

The economics of obesity –

The more the better ?



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Maastricht, 25 May 2010

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Study: Economics

Course code: EBC2029

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1. Introduction

The United States of America are regarded as one of the richest and most progressive countries in the world. Would it then not make intuitive sense to assume that it is one of the healthiest countries, too? Yes, however, surprisingly empirical data shows that people living in the United States are among the unhealthiest in the world. In fact, a survey launched by the Centre For Disease Control And Prevention (2009) shows that in 2008 only one US state, among the fifty, recorded less than 20% of obese population. In contrast, obese inhabitants of European nations, such as the Netherlands and France, account for only 10% or even less.

According to the World Health Organization, obesity is defined as the “health condition in which excess body fat has accumulated to such an extent that health may be adversely affected” (WHO, n.d./2006). Excess body fat accumulates if constantly more calories are consumed than burned.

Until very recently, obesity was only considered as a social or aesthetic problem, with severe medical consequences for individuals. However, today, obesity is seen as an economic problem as well since it imposes high medical costs on society as whole. In his book, “*The fattening of America*”, health economist Finkelstein (2008) argues that over the past three decades, the number of obese Americans has more than doubled.

This paper will first examine several social and economic phenomena that cause obesity. It will try to answer the question whether market failures are responsible for obesity. What role do prices, technological progress and American values play in explaining the reasons for especially this society’s overweight? Next it will elaborate on the social and economic consequences of obesity by trying to model the phenomenon in a microeconomic framework. Weighing costs and benefits will lead to several policy implications that need to be implemented in order to regulate the prevalence of obesity. The paper will be concluded by trying to answer the most pressing questions concerning obesity being raised in the introduction of that paper.

2. Social and Economic causes for obesity

Obesity can have multiple reasons. One major determinant of body weight can be attributed to genetics. More specifically, genetics can have an impact on how well the human body can regulate metabolic reactions that keep body cells healthy and working. If the metabolism is disrupted the energy from food consumption cannot properly be decomposed so that the body accumulates excess body fat. The genes containing certain characteristics of metabolism are passed from parents on to their children.

There are multiple other reasons for obesity. This paper, however, will primarily focus on the economic aspects of obesity.

According to health economist Eric Finkelstein (2008) the two most obvious reasons that cause obesity are 1) the abundance of cheap, tasty foods and 2) the rapid pace of technology change. Prices have played a major role in the emergence of obesity in the United States. In fact, food prices have fallen by 14% compared to non-food items in the U.S. between 1980 and 2005. This decline in food prices can be attributed to large agricultural subsidies and to the enormous (and nearly ubiquitous) supply of food in grocery stores, restaurants or snack bars that creates a fairly high level of competition in the market and keeps the prices low. According to Drewnowski and Darmon (2005) the United States have the lowest cost food supply in the world. But the United States is the richest country of the world in terms of GDP per hour worked. (Conference Board Total Economy Database, 2010)

Combining the information on prices and income one can detect two important mechanisms operating in the market for food, namely the income- and substitution effects. Assuming that both “food” and “other goods” are normal goods, one would expect a rational consumer to extend the consumption of food and cut the consumption of other goods in response to a price decrease of food. This is called substitution effect. In addition, income has constantly been on an upward trend raising the consumers’ ability to buy goods. According to the income effect, the consumption of both “food” and “other goods” would go up in response to an increase in income. One can conclude that both mechanisms are working in favor of food consumption.

This discussion can easily be linked with the observation of decreasing physical activity. If the two goods taken into consideration are food and physical activity (instead of “other goods”), the decline in physical activity can be modeled by applying the substitution effect. There is a price associated both with food and physical activity. Assume that the price of physical activity stays the same while the price of food decreases.

This situation is described in Figure 1. In response to a decrease in the food price the budget constraint B shifts out and the consumer has to choose a new consumption bundle in order to maximize utility subject to the outwardly rotated constraint B_2 . The resulting bundle $(F_2; PA_2)$ exhibits an increase in food consumption and a decrease in consumption of physical activity. This idea is consistent with the empirical evidence. Brunello, Michaud and Sanz-de-Galdeano (2008) find that physical activity has generally decreased and technological progress is one reason for the decline according to Finkelstein (2008). Contrariwise, food consumption has increased.

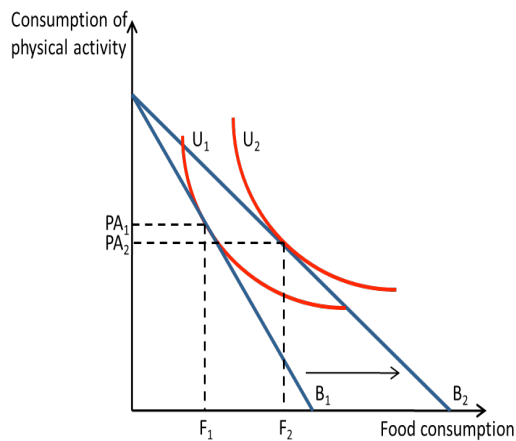


Figure 1: Tradeoff between food consumption and physical activity

This analysis has shown what happens after a food-price increase in the short run. In Figure 1 the decision maker can move to an indifference curve affiliated to a higher level of utility (U_2). To put it in a nutshell, consuming more food gives the decision maker a much higher satisfaction. This is not the end of the story. The more important long-run approach will be discussed at a later stage.

Technological change allows the beneficiaries to be more productive at work. Over the decades technological progress has led to higher nominal and real wages throughout most industries.

Now consider an individual being confronted with the question to either work or to cook. Time can be regarded as the only resource he/she can use in order to cook or work. The "price" of cooking is the money forgone by not working. This "price" is commonly called opportunity cost. Taking into account the evolution of wages, the opportunity cost of cooking and thus not working has been increasing sharply. The opportunity costs of not working have risen for women most rapidly in relative terms. Overall trend shows that the labor participation rate of women has increased in most industrialized countries over the last few decades. The rising opportunity cost of not working can also be considered as one reason why it has become economically more interesting for women to engage in a daily work life. Working comes at the cost of committing time to the household. The existence of a dual-career family can lead to a serious time constraint when it comes to home cooked food. Convenience food such as snacks, deep frozen, canned food or eating out is a welcomed alternative to extensively prepared meals. Only fifty percent of the overall food consumption by U.S. inhabitants is taken at home (Business Wire, n.d./2009)

The evolution of the technological progress and the demand for pre-cooked food led to mass preparation especially of sweet, greasy, and calorie dense food that contains a lot of saturated fat. It is now possible to prepare the family dinner within minutes "thanks to vacuum packing, improved preservatives, deep freezing, artificial flavors and microwaves food" (Cutler, Glaeser and Shapiro, 2008, p. 94)

For example if a household were to make fresh French fries – therefore starting from scratch – it would take around 40 minutes to prepare the food since it involves actions such as peeling, slicing, and the use of oil - frozen French fries would only take less than 15 minutes. As a consequence the family has saved around 25 minutes a day in which it can engage in other more useful activities.

(Finkelstein, 2008). In addition to the time saved by having frozen French fries, another source of gain comes from the lower price of the preserved alternative. There are monetary savings associated with frozen French fries.

Due to technological progress many high-tech facilities are relatively cheap nowadays. It is therefore tempting to buy and install an inexpensive printer in your office instead of taking a foot walk to the nearest community printer. (Finkelstein, 2008) This sounds appealing since the human's sedentary nature discourages physical activity whenever possible. The United States has been the most productive and progressive nation in the world, so it is not surprising that the obesity is especially gaining ground there.

These two examples indicate the relation between technological progress and patience. According to Cutler, Glaeser and Shapiro (2003) and Brunello, Michaud and Sanz de Galdeano (2008) time inconsistency is a major problem when it comes to fighting obesity, especially for impatient consumers.

While the lack of information might have contributed to obesity a few decades ago – when the invention of the internet was still in the making and the side effects of fast food were not that well known – Brunello, Michaud and Sanz de Galdeano (2008) conclude that today the majority of individuals tends to be informed about the consequences of overweight and obesity on health. Instead of lacking information, Cutler, Glaeser and Shapiro (2003) suggest that lack of rationality can be a major factor that is relevant when analyzing food consumption. It is generally assumed that people - based on food prices and income - make the right choices in what and how much to eat. However, people do not always make rational choices when it comes to food consumption. They tend to over-consume despite the willingness to make a diet. Time inconsistency can be considered to be the most common source of lack of rationality. It describes how individuals constantly remove the original beneficial long-term plans by reaping the benefits of short-term gains. When applying the concept of time inconsistency to food consumption it is widely observed that individuals are always eager to begin a diet tomorrow, since the long-term benefits would then justify the lost utility tomorrow, but it will not justify the lost utility of today, because the immediate satisfaction from consuming (fast) food is too high.

Speaking of time inconsistency one understands that short run gains are given more consideration than long run costs. This can be shown graphically by taking a similar graph as in figure 2. The main difference to the graph from before is what is measured on the axes. Here, not the short run consumption of food versus physical activity is measured but the adjusted or long run consumption of food.

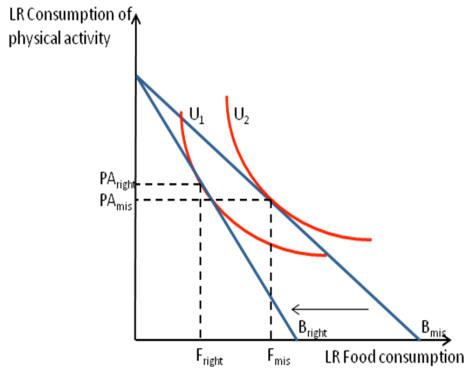


Figure 2: Time inconsistency in terms of long run food consumption and physical activity

This means that the consumption bundles are not computed with the price of the respective good. Instead, the present value (PV) of these two goods is used. By considering the present value, both today's benefits and the future's costs are integrated into the decision making progress. Consider the present value of food and keep the present value of physical activity constant.

$$PV_{food} = P_{food} + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3} - \dots = P_{food} + \sum_{i=1}^n \frac{C_i}{(1+r)^i}$$

The underlying assumption of this formula is that not only acquiring food puts a financial burden on the consumer but there are also future costs associated with food consumption. For positive future costs (C_i), the present value of food will always be larger than the initial price (P_{food}) paid in period zero. Now consider what was said about time inconsistency. There is a tendency for people to under-emphasize future costs incurred by food consumption like for example higher medical costs. Looking at the formula, this implies that the sum is estimated to be smaller than it really is. In the extreme case, future costs are completely ignored and the sum disappears from the equation.

Keeping this in mind, it is now appropriate to consider Figure 3 again. The blue line labeled B_{mis} is associated with a misunderstanding of future costs that puts a downward bias on the present value. Since the present value is very low, the opportunity set the decision maker is presented with gives rise to choose a bundle (F_{mis}, PA_{mis}) such that he can reach the highest possible indifference curve associated with utility U_2 . However, there is a mistake in the calculation from ignoring parts of future cost, thus really, the present value of food is much higher. If this mistake is corrected, one finds that the new budget constraint (B_{right}) is to the left of B_{mis} . Therefore, the decision maker would choose a new optimal bundle giving less utility than U_2 and that consists of more physical activity and less food consumption than the bundle (F_{right}, PA_{right}) resulting from time inconsistency.

The utility level U_2 is nothing more than an illusion. A decision maker operating with B_{mis} , the falsified budget constrained, will incur major utility losses from his idealistic calculation. At some future point, the costs caused by excess food consumption as in the bundle (F_{mis}, PA_{mis}) will accelerate costs and worsen the situation. It is then likely, that this person will eventually be much worse off than another agent who correctly estimated the costs of food.

This discussion shows that if time inconsistency were not an issue, people would engage in more physical activity and consume less food. They would then be capable of correctly estimating the future

costs created by food consumption and realize that they are fooling themselves thinking they can reach more utility by over-emphasizing the present satisfaction derived from food.

The essential conclusion is that people with self-control problems exhibit great difficulties by giving up current pleasure for future benefits. Hyperbolic consumers are not necessarily very price sensitive; they are rather very sensitive to changes in time delay. While people without extreme self-control problems – rational and patient individuals for example – are not affected by the increasing abundance of fast-food and other restaurants, extremely irrational and impatient individuals – like the children – will be hurt the most.

The clustering of fast food restaurants is a trend that has largely contributed to obesity as well. According to Austin, Melly, Sanchez, Patel, Buka and Gortmaker (2005) fast food retails sales in the United States have jumped up by 900% over the past three decades and the number of fast-food restaurants in the country now exceeds 280,000. The fact that the clustering of fast food restaurants is mainly apparent around schools is a troublesome trend. The Figure 3 depicts the location of schools and fast-food restaurants in Chicago. In their research paper Austin, Melly, Sanchez, Patel, Buka and Gortmaker (2005) found that the median distance from any school in Chicago to the nearest fast-food restaurant was 0.52 km, which can be considered as a little walk for an adult. Additionally, 78% of schools had at least 1 fast-food restaurant within 800 meters. Additionally, many schools tend to provide unhealthy and cheap food exposing children to poor-quality food environments in their school neighborhoods.

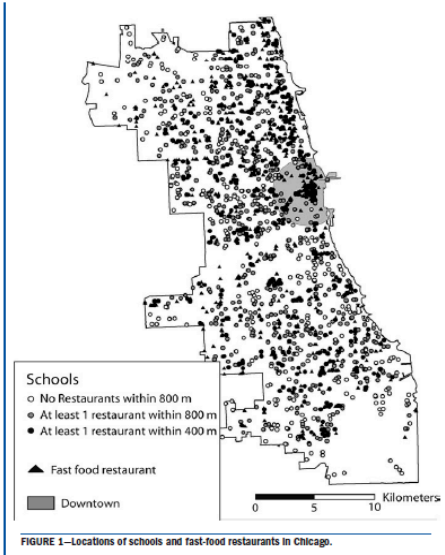


FIGURE 1—Locations of schools and fast-food restaurants in Chicago.
Figure 3: Location of schools and fast-food restaurants in Chicago

Considering that children are rather irrational and impatient consumers, it is easy to understand why the presence of fast-food restaurants is especially critical in school areas.

Besides the economics – its underlying market mechanisms – the beliefs, values and lifestyles of society can also be regarded as a source contributing to obesity. American values are closely linked to words such as individualism, freedom, free will and free market and the absence of restraints on our thoughts. One might question in how far these values can be related to the phenomenon of obesity.

The idea of the free market is nowhere so deeply inherited and supported by the people as in the United States. Companies are supposed to maximize their profits generally without state intervention. There is no economic incentive for companies to restrict their production and supply of fast food

because they would forgo profits. Why would a company that makes a lot of profits through selling fast food want to stop making profits voluntarily? The question is closely aligned with a famous quote by Nobel-prize winning economist Milton Friedman: “Do corporate executives, provided they stay within the law, have responsibilities in their business activities other than to make as much money for their stockholders as possible? And my answer to that is, no they do not (...) there is one and only one social responsibility of business—to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud.” (Friedman, 1970, p.6).

Concluding what has been discussed, obesity in the United States can be regarded as a result of market success - rather than failure - considering the rapid implementation of technological progress in every day's life and the abundance of relatively cheap food. Declaring obesity a victory of market forces is a clear understatement of long run social and economic costs. In the next section, the paper will discuss the social and especially the economic consequences of obesity. Section 4.0 will try to solve the question whether the government should launch particular regulations in the food industry in order to tackle the phenomenon of obesity effectively.

3. Social and economic consequences of obesity

There are multiple diseases like diabetes, hypertension, respiratory disorders and strokes which become much more likely the higher the weight (Brunello, Michaud and Sanz de Galdeano, 2008). Additionally, overweight people are on average disabled for a longer time than people of normal weight when they get older. Not surprisingly, there are tremendous costs for medical care caused by obesity. In the United States for instance health-care costs for overweight people are 37% higher than for people that have normal weight (Loureiro, 2004). In total, the problem of obesity creates costs of \$93 billion every year (Finkelstein, 2008). Not incorporated in these costs is the non-quantifiable loss of utility coming from a lower quality of life.

Obesity can be regarded as a negative externality because it implicitly creates costs for the whole society that are not taken into consideration for individual decision making. Consider Figure 4: Assume there is a marginal private benefit (MPB) from obesity, like utility derived from eating unhealthy and calorie dense food. There is also a marginal private cost (MPC) to the consumer he has to take into account. This could be a higher risk to have a stroke or diabetes or the loss of life quality due to a very large body. These two aspects are felt and seen immediately by the individual. They are the basis for a rational decision making process. The resulting level of obesity for the individual is then O_{ineff} . This level of obesity, however, is not the social optimum because the obese individual causes costs that society has to bear. For instance, an overweight person needs additional medical care

after a stroke that can be traced back to obesity. These costs are not paid by the individual but by social insurance funds. Therefore, the obese individual is an externality to society. In order to construct a graph for the marginal social costs (MSC), the marginal costs to society and the individual have to be added. The individual should choose the level of obesity at which the marginal social cost is just as large as the marginal private benefit. The outcome (O_{eff}) is the socially efficient level of obesity. However, there is no reason for the individual to reduce his level of obesity from O_{ineff} to O_{eff} . This is why obesity remains overproduced.

The externality caused by obesity can be seen as well in the context of medical insurance. Assuming that people can be classified as obese (O) or healthy (H), insurance contracts can be constructed for each group respectively.

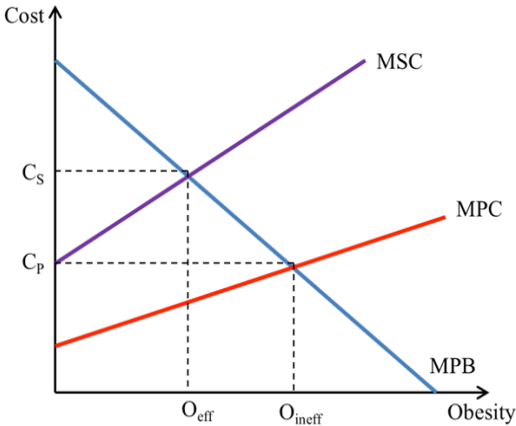
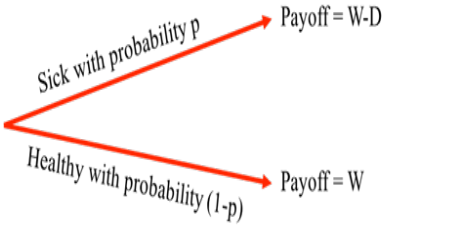


Figure 4: Obesity as a negative externality



Each group has a probability (p) of getting sick. In the case of a disease, costs (D) have to be covered which are subtracted from initial wealth (W). If people choose to buy insurance, they have to pay a premium which is expected costs.

Figure 5: Obesity as health insurance problem

The group of obese potential patients will have to pay a larger insurance premium because there is a higher risk to need medical care ($p_o > p_h$). This higher risk or higher probability to become sick can be translated into the graph seen in Figure 6. The lines labeled B_o and B_h represent the budget constraint of obese and healthy people. They start in the initial endowment ($E = (W; W-D)$) which represents the wealth in the good state when no disease occurs (W_G) and when the disease occurs (W_B) in the case of no insurance. Their slopes are determined from the ratio of being healthy to getting sick. If obese and healthy people can be given different contracts according to their differing insurance premiums, both groups can move along their respective budget constraint and receive full-coverage insurance ($W_B = W_G$). In this case, the healthy people would reach utility level U_h while obese people achieve U_o . This outcome is a separating equilibrium. Obviously, obese people have large incentives to provide false information about their body weight and let the insurance classify them as “healthy” in order to reach a higher indifference curve.

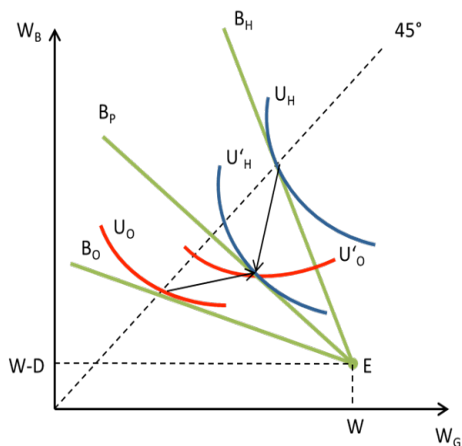


Figure 6: Pooling and Separating equilibrium

If obesity is unobservable for insurances or cannot be taken into account, a pooling equilibrium is the right measure. Everyone has to pay the same premium and can insure along the pooled budget constraint (B_P). As a result, healthy people will suffer larger costs while obese people enjoy a lower premium compared to the separating equilibrium condition. These effects can be traced in the graph as well.

4. Policy implications

Due to the fact, that obesity is gaining ground around the world, it is legitimate to pose the question: Where does social/individual responsibility stop and public/corporate responsibility begin? Public intervention is known to be useful when market failures appear. Therefore, the government should be considered to be one of the legitimate institutions for resolving/reducing the prevalence of obesity. It is hotly debated what exactly the market failures associated with obesity are in this context: lack of information, productive inefficiencies, lack of rationality, health insurance externalities. Nevertheless, there is wide agreement among scientists that policy implementations should address those groups that are most affected by obesity.

One possible reform is the introduction of a minimum wage that increases disposable income of relatively poor households. Consequently these households would now be able to afford slightly more expensive and healthier food. Even though it would impose high costs on the companies, these could be offset by lower medical costs in the future. However, it is questionable whether this policy reform will eliminate the time inconsistency. As suggested by Cutler, Glaeser and Shapiro (2003) time costs of food are more important than the monetary costs of food when tackling the problem of obesity. As depicted in Figure 7, especially low-income households tend to consume a lot of fast food thanks to its high energy density and its low energy cost at the same time.

Considering the discussion about obesity as an externality, a feasible solution would be to introduce a Pigouvian tax on every unit of obesity (e.g. every kilo of gained weight). If applied correctly, this would allow the individual's decision with the socially optimal level of obesity as is shown in Figure 8.

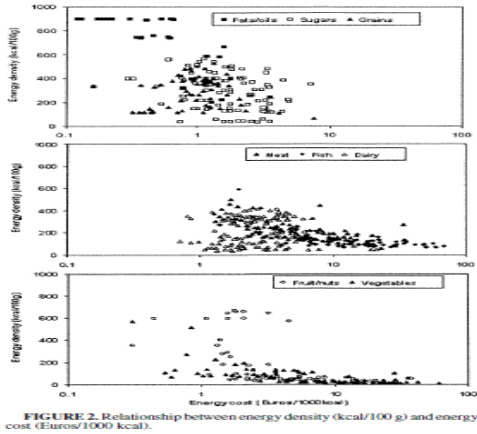


Figure 7 (left): The figure depicts the relationship between energy density and energy cost using a logarithmic scale. The differential in energy costs between the “healthy” and “unhealthy” foods was several thousand percent. Fats and oils, sugar, refined grains, potatoes, and beans provide dietary energy at the lowest cost whereas the cost per calorie of meats, fish and shellfish, dairy products, vegetables, and fruit are much higher. The underlying message should be quite clear: Healthier food costs more and is therefore not feasible for many low income households since their budget set is smaller compared to high income households. (Source: Drewnowski and Darmon)

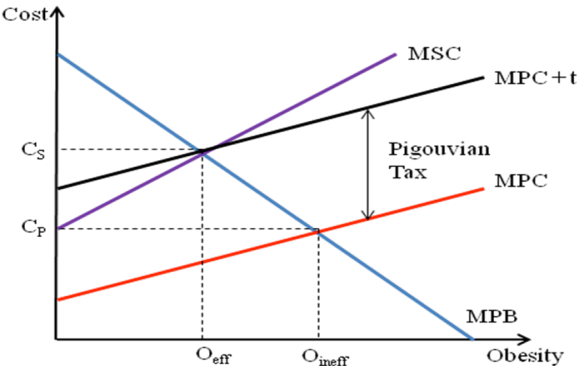


Figure 8 (right): Pigouvian tax as a solution to the negative externality

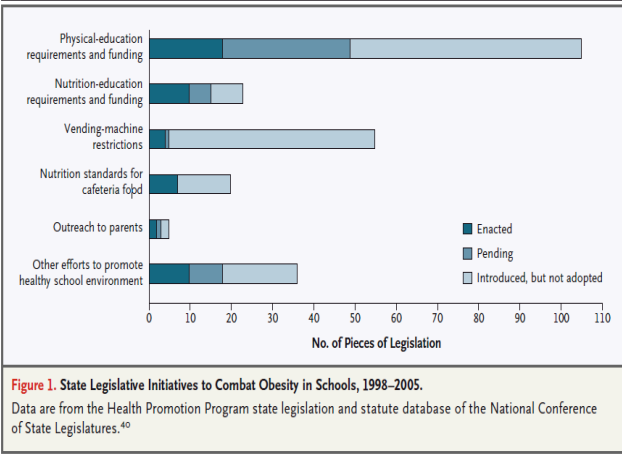
Alternatively, the externality could be removed if every individual had to pay his respective medical bill or if people could be classified as obese and non-obese which is shown in the separating equilibrium in Figure 6. This is not a feasible solution in reality. Medical insurance is based on the idea of risk sharing and it would be a major step back for society to have every one cover his/her own costs. A separating equilibrium is not as easy to construct as the graph shows. Possible solutions would be for insurances to introduce bonuses for people who achieve to lose weight.

Another measure against obesity that could be studied is to reduce children exposition to advertising about food and especially unhealthy food. In 1978, the Federal Trade Commission (FTC) in agreement with the Food and Drug Administration (FDA) tried to regulate some TV advertising about products considered as unhealthy for children. It was exposed to numerous barriers, such as food industries which spent millions of dollars to fight against this law and the difficulty to implement the law. Moreover the FTC was not able to prove that food advertising could engage people in long-term eating habits. Finally the project was abandoned and no one has replaced it. Indeed the American Supreme Court has regularly protected advertising according to the principle of free speech, which can be applied to commercial speech.

At the federal level, the policy to fight against obesity focus on providing more information to the customer, in particular with labelling rules. In 1994, with the National Labeling and Education Act, the FDA required that food packaging contain information about contents such as fat, sugar, sodium, cholesterol ... etc. Labels can be used in order to provide information to the customer about the product he will consume. If people are aware of the various components of the food they eat, the government expects them to make more judicious choices in consuming, and consequently to reduce their consumption of products which could be unhealthy on the long term. It seems difficult, however, to regulate advertising or to impose taxes in the American economic and political context. But it was shown that people are mainly aware of the causes and the danger of obesity, so the solution to provide more information is maybe not the most effective. Moreover, food labels are not targeting children which are the ones who need the more information about what they eat.

At the same time, many American States have proposed and implemented laws at the community level to reduce the problem. They use a huge diversity of programs and rules, mainly targeted at children and schools. The Georgia Department of Human Services (2005) reports that public health staff from local health districts are eager to equip schools with technical assistance and consultation to foster school health promotion policies that are concentrated on physical education, nutrition (and vending machines), and how school staff can model health behaviours (as shown in Figure 9).

From an economic point of view, it is worthwhile to draw two main conclusions from several surveys conducted at many US high schools: the introduction of healthy food in schools seems to be positively related to the performances of children at high school. Additionally, serving healthy and fresh food costs about the same as the normal lunch manual that promotes obesity. Even if serving healthy food was more costly, these additional expenditures could be offset by higher gains in human capital driven by more attentive students.



Based on empirical evidence, human capital is a major source for economic growth within an economy. If there are short-term costs for schools at the community level, the reduction in market advertisement of fast food targeted at children or the introduction of a minimum wage for low-income households at the federal level, the long-run gains of these possible policy changes are not to be underestimated – healthier and smarter children.

Figure 9: State Legislative to Combat Obesity in Schools, 1998-2005

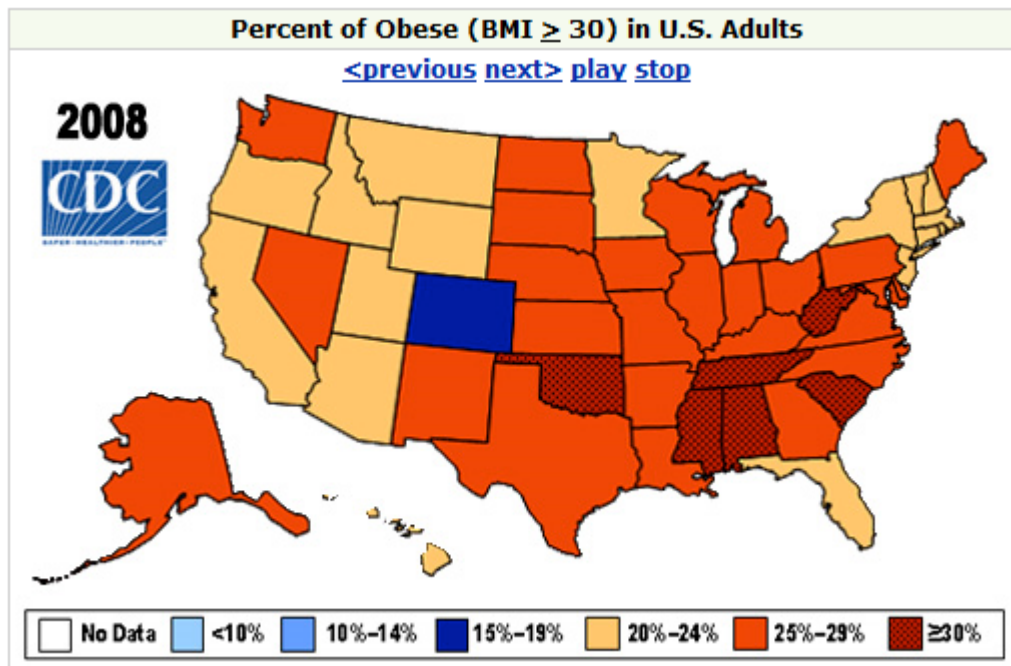
5. Conclusion

Besides analyzing obesity from a sociological, psychological or medical perspective, this subject qualifies to be seen as an economic problem as well. While until very recently, the phenomenon of obesity was only considered to be an individual problem, experts in various sciences are now becoming increasingly aware of the huge costs that obesity generates not only for the individual but for the society as a whole. Even if it might sound contradictory, the paper has clearly found evidence for the existence of a causal relation between market success and high rates of obesity. Market success is especially prevalent in the United States with constantly growing income per head and technological progress. This technological progress influences living habits as shown by the French fries and printer examples. On the other hand, there is a market failure: Obesity is an externality to non-overweight individuals since the costs on society are mostly ignored when consuming fast-food.

This paper suggests several policy implications to mitigate the negative externality which especially focus on children and young adults. A quote by Mahatma Ghandi fits very well in this context: "A nation's greatness is measured by how it treats its weakest members." Children are especially exposed to the problem of time inconsistency and lack of rationality. A child cannot simply weigh up the short run and long run impacts of a decision made today. It is therefore reasonable to target these with measures against obesity in order to get down to the root of the problem. Additionally, there are future gains that come with fighting obesity among children because children socialize to a higher degree, are less likely to get frustrated and tend to perform much better at school (Brunello, G., Michaud P.C., & Sanz-de-Galdeano, A., 2008). Consequently the accumulation of human capital turns out to be much more favourable in terms of education performance and socialization. Inspired by Ghandi's words, it would also be interesting to find out whether obesity affects high- and low-income classes differently. This remains to be an issue for further investigation which is beyond the scope of this paper.

It is not surprising to observe the large spread of overweight across the entire American population. The phenomenon of obesity reflects many American values deeply entrenched in American society. As this paper has illustrated the negative consequences of obesity go beyond the scope of economics. Apart from the medical health and insurance costs that the society has to bear, other negative consequences such as increasing health problems, decreased life expectancy and discrimination are clearly evident for individuals. For this reason, this paper recommends several fields of study - be it medical, psychological or social background - to further deepen their investigation of the phenomenon of obesity. A broader, world-wide approach to obesity certainly needs more consideration since it has become a problem in all industrialized nations and an even greater threat in developing countries.

6. Appendix



2008 State Obesity Rates							
State	%	State	%	State	%	State	%
Alabama	31.4	Illinois	26.4	Montana	23.9	Rhode Island	21.5
Alaska	26.1	Indiana	26.3	Nebraska	26.6	South Carolina	30.1
Arizona	24.8	Iowa	26.0	Nevada	25.0	South Dakota	27.5
Arkansas	28.7	Kansas	27.4	New Hampshire	24.0	Tennessee	30.6
California	23.7	Kentucky	29.8	New Jersey	22.9	Texas	28.3
Colorado	18.5	Louisiana	28.3	New Mexico	25.2	Utah	22.5
Connecticut	21.0	Maine	25.2	New York	24.4	Vermont	22.7
Delaware	27.0	Maryland	26.0	North Carolina	29.0	Virginia	25.0
Washington DC	21.8	Massachusetts	20.9	North Dakota	27.1	Washington	25.4
Florida	24.4	Michigan	28.9	Ohio	28.7	West Virginia	31.2
Georgia	27.3	Minnesota	24.3	Oklahoma	30.3	Wisconsin	25.4
Hawaii	22.6	Mississippi	32.8	Oregon	24.2	Wyoming	24.6
Idaho	24.5	Missouri	28.5	Pennsylvania	27.7		

Published by: Centre for Disease Control and Prevention (2009)

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