-10). It is important to see, however, that a similar subsidy would cost that much. Instead of taxing fat, the government could tax a broader range of nutrients. And, instead of possibly subsidizing foods incorrectly or inefficiently, the government could use these revenues to fund nutrition education programs. In doing this, the government may help naïve people make educated decisions that they might otherwise overlook.

### C. REGRESSIVE NATURE OF THE FAT TAX

The tax placed on a good is a set percentage of the value of the good. The lower the income of the individual, the greater proportion of the individual's income paid as a tax. Chouinard et al. (2007) claim a rapid decline in the tax burden on households as income increases. They estimated the burden at .24 percent (.24%) of income for a \$20,000 income level and only a .10 percent (.10%) burden at the \$40,000 income level (Chouinard et al. 2007, under 'WELFARE EFFECTS OF A FAT TAX'). For a better perspective on this issue, the \$20,000 income household will have a burden of \$48.00 per year in fat taxes while the \$40,000 income household will only have a burden of \$40.00 per year.

A few things must be considered. First, this does not show a significant difference in burdens between households with significantly different income levels. Second, one must consider that lower-income families are more constrained by their budget; they are more likely to respond actively to a tax by decreasing their purchase of taxed foods. Purchasing substitutes will reduce their burden. The low-income families, then, will receive the majority of the help through longer lives and the potential for lower health care costs than they otherwise would have. Also, low-income families *not* suffering from obesity and not in need of change will then not be adversely affected by the tax.

## D. EXPECTED COST OF OBESITY

A common argument is that obesity increases the cost of health care in America. Every insurance claim made increases the cost to society as insurance companies must compensate for the money lost in covering a claim. Therefore, decreasing the claims made for obesity-related diseases will keep the cost of health care for the rest of society down. But this common claim is, in a word, false.

Boshuizen et al. (2008) used a simulation model to estimate the lifetime costs of health care for three different lifestyles: smokers, obese individuals, and healthy individuals. While obese individuals were the most expensive for their lifespan, their average lifespan was considerably shorter than either smokers or healthy individuals. Smokers, with an intermediate lifespan, incurred the least cost (on average) of the three. The highest expected lifetime expenditures? The long-living healthy individuals (Boshuizen et al. 2008, 0244). As the researchers put it, "Unfortunately, these life-years gained are not lived in full health and come at a price: people suffer from other diseases, which increases health-care costs. Obesity prevention...will not stem the tide of increasing health-care expenditures" (Boshuizen et al. 2008, 0245). The implication here is that the opportunity cost of increasing the average lifespan is an increase in society's health care costs. Although diseases such as diabetes, cardiovascular disease, and heart disease are health care-intensive, they also carry a higher mortality rate. While research has improved cancer care and greatly reduced its mortality rate, it comes with a cost, literally. Less-fatal diseases have increased total health care use and increased society's fee.

It is important to understand that these findings are only as strong as their ability to accurately depict life. For these findings to be accurate, they must correctly estimate the costs smokers, healthy individuals, and obese individuals incur throughout life. This study also omits any talk of changes in productivity and quality of life due to weight loss or gain. Yet it can now be seen that simply reducing obesity may not result in lower health care costs.

Productivity is another matter. Using a sample of 15,794 working adults (obtained and screened for high-risk factors through mail survey correspondence), Fox, Grandy, and Rodbard (2009) ran empirical tests to evaluate productivity among varying BMI's. Productivity losses were greatest among the obese. There was up to 4 hours of time lost per week

due to obesity (Fox, Grandy, and Rodbard 2009, 356). While this number may seem small, the wages associated with 4 hours of work per week are at least as much as the cost of an individual's health insurance. This implies that a rational-minded employer could hire a non-obese person *and* pay their health insurance for the same amount as hiring an obese employee. Tucker and Freidman (1998) showed similar results on productivity, but also showed an impaired relationship to with coworkers (Fox, Grandy, and Rodbard 2009, 358). It is clear that productivity is lost to obesity, and the amount is measurable. The problem arises in accurately measuring the differences in health care costs. If a policy is to be made using health care and productivity measures, more research must be done.

#### E. ALTERNATIVES TO THE FAT TAX

The current medical insurance program gives incentive for many people to over-consume health care (Mann 2008, 168). Over-consumption creates higher costs for all through an increase in aggregate demand. The aggregate demand, equal to the sum of all of the marginal benefits to the *individual consumers*, is equated with the supply of health care to determine the market price. Those individuals with a higher marginal benefit will end up consuming more because their gain is greater than the expense to them. This will drive up costs, and those with a lower marginal benefit of health care will be crowded out from purchasing certain health care plans. An alternative to a fat tax would be a complete privatization of health care. This would create a private market for all those looking to be insured and allow for a pre-determined level of care. If health care was privatized, there would be no possibility for externalities, and therefore a tax would be completely unneeded. Unfortunately, the privatization of health care is a complex issue in need of both research and debate beyond the time constraint of this paper.

Another alternative to the tax is to increase regulation on both product placement and advertisement since both affect demand. This is a touchy issue. Cash and Lacanilao (2008) propose instead stigmatizing labels. Using a purchase-simulation survey, participants were asked to choose between various goods, though participants were not forced to purchase the goods they chose. In the first round, participants chose between goods that had no warning labels. The second round had the same choices except that labels on unhealthy goods warned about the consequences to

their health and informed the buyer that the good was taxed. After testing at various price levels to estimate a relationship, they reported that the warning label had a significant deterrent effect (Cash and Lacanilao 2007, 17-18). According to Engel's Law people with lower incomes spend a greater portion of their income on food. Because of this I feel that low-income families pay more attention to the food they are buying, and therefore the stigmatizing effect will be noticed and heeded more frequently in low-income households. Long-term effects such as desensitization are not discussed in their research, but should be evaluated when considering this as a policy option.

## **V. Conclusion**

Obesity issues have greatly increased over the last forty years. As a policy issue, though, it is still relatively young; much research is still needed. For example, should the government tax whole milk while simultaneously advising that new mothers buy whole milk for their infants? Implementing a fat tax or any similar subsidy comes with administrative and regulatory costs. These must be weighed as a part of the net loss or gain of any such policy.

A subsidy on healthy foods is a means to make them relatively less costly compared to unhealthy food. It would be a positive means to increase the incentive for healthy food consumption. With a subsidy, the income effect and the income elasticity of exercise increase the average amount of daily exercise by the individual. Along with healthier eating, this leads to a greater level of welfare and total utility for the individual. The major drawbacks to a subsidy policy would be in financing the administrative costs, financing and supporting the payout, and deciding what foods are healthy. To finance these costs, a tax would need to be levied either directly on incomes or on foods, which serves to lower the overall net gain from a subsidy, possibly making for a net loss. Also, it is still unclear which foods should be supported by the subsidy.

The regressive nature of the fat tax is a major constraint. I note, however, that the regressive burden might not be as strong as some studies claim. First, one must consider the effects that the awareness of a tax will have on people's choices, particularly low-income households with tighter budget constraints. A tax on an item, if the individual is aware of it, has a stigmatizing effect. The stigmatizing effect serves, at the very least, as a slight deterrent. The overall effect of the stigma is

hard to measure, but will likely be a greater deterrent for the low-income group because of their stronger association of taxes with reduced incomes. Second, to argue that \$.07 is twice as detrimental to a household with an income of \$20,000 as to a household with an income of \$40,000 is to imply that all food prices should be pegged to income levels due to their regressive nature. That is not a viable claim.

The results from both Brachey et al. (1995) and Chicano et al. (2003) lead us to conclude that more research must be conducted on the nature of fighting obesity. The most effective ways of both prevention and reduction of obesity must be *identified* if we are to decide on policies that steer the public towards those ends. The importance of issues such as nutrient timing and the impact of certain foods must also be taken into account when creating policies. For example, fat-free pretzel sales would likely increase if a tax on fats was levied. To a sedentary individual, this may cause more fat storage than an equal amount of calories from items such as peanuts; only further research can determine this. Nutrition issues that point towards extremes in the intake of nutrients (such as very low-carbohydrate or very low-fat) are not likely to be an effective means of combating obesity.

Gray et. al (2007) have shown that their SSCg3d system, although in its infancy, has the potential to be an efficient way of combating obesity. The SSCg3d system makes use of both taxes and subsidies in a way that make the program financially self-sustaining. A review of the evidence has led me to the belief that this is the most valid form of policy *if a tax is to be implemented*. More research and evaluation of the SSCg3d system is required to take a stronger stance.

Boshuizen et al. (2008) reported that because of a decreased lifespan, the obese are not increasing long-run costs of health care. If this is true, then there is not a negative externality imposed on the rest of society, and to tax the obese for increasing health care costs is not the efficient choice. Fox, Grandy, and Rodbard (2009), as well as Freidman and Tucker (1998) reported significant losses in productivity among the obese. Using these two factors to identify externalities would generate weak results unless a greater number of studies are conducted and compared. Also, new information on both diet composition and health are coming out regularly, and are regularly changing our view of what is and what is not healthy. To make a decision to tax or subsidize a nutrient may prove to be a terrible decision after a fairly short amount of time. If a tax is to be implemented, it should be over a broad range of unhealthy foods, not just

carbohydrates or fats. The revenues should be used to support educational programs, not subsidies on foods that we currently think are healthy.

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**Endnotes**

1. This falls under Section 1 of the 13<sup>th</sup> Amendment (Emancipation Proclamation) to the Constitution of the United States of America.
2. Race and gender may both affect the best dietary compositions, but the research here is based on diverse population samples. For both simplicity and clarity, neither gender nor race will be evaluated separate from the population.
3. Income disparity is a major issue with any tax, and a tax on food will affect people with lower incomes more than people with higher incomes.
4. Policies and incentives aimed at parents affect their children. As the child matures, dietary practices will affect a growing child much differently than a mature adult. Where relevant, this issue will be taken into consideration.
5. 'Body Mass Index' as defined for those 20 years and older. BMI is your [weight in pounds x 703]/[height in inches x height in inches].
6. The following information was retrieved from (Bouchez 2008).
7. The facts found in this section are originally from (Mayo Clinic Staff 2008).
8. Principle sources of saturated fats would include items such as whole milk, cakes and other pastries, butter, puddings, cheeses, and ice creams.
9. Higher levels of triglycerides can lead to a heart attack or many other cardiovascular issues. Insulin sensitivity refers to your body's ability to pull nutrients and glucose out of your blood and into your muscles.
10. Total energy expenditure (TEE) is based on the Basal Metabolic Rate (BMR), the thermal effect of food (TEF) and total energy expenditure. BMR is the amount of calories one needs to simply survive and perform bodily functions such as breathing and blood flow. The thermal effect of food (TEF) is the amount of energy needed by the body to digest food and transport the digested nutrients efficiently to the body. Energy simply refers to the activity level of the individual (how many calories used up during daily activities).
11. Carbohydrates, when ingested in absence of both fat and protein, absorbs rapidly into the blood stream. This causes an increase in the body's hunger response that leads to 'craving' more food.
12. Many developed countries suffer from a deficiency in fiber due to fiber's removal during food processing.
13. Income elasticity shows that as income falls, people work more, and therefore have less time for exercise or active leisure.
14. 'Time spent exercising' includes all active leisure/recreation.
15. Libertarianism, in a sense, is 'freedom of choice'; paternalism is more of a 'parented', or directed, choice made by government.
16. Sunstein and Thaler make use of the terms 'econs' and 'humans' to refer to the textbook-rational-minded thinkers and mistake-prone-people-in-reality, respectively.
17. Willpower and emotions are both part of what Sunstein and Thaler call the 'hot and cold effect.' When emotions are involved, we are more likely to make a choice that follows our emotions instead of rational thought. Often, we are unable to say no to food, addictive habits, etc. when they are right in front of us; hence, weakness of will.