

Tackling Child And Adolescent Obesity: An Economical Challenge

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Introduction

Childhood obesity is currently one of the biggest burdens of our society, not only in the West, but worldwide. According to a 2014 study, roughly 110 million children in the world can be considered as obese and a further 200 million as overweight [1]. These depressing figures cannot be ignored and they call for immediate actions by governments to find appropriate solutions. Typically, in the absence of market inefficiencies associated with this epidemic, government interventions to address the issue are mostly motivated by a public health rationale [2]. Nevertheless, some of the most recent publications in the field of economics suggest that an excessive food consumption could be associated with various market failures. Interestingly, this means that policies aimed at reducing obesity may also be justified on grounds of economic efficiency. Given this possibility, a growing number of economists are currently focussing on this epidemic in order to find out to what extent it can be understood and addressed within an economic framework.

In this article, I review the main findings of the literature in this sector in order to present: (i) the market factors causing childhood obesity; (ii) the economic rationales for government intervention; (iii) the possible policy solutions. The aim of this contribution is to give an overview of childhood obesity from an economic perspective and to highlight the role that economics can play in tackling this epidemic.

Economic Causes Of Childhood Obesity

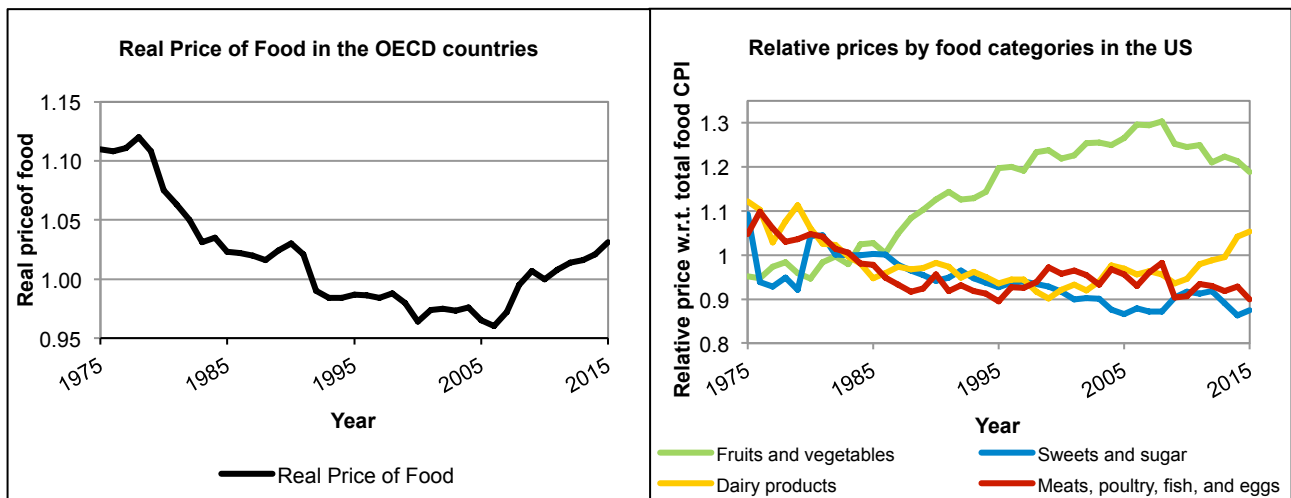
Understanding the causes of childhood obesity is a complex multidisciplinary issue. Nevertheless, economic research can provide precious insights into those market factors that may have contributed to the dramatic spread of this epidemic. In this section, I introduce three possible ways in which the market environment may have led children and adolescents to raise their energy intake over the last 40 years.

- Evolution of Food prices

The real price of food has declined substantially over the last few decades.¹ In the OECD countries, it dropped by almost 14% between 1975 and 2005 [3]. During the same period, the prices of healthy foods increased considerably with respect to less healthy and high-calorie food options. In the United States, for instance, the relative price of fruit and vegetables rose by roughly 25% in the period 1975-2015 [4]. In terms of economic incentives, these changes in food prices have probably had two main consequences on people's diets. First, as foodstuffs in general became relatively cheaper than other commodities, consumers increased their consumption and hence their energy intake. Second, given that fruit and vegetables became relatively more expensive than other categories of food, consumers tended to substitute healthier food with less healthy and high-calorie foods, thus further increasing their intake of calories and gaining body weight.

¹ The real price of food is simply the food price adjusted for inflation. If it goes down this basically means that food commodities become relatively cheaper than other non-food products.

Figure 1 Changes in food prices (1975 – 2015)²



Source: Author, with data from OECD (2016) and US Bureau of Labor Statistics (2016).

This direct link between food prices and consumers' body weight is generally confirmed by the empirical literature. A decrease in the real price of food is often associated with a higher energy intake and an increase in Body Mass Index (BMI) [5,6,7], while an increase in the relative price of fruit and vegetables tends to be associated with a rise in BMI, particularly during childhood [8,9] and adolescence [10,11].

- Reduction in the “time-cost” of consuming calories

Starting in the early ‘70s, the food industry put a wide variety of ready-to-eat foods onto the market as a consequence of the development of new production techniques and treatments that could preserve pre-prepared food before it reached the final consumer. These technological changes gradually moved the emphasis of cooking and preparing food from the household to food suppliers, reducing the time needed to make meals and clean up afterwards. Food became cheaper per calorie and consumers increased both the quantity and the variety of food they consumed [12]. Various American studies have confirmed this by showing that children have substantially increased their energy intake from pre-packaged snacks over recent decades [13,14,15]. These products are usually very high in calories and do not require any sort of preparation. Hence, their consumption is much easier and less time-consuming than other foods.

- Advertising aimed at children

The food and beverage industries spend massive sums on the marketing of junk food chiefly aimed at the young [16,17,18]. Recent estimates show that the food and beverage industry in Europe spends roughly €7 billion yearly on food advertising [18]. Similarly, in the U.S., such figure amounts to \$10 billion per year [17]. A consistent part of these expenditures concerns advertising directly aimed at children and adolescents [17,18]. Although television remains the main channel for these marketing techniques, digital media are increasingly being used too. Viral adverts on internet, mobile devices and social media are now becoming prime strategies to promote food and beverage products to children [19]. Yet, in both Europe and the U.S., the vast majority of the products being promoted have poor nutritional values and are high in either fat, sugar or salt [16,17,18]. This raises a legitimate public health concern since, if these marketing techniques are effective, they risk encouraging unhealthy diets in the young.

² The relative price for each of the four food categories in the graph on the right is computed by deflating their Consumer Price Index (CPI) for the overall food CPI. The data regards price levels for U.S. urban areas.

Research in this area generally supports this idea by showing that food advertising does in fact have a negative impact on children's diets and body weight. Recent studies have found that their exposure to junk food advertising on TV increases their consumption [20,21,22] and that the rate of childhood obesity in the U.S. would probably have been much lower in the absence of these marketing techniques [23,24].³ Furthermore, while the evidence on the effectiveness of advertising through new digital media is still rather limited, some authors hypothesise that they can be even more effective than traditional marketing tools. This is because they tend to be more engaging and interactive, thus leading to a higher marketing exposure, while being less explicit in their advertising content [19,25].

Economic Rationales For Government Intervention

The issue of childhood obesity has raised a legitimate public health concern and is motivating many governments to implement effective policy solutions. Yet improving public health may not be the only justification for government action. Under certain circumstances, an excessive energy intake by the population can be associated with an inefficient allocation of market resources. This kind of situation provides governments with an economic rationale for reducing obesity apart from the question of public health alone. Examples of such market failures can include: (1) *health insurance externalities*, (2) *imperfect information* and (3) *limited rationality*.

What is a market failure?

In economics, any allocation of goods and services obtained through the free market is often considered as the most desirable one. That is, as long as firms and consumers act in their own self-interest, the resulting market outcome is supposed to maximise social welfare. Nevertheless, under certain situations, this result cannot be obtained since the mere pursuit of self-interest would eventually lead to an inefficient allocation of resources. That is, there may be a different market outcome where most individuals could be made better-off. These situations are better known as market failures and can provide governments with sound economic rationales for policy intervention.

Negative externalities are a typical example of market failure. These occur when the actions of firms or individuals are costly to a third party who did not choose to incur in such cost. For instance, this can happen when a polluting firm maximises its profits by setting a production level irrespectively of the social cost arising from its excessive pollution. In this case, the population living nearby experiences a negative externality since it bears health and environmental costs that are not generated by themselves. The government could solve this situation by imposing a tax on pollution that would incentivise the firm to reduce its production to a socially acceptable level.

- *Health insurance externalities*

Obesity-related illnesses may generate societal costs that are not privately borne by affected individuals. It may indeed be the case that people find it easier to live unhealthy lifestyles, consuming more junk food or avoiding healthy physical activity, precisely because they don't have to bear the cost of medical treatments that are caused by their irresponsible behaviour. This can lead to a problem of negative externalities in the public health care system and in the private health insurance market. In order for this to occur, two necessary conditions must be met: (1) the obese must cost more than the non-obese in terms of health care while paying

³ These results should be considered with some caution. Exposure to food advertising is closely correlated with other features of unhealthy lifestyles and hence it is rather difficult to establish a direct causal link between advertising and changes in body weight. To solve this issue, researchers will need to focus on more advanced experimental designs that are able to control simultaneously for these confounding factors [24].

the same insurance premiums;⁴ and (2) in response to this, the non-obese must either be forced to reduce their health insurance coverage because the cost of premiums has risen too much or they must have started to live unhealthy lifestyles involving increased risks to their health [26,27].

While many researchers have focussed on estimating the health care costs of obesity, very few empirical studies have investigated this kind of externality. Not surprisingly, research has suggested that the obese do in fact impose a higher burden on the health care system than individuals of normal weight [28,29,30]. There is also evidence that, due to indiscriminate risk pooling, this can lead to negative health insurance externalities since people's BMIs usually tend to rise after they have taken out a health insurance policy [27,31]. This is presumably because they know that a less healthy style of life will not entail any additional medical costs, since insurance premiums are the same for everyone. According to Bhattacharya and Sood [26], in the U.S., this source of externality can impose a welfare cost of \$150 per capita each year.

- *Imperfect information*

Another source of market failure can be the consumers' lack of information about food products [32,33]. Consumers can find it difficult to assess the effective quality of this food and its possible effects on the health of those who eat it. Retailers, in contrast, are often much better informed than consumers. Food producers and restaurants usually have all the relevant information on the ingredients, the proper procedures for preparation and cooking and the nutritional values of each product they produce or meal they serve. If consumers do not have access to all this information, they may consume too much unhealthy food or not enough healthy products.

Whether this lack of information exists and the extent to which it leads to an inefficient allocation of market resources is still hotly debated. This does not seem to be a significant problem for most European consumers, as less than 9% of European adults claim to have troubles following a healthy diet because of information problems [34]. Furthermore, in both Europe and the U.S., producers are legally obliged to divulge the nutritional and energy values of their products on the market. Thus, as long as parents seem to be fully aware and dispose of all the relevant information about food products, we may not expect kids' health to be at stake for a lack of information in the food market.

Yet, understanding nutrition information can be difficult and very costly, Therefore, the mere presence of information on food packaging does not necessarily imply that consumers are well-informed about the healthiness of a product [2,35]. A recent review of the literature on knowledge of nutrition and people's diets shows indeed that individuals with a better understanding of nutritional information usually have healthier diets than others [36]. This suggests that if consumers are not sufficiently knowledgeable about food and nutrition, their understanding of food information can be limited and their food choices, together with the ones of their children, may not be optimal.

- *Limited rationality*

A third economic rationale for government intervention is that individuals, particularly children, are not fully rational consumers. That is, they cannot correctly consider the consequences of their consumption behaviour on their health when making food consumption choices. Following the literature on behavioural economics, there could be at least two ways in which this can happen. These are *lack of self-control* and *limited attention* to product attributes.

⁴ This means that the obese and the non-obese must be lumped together in the same insurance pool so that insurance premiums do not adjust for the different health risks of the different persons insured (risk pooling). This condition is more likely in public health care systems, which are thus more exposed to this type of externality.

1) *Lack of self-control*

Deciding whether or not to consume unhealthy food often involves a trade-off between instant gratification and future health consequences. Truly rational consumers would be able to reasonably consider this trade-off at any moment of their lives, on the basis of their own specific food preferences. This means that if they were to decide that the benefits of going on a diet outweigh the pleasure of consuming tasty food in future, then they would actually go on a diet, and stick to it. For consumers with problems of self-control this is never a realistic scenario. Even if they are willing to go on a diet, they always prefer the instant gratification and pleasure they get from a tasty meal to the possible future health benefits of going on a diet. These consumers are therefore destined to suffer the negative consequences of their unhealthy eating habits, as well as regretting their previous consumption decisions. In economics, this time-inconsistency in consumer preferences is often expressed by means of models of *hyperbolic discounting* [37]. In these models the consumer's discount rate between the present time and the near future is larger than the discount rate between any other future periods. Interestingly, empirical research confirms that this consumption behaviour is positively related to an increase in BMI [38,39,40] and obesity [41,42].

2) *Limited attention*

Another possibility is that individuals are inattentive to the health consequences of consuming unhealthy food. While standard economic models assume that consumers are fully informed and that they correctly process all the information they are given about a product, recent evidence shows that such behaviour should not be taken for granted. Even when consumers are fully informed about the characteristics of a product, they sometimes take in just the more visible or prominently publicized information [43,44]. This can lead the consumer to misperceive the “true” worth and benefit of a product and thus to make suboptimal consumption choices [45].⁵ To my knowledge, no empirical studies conducted until now have tested models of *limited attention* in the context of food demand, and yet the current food market environment strongly suggests that some kinds of product information are much more visible or salient than others. As we have previously seen, while child-oriented junk food advertising is massively present in food markets, little or no media coverage is given to raising the awareness of children and families regarding the negative health consequences of these products [16,17,18].

Policy Solutions

In order to solve these market inefficiencies, governments can adopt effective policy solutions to ensure the optimal allocation of market resources. If a policy designed for this purpose is also effective in reducing obesity, then it will be justifiable from both an economic and a public health perspective. In this section, I will discuss a number of policy interventions that could be implemented in order to resolve the above-mentioned market failures in the context of excessive food consumption.

How to evaluate the impact of policy interventions on market efficiency?

When market failures occur, governments may improve social welfare through policy interventions that leads to a better allocation of market resources. In order to assess the effectiveness of a given policy, economists firstly need to derive a social welfare function that ranks different allocations of market resources from the less to the most desirable one from a societal perspective. This function is usually identified as the summation of each individual well-being under different market outcomes. Once this function is derived, it is then crucial to assess how such policy would change (ex-ante evaluation) or

⁵ Although this behaviour seems to be similar to the one deriving from an imperfect information, we should distinguish the two. While under imperfect information the consumer would be able to make optimal food choices once missing information are provided, this might not happen under limited attention. This is because the consumer, by placing more attention to some information than others, could actually ignore new information provided.

changed (ex-post evaluation) the behaviour of firms and consumers, and hence their well-being. This will allow to check whether the new allocation of market resources is preferable to the previous/existing one from a social welfare perspective.

- Fiscal policies

The taxation of junk food and subsidizing of healthy food are often seen as being possible solutions to the problem of obesity. These policies can indeed raise the relative price of unhealthy food and thus discourage its consumption. They can also be useful to solve at least two market inefficiencies associated with an excessive energy intake.

First, the taxation of unhealthy food could act like an implicit insurance premium aimed at eliminating the social losses due to health care insurance externalities. An excise tax levied on unhealthy food could eventually lead obese consumers to internalise this source of negative externality [46]. The resulting tax revenues could then be used either to directly cover individuals' medical expenditures, in the case of publicly funded health care, or to reimburse private insurance companies, in the case of national health care administered by the private sector [46].

Second, taxing junk food and/or subsidising healthier products could be used to correct self-control problems. By raising the relative price of unhealthy food, these policy instruments can persuade people to resist the temptation to consume unhealthy food and to start buying less tempting but healthier products [47,48]. Importantly, the effectiveness of such policies heavily relies on the consumers' behavioural response to price variations, as more sensitive consumer demand is to food prices, the more effective these commitment devices will be.

Numerous empirical studies have focussed on estimating the impact of food taxation and/or subsidies on food demand [49-53]. This literature usually models consumer demand for food in order to estimate its price elasticities econometrically. Once these estimates have been obtained it is possible to simulate the impact of a given price variation due to a tax or subsidy scheme on consumer food intake. A limitation of this literature, however, is that it assumes food markets to be perfectly efficient and hence it does not account for any possible sources of market inefficiencies when evaluating the welfare impact of these policies. This can often lead the authors to mistakenly conclude that these instruments would undermine the market efficiency and thus economic welfare, since they would distort the optimal choices made by consumers.

- Informational programmes

Governments can solve the lack of information about food on the markets either by directly providing it to consumers or by imposing a legal obligation upon firms to disclose it. For instance, public authorities can fund media campaigns that provide additional information to children and parents about the health risks of consuming too much junk food or they can oblige food manufactures and restaurants to divulge detailed nutritional information regarding their products [32]. On average, evidence indicates that these measures do actually affect consumer choices, with research showing that the introduction of nutritional labels on pre-packaged food is often associated with an increase in healthier diets [54] and that media campaigns can increase the general consumption of healthy products [55]. Nevertheless, there is little evidence that the indication of calories on restaurant menus significantly affects people's choices. [56].

Many authors, however, suggest that both governments and researchers should make greater efforts to find more effective formats in order to present nutritional information in ways that are simple and understandable, especially for children and adolescents [32,54,57]. For example, it has been shown that consumers are more responsive to the calorie labels on restaurant menus when information on recommended daily energy intake

is also included [58] or that introducing “traffic light” food labels can lead people to further improve their diets [59,60].

- Limitations on food advertising

The evidence that unhealthy food advertising may have caused obesity rates in children and adolescents to rise is now pushing governments to implement limitations to these marketing practices aimed at the young. In this regard, some studies have reported that limiting television food advertising can have a beneficial impact on kids’ diet [23,24]. Besides improving public health, however, these measures may be also justified on grounds of market efficiency if it is the case that consumers are inattentive to junk food information. By emphasising the more attractive qualities (such as flavour, appealing packaging or low price), junk food advertising can in fact distract inattentive children and parents from considering the health consequences of an excessive consumption of these products.

To my knowledge, no studies have so far attempted to evaluate the impact of these policies in a framework of *limited attention* due to bounded rationality. Assessing the genuine impact of limitation to food advertising on market efficiency in such a context can be rather difficult. This is the case firstly because it is not a straightforward task to estimate the inefficiency arising from limited attention. Neither the economic nor the psychological literature provide clear indications for measuring the salience of information [45]. Secondly, this kind of assessment is difficult because very complex experimental designs need to be employed in order to establish a robust causal link between a reduction in the exposure to food advertising and food choices [24]. Nevertheless, new insights from neurosciences may help overcoming these issues. For instance, recent evidence from a brain examination study finds that obese children are significantly more sensitive to food images than lean subjects [61]. This does not only suggest that it is important to account for heterogeneity across the population when evaluating the impact of food advertising, but it also open up to the possibility that future research in this field can give a measure of the salience of food information and its impact on food choices.

Conclusions

Economic research has shown that the issue of childhood obesity can also be understood and resolved within an economic framework. At least three market factors could have contributed to the spread of this epidemic. First, the evolution of food prices, which incentivised people to consume more calorie-rich and unhealthy food. Second, technological changes in food production that reduced the time-cost of consuming calories. Third, massive junk food advertising campaigns aimed at the young. Furthermore, various market inefficiencies seem to be associated with an excessive calorie intake. These include health insurance externalities, information failures and limited rationality. This provides governments with additional economic rationales for reducing obesity aside from reasons of public health alone, although further research is still needed to investigate these sources of inefficiencies, as the empirical evidence in the field is still rather limited, especially in Europe. Taxation on unhealthy food, changes to labelling and the imposition of limitations on junk food advertising are some of the policy options that could be introduced to address these market failures. In order to correctly evaluate their impact on economic welfare, however, there is a basic need for policy evaluation frameworks that would account for the possible sources of market inefficiency associated with the obesity epidemic. This provides an interesting opportunity for future research.

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