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Fiscal measures to promote healthier choices: an economic perspective on price-based interventions



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ABSTRACT

Introduction: Non-communicable diseases strongly linked to lifestyle factors create an increasing burden of disease. Fiscal interventions (tax and subsidy) are one approach to improving lifestyles, but their effective design might be improved.

Economic framework: Conventional economic theory suggests that fiscal interventions are only used to correct prices for externalities (costs or benefits imposed on others). These can be difficult to calculate accurately. Fiscal interventions operate by altering the prices that consumers face. Price increases are predicted to reduce demand, and the size of the effect is measured by the price elasticity. Tax changes may not translate directly into price changes, however.

Evidence for the effect of taxes, subsidies and prices: There is strong evidence for the effectiveness of taxation in relation to reducing tobacco and alcohol consumption and resulting harms. There has been less evaluation of taxation in relation to other unhealthy behaviors or of subsidies to promote healthy behaviors.

Discussion: Fiscal levers have been used as interventions to improve health rather than for market correction. Taking account of behavioral insights may improve the design of fiscal interventions and combining interventions may increase effectiveness.

Conclusion: Both types of intervention have a role in improving health, but there may be challenges in promoting uptake of healthy behaviors.

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Introduction

Non-communicable diseases (NCDs) such as cancer, heart disease, stroke, and diabetes are amongst the leading causes of morbidity and mortality in higher income countries and increasing in low- and middle-income countries,¹ and their prevalence is strongly linked to lifestyle factors including diet,

sedentary behavior, smoking, and alcohol. In the United Kingdom, the mortality rate from some NCDs, particularly heart disease, has been falling, but they remain the leading cause of death, and there is an increasing burden of disease as people live longer in ill health.

There are many factors which contribute to unhealthy lifestyles; individuals make choices about what to consume,

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but these choices are shaped and constrained by their life circumstances and environmental factors. There is a general consensus that action is required across a broad range of causes and settings that contribute to unhealthy lifestyles. However, this article focuses principally on an economic perspective of the role of fiscal interventions (taxes and subsidies) and other price-based policies in promoting healthier choices.

This is not intended to imply that this is the best or the only way to address health behaviors or that individual health behavior is the only factor that should be addressed. In the discussion, it is argued that the formation of policy should consider a broad range of effective interventions, including smarter fiscal interventions and other price-based policies and take account of the relative costs and benefits of individual interventions as well as the combined efficiency of multiple interventions.

The next section outlines the economic framework which underpins the application of taxes, subsidies, or other price-based interventions. This is followed by a focused review of the evidence relating to health behaviors which is intended to provide an insight into the different challenges posed by the varying characteristics of the behaviors and the different nature of the economic decisions that are involved. The discussion considers how the effectiveness of fiscal interventions and price-based policies might be improved as well as their role in relation to other potential economic interventions.

Economic framework

Consumer perspective

The underlying model for the economics of consumer choice assumes that individuals behave as if they are allocating limited resources (time and money) across a range of goods and services such that the benefit they receive is maximized, based on the cost to them of acquiring the goods and services. Individual preferences are taken as a given, and these preferences are complete and stable over time. Consumers are assumed to act rationally and to know what is in their best interest, making decisions accordingly. This is the principle of consumer sovereignty. Clearly, the real world does not conform exactly to this model, and this is explicitly recognized in the phrase ‘as if’ above. The strength of this or any model lies in its ability to make reasonably accurate and testable predictions of what will happen when conditions change.

Within the given parameters, the economic model can predict how the use of any price-based intervention, including taxes or subsidies, will affect demand for a particular product or service. The direct effect of a price increase (decrease) on any good is to reduce (increase) purchases of that good (and any complementary products) and increase (reduce) purchases of goods which are substitutes. One practical difficulty in relation to the goods or activities relating to health behavior is that these are typically classes of goods or activities, and consumers can maintain a higher level of consumption by substituting within a product category; for example, switching to a cheaper brand of alcohol or tobacco. This phenomenon is

known as trading down and implies that from a public health policy perspective, the lowest prices in any particular market are important.

The economic measure of the effect of a tax or other price change can be expressed through the price elasticity; this is the ratio of the change in quantity to the change in price. If a 10% increase in price reduces the quantity bought by 5%, the price elasticity is -0.5 . Price elasticities are almost always negative (price increases reduce the quantity purchased). If the price elasticity is between 0 and -1 , then demand is described as inelastic; that is, the quantity purchased falls by a smaller percentage than the price increase. All other goods with a negative price elasticity have demand that is elastic. Price elasticities vary considerably across goods related to health behaviors, across time, and across countries and depending on the estimation methods and data sources used. Estimates will also vary when there are differences or changes in the use of other policies to promote healthy behavior. In some cases, these could reinforce the price effect, e.g. a media campaign coinciding with a price change. In other cases, there may be reverse effect; for example, the use of licensing restrictions to regulate access to alcohol or tobacco can create a higher time cost, making money price relatively less important than in settings where access is less restricted.

The consistent finding, however, is that price elasticities are negative and therefore a tax (subsidy) on unhealthy (healthy) goods, leading to a price increase (reduction), will reduce (increase) the quantity purchased, all other things being equal. One of the things that may not remain equal is household income; if incomes increase more rapidly than the price of unhealthy goods, then this will make them more affordable and dilute any effect of a tax increase. Thus, it is the real terms price change (adjusted for income) that determines the impact of a tax or subsidy. Note that a change in tax or subsidy also has an indirect effect on real income.

For a health behavior such as smoking, where quitting confers more health benefits than cutting down, it is also possible to estimate the effect of tax changes (the tax elasticity of quitting) with appropriate data.² Similarly, the effect on smoking initiation can also be estimated.

Producer perspective

Although the consumer or purchaser of goods and services is most often seen as the focus for government fiscal interventions and is generally given the most attention in the discussion of taxes or subsidies, these can also be directed toward changing producer behavior. Determining the target or subject of a tax or subsidy is one feature of designing a fiscal intervention,³ and in some contexts, intervening with producers may be a more efficient approach. A brief consideration of the producer or supply side of the market and their potential role in determining what is supplied and at what price follows.

In the basic economic model, consumers are price-takers; i.e. they respond to whatever price is set by the market. This model also assumes that there are many firms competing to supply a particular good or service, which has identical characteristics, and this process of competition will determine the market price. As with the consumer side of the

market, this model abstracts from reality to provide a starting point for analyzing producer behavior. Just as maximizing utility is taken to be the aim of consumer behavior, profit-maximizing is the aim of producer behavior. To achieve this, producers have to be cost-minimizers, in the sense that they produce a specified good efficiently. If costs are reduced by changing quality, then this is, in effect, a different good. Producers will, therefore, respond to changes in the costs that they face, just as consumers respond to price changes. Thus, fiscal interventions on the producer side of the market have the potential to change what is consumed.

Intervening in the market

Within the economic model outlined, intervention can be justified where there is deviation from the conditions of perfect competition, and this occurs rather frequently. Externalities provide one such justification. External costs (or benefits) arise when costs (or benefits) accrue to others in society and are not taken into account in the market. This provides the main economic justification for taxing harmful goods or subsidizing beneficial ones.

In strict economic terms, the tax or subsidy should be set at a level that equates the private cost (benefit) with the social cost (benefit) at the margin that is to say measured on the last unit purchased, sometimes referred to as a Pigouvian tax.⁴ This approach faces a number of difficulties, not least of which is calculating the external cost where there can be considerable debate about what counts as an external cost as well as how to measure it.⁵ Even if the external cost can be agreed, the relationship between consumption of an unhealthy product and the resulting harms is not necessarily linear. Taking alcohol as an example, health risks are not linear, and other harms, including antisocial behavior, may only arise with excessive consumption. The optimal tax might be one which increases with consumption, and this seems impractical.

The focus of these debates has been almost exclusively based on considering the externalities as arising from consumer decisions rather than producer decisions. While producers will argue that they respond to consumer demand, production decisions such as whether to produce a more or less healthy version of a particular good will not take account of potential external costs or benefits. They will take account of whether there are different input costs and what the effect will be on demand for the product. From an economic perspective, it is just as valid to tax or subsidize inputs to the production process that generate the externalities that arise from the consumption of the product. While the increase or reduction in production cost will be reflected in the final price to consumers, this approach provides an incentive for producers to reformulate products.

If the existence of external costs (or benefits) provide an economic rationale for intervening in markets, other major challenges to the conventional economic model come from the recognition that individuals are not always fully informed, particularly when faced with many alternatives, and preferences may not be complete or consistent, particularly over time. Imperfections also exist on the producer side of the market. Competition may be limited by the concentration of

production or retailing in large companies. Various forms of product promotion may be used to increase sales. Lower prices for larger sizes (volume discounts) may be justified by economies of scale (lower costs) in production but will increase purchasing and, potentially, the amount consumed per occasion. This is particularly true in relation to low price offers to upgrade portion size or add side dishes to a meal. The very complexity of real world decision-making may lead to consumers using shortcuts (decision heuristics) when taking decisions, and the implications of this for fiscal interventions will be picked up in the discussion.

Evidence for the effect of taxes, subsidies, and prices

The relevance and impact of fiscal instruments in advancing public health goals has been varied and depends to a certain extent on characteristics of the health behavior being addressed and the object (good or activity) to which the fiscal instrument is applied. In this section, an overview of evidence is presented for different health behaviors which exemplify some of the different challenges they pose.

Smoking

There has been widespread use of taxation over an extended period of time to address smoking behavior. Substantial levels of taxation have been applied to tobacco in the United Kingdom, partly as a revenue raising activity but increasingly as a public health measure, as the evidence of health and social harms has accumulated. Currently, the tax on a typical packet of 20 cigarettes can account for around 80% of the selling price and comprises a flat duty of £4.57 plus 16.5% of the retail price plus value added tax (VAT) of 20%. As a result, there has been considerable impact on affordability, and this has contributed to reduction in consumption. It should also be noted that the flat rate element of the tax ensures that the percentage tax is higher on cheaper products, which means that the affordability of the cheapest product is affected most by the tax.

Tobacco has become 40% less affordable in the United Kingdom since 1980; much of this effect has been concentrated in the more recent period between 2006 and 2016, when tobacco became 27% less affordable.⁶ Increasing tax rates may not in itself ensure that tobacco products become less affordable as this may be affected by the response of producers or retailers. While evidence from the United States⁷ suggests that cigarette taxes are overshifted (prices to consumers increase by more than the tax), in the United Kingdom, part of recent tax increases have been absorbed by producers or retailers resulting in under-shifting, particularly for cheaper products.⁸

Smoking prevalence has fallen steadily in the United Kingdom from around 40% in 1980 to 16% in 2016.⁹ Accurately measuring the impact of tax policy on health behaviors is confounded by the coterminous use of several policy instruments. Thus, tobacco control policy in the United Kingdom has not relied solely on tax measures but an array of interventions including public health information, individual

support for smoking cessation (including the development of nicotine replacement therapy (NRT) and other products to reduce craving), regulation of advertising including at point of sale, and most recently plain packaging. However, Forster and Jones² estimated a tax elasticity of quitting of -0.6 for men and -0.46 women using British data from 1984, which would predate much of the increase in use of other interventions. These figures are interpreted as years of smoking avoided as a result of quitting; thus, a 10% real increase in tax would, on average, produce a 6-year reduction in years of smoking by men. Furthermore, it is estimated that doubling the price of tobacco in real terms worldwide would reduce prevalence of smoking by a third.¹⁰

Alcohol consumption

Alcohol consumption shares some characteristics with smoking but also some differences. Both behaviors can be considered non-essential; i.e. it is not necessary for anyone to smoke or drink alcohol. However, while there are clear health risks associated with any smoking, there is less consensus about health risks associated with any consumption of alcohol as opposed to excessive consumption of alcohol. A large majority of the adult population consume some alcohol, whereas smokers are a decreasing minority. However, clear associations have been shown between tax levels and health harms from alcohol.^{11,12}

There is a long history of taxing alcohol as a revenue raising mechanism, but the focus on tax as a public health measure is more recent. The UK taxation of alcohol is complex; while VAT is levied uniformly at 20%, alcohol duty rates are applied differently to different products and are not directly based on alcoholic strength, resulting in a tax rate per unit of alcohol that varies both between products and, in some cases, within products. Spirits are the only product where duty is proportional to alcoholic strength and is currently 28.74p per unit of alcohol. However, the duty per unit on the lowest strength of still cider would be nearly the same (27p per unit), whereas duty on strong cider would be only 7–8p; this is because cider is taxed on the volume of product, within bands, and not on the volume of alcohol.

In contrast with the situation with smoking, alcohol has become 60% more affordable since 1980, despite tax increases,¹³ although the increase in affordability has reversed more recently. Alcohol consumption has begun to fall more recently; the volume of alcohol released for sale per adult in the United Kingdom peaked in 2004/5,¹⁴ whereas the increase in affordability peaked a little later in 2007.¹³ This more recent reduction in the affordability of alcohol in the United Kingdom owes more to falling real incomes than to higher taxation. One reason for the increase in affordability, particularly with respect to alcohol sold for home consumption (off-sales), has been the failure to pass on tax increases,¹⁵ with supermarkets often promoting alcohol products as loss leaders, with the aim of increasing footfall and overall sales. Legislation has been introduced to prevent 'below cost' selling; i.e. alcohol cannot be sold for less than the combined duty and VAT payable. However, products can still be sold for less than their true cost.

It was in response to the specific problem of very cheap alcohol fueling problem drinking that the Scottish

Government passed legislation in 2012 to allow the introduction of a different type of price intervention, minimum unit pricing (MUP) per unit alcohol. This establishes a 'floor' price across all types of alcohol product below which alcohol cannot be sold. The relative effectiveness of increasing the lowest prices in the alcohol market, compared with increasing the average price, had been demonstrated by Gruenewald et al.¹⁶ It was shown that a price increase targeting lower cost products would reduce the volume of alcohol sold by 4.2% compared with a reduction in sales of 1.7% when prices increased across all products. Some Canadian provinces operate a similar policy of Social Reference Pricing; increasing this minimum price has been shown to be associated with reductions in alcohol consumption and alcohol-related health harms.^{17,18} Legal challenges delayed the introduction of MUP until 2018, and the effects are currently being evaluated. However, modeling of the policy's effect on problem drinking suggests it will be more effective than large tax increases in reducing alcohol consumption by the heaviest drinkers.¹⁹

MUP cannot be described as a fiscal intervention, but it is a price-based intervention that affects the supply of alcohol products. Scotland had previously introduced other restrictions on 'irresponsible' price promotions, which were defined as those which would potentially encourage increased alcohol consumption over a period of time. This was initially targeted at 'happy hour' offers and other short-term price reductions within licensed premises but was later extended to all volume-based price discounts. Again, this is aimed at restricting some aspects of price setting on the supply side of the market where these have been associated with adverse drinking behavior.

Food taxes and subsidies

Moving into the area of food and healthy diets provides different challenges for policymakers when compared with smoking and alcohol. Food is an essential commodity, and the challenge is to implement taxes, subsidies, or other price interventions that will promote healthier choices without causing potential hardship to low income groups. The aim of fiscal interventions should be to achieve a healthy diet through increasing the consumption of healthy foods, reducing the consumption of unhealthy foods, and reducing excessive calorie intake. Healthy foods include those which are less processed and are high in fiber and important nutrients such as fish oils. Unhealthy foods are those which are high in fat, sugar, and salt and usually highly processed and energy dense. In this context, it is particularly important to consider what is to be taxed or subsidized but also how the tax is to be applied. Taxes or subsidies could be applied to particular foods and to particular nutrients or could be applied on the basis of calorie content or energy density.³

Most evidence in this area relates to the effect of interventions aimed at directly increasing prices paid by consumers for specific products. Recently, however, attention has been shifting to other uses of taxation which may be more suitable for the complexities of improving diets. Taxes which target nutrients rather than products may be more effective,²⁰ and if these are taxed as inputs to food production, they may induce behavior change in producers. The soft drink industry

levy, which was introduced in the United Kingdom from April 2018, targets the sugar content of certain sugar-sweetened beverages (SSBs).

The tax is levied on producers of soft drinks based on their production of soft drinks within two bands of sugar content, with a zero levy for drinks containing less than 5 g of sugar per 100 mL. A stated aim of this policy was to encourage reformulation of soft drinks with a clear incentive for producers to reduce sugar content to avoid or reduce the tax. In this respect, the levy has been successful with the government reporting that more than 50% of manufacturers had reformulated drinks.²¹ However, the decision on whether to pass on the levy to customers, in part or in full, by charging higher prices for drinks with a higher sugar content is left in the hands of the suppliers (producers and retailers).

The most obvious marker of the health issues relating to food intake is the increased prevalence of obesity,²² which almost doubled from 15% of adults in 1993 to 26% in 2016. This is, of course, also related to increasingly sedentary lifestyles (see Physical activity subsection below). Considering general price trends, until relatively recently food was becoming more affordable in the United Kingdom. Food prices fell in real terms by nearly 30% from 1980 to 2007.²³ This was followed by a sharp increase in prices as a fall in real incomes combined with increasing prices; real prices began to fall again from 2014. The effect of this natural change in the affordability of food reveals interesting evidence about consumer responses, with consumption of relatively unhealthy food categories being protected, partly by trading down to cheaper alternatives, and consumption of fruit and vegetables falling.²³

There have been relatively few evaluations of implemented tax initiatives relating to unhealthy foods, although there have been many modeling studies based on price elasticity data. A recent review by Marron et al. in 2015, specifically relating to taxation of unhealthy food and drink, suggests that well-designed taxes may be helpful, but the evidence to date is rather limited.²⁴ In particular, more evidence is required both on substitution effects and on the response of food industry.²⁵ Substitution effects will not necessarily undermine specific food taxes²⁶ but need to be carefully considered.

The most frequent target for taxation has been SSBs, and mixed results have been reported. Very small taxes, mainly as a revenue raising device, produce limited effects. Collins et al.²⁷ estimated that a 10% price increase would reduce SSB consumption in the United Kingdom by 4.6%, and a 20% price increase would reduce consumption by 9.1%. Evaluation of an 8% tax on non-essential foods in Mexico²⁸ indicates that the effect of the tax in reducing purchases increased over time (year two compared to year 1 post tax) and that the effect was concentrated in households defined as unhealthy purchasers pretax. In Hungary, taxing unhealthy foods produced a shift from processed to unprocessed foods, with the lowest income groups being the most responsive.²⁹ Although the tax on fat in Denmark was short-lived, it did impact on household purchases.^{30,31}

Rather less evidence is available on the potential effect of subsidies for healthy eating, although these are included in some modeling studies. Specific interventions to promote healthier eating have tended to take the form of vouchers for fruit and vegetable purchases usually targeted at low-income

households. The UK Healthy Start scheme, for example, increased expenditure on fruit and vegetables by 15%.³² These are not strictly a fiscal measure as they are a form of income supplement, reducing the price of voucher purchases to zero and potentially freeing income to spend on other things. However, insights from behavioral economics suggest that there is a tendency for consumers to earmark money for specific purposes (known as mental accounting) such that food vouchers will increase total food expenditure.³³ In the Healthy Start scheme, expenditure only increased among recipients who previously spent less than the voucher value.³²

Physical activity

Using taxes, subsidies or price-based interventions to increase physical activity presents a different set of challenges when compared with the other health behaviors considered previously. Apart from some extreme exceptions, everyone spends some time in some level of physical activity and is sedentary for some time. While shifting the balance toward greater physical activity may involve financial costs for some activities, the main cost to individuals may be time costs, which have been shown to be a greater barrier to physical activity than monetary costs.³⁴ Physical activity required in the workplace, which could be considered as physically active time which was being paid for, has declined over time.

There is very limited evidence relating to the use of taxes, subsidies, or price-based interventions relating to physical activity and sedentary behavior. A systematic review³⁵ identified just 13 papers, and this included evaluations of transfer payments and the effect of congestion charging, where there would be an indirect effect of improving the environment for active travel.

Subsidies to public transport could also be seen as promoting active travel but are primarily aimed at meeting other policy objectives. In Canada, schemes to provide tax credits or refunds for enrolling children in physical activity programs and exemptions from sales tax for sports-related goods have been introduced at federal and provincial levels³⁶ but do not appear to have been evaluated in terms of increased physical activity.

Discussion

From the perspective of economics, the most controversial aspect of any intervention in the market is the potential violation of consumer sovereignty. The economic principle underlying fiscal interventions is that they should be market correcting; i.e. they should ensure that the prices consumers face reflect the social cost of their choices. In practice, the optimal level of tax or subsidy can be difficult to determine, and fiscal interventions are more often judged on their effectiveness in reducing health and social harms and promoting positive health and social outcomes. There is a strong argument that the choice of interventions to promote health should be based on the costs and benefits to society, including the individuals whose choices are affected. The best interventions, or combination of interventions, would have the highest ratio of benefits to costs.

The available evidence relating to fiscal levers is variable across different health behaviors. Far more use has been made of taxation for tobacco and alcohol than for diet and physical activity, partly reflecting the greater complexity of these latter behaviors and partly the fact that they are so embedded in daily activity. Levels of taxation for tobacco have been kept sufficiently high to reduce affordability and make a contribution to reducing smoking prevalence. However, alcohol has until recently become more affordable as tax increases have not kept pace with real incomes. Different approaches to targeting the cheapest alcohol products are now being evaluated.

Fiscal levers aim to alter the prices that consumers face, but cost includes other factors particularly time. Convenience foods, which free up time from food preparation but may be energy dense, have played a part in fueling the increase in obesity. So too has the increasing availability of food outside the home. While the underlying economic principle that higher prices will reduce demand will hold the scale of effect is less predictable. Other interventions apart from fiscal policy can increase the non-monetary cost of unhealthy behaviors, for example, regulations that impact on availability of unhealthy products increase the time and effort involved in acquiring them.

Smarter design of fiscal instruments could provide more effective interventions. Ensuring that affordability is taken into account is one of the principles suggested for ‘smart’ taxation.³⁷ In relation to food, taxes (or subsidies) that give manufacturers incentives to reformulate products may have greater impact than taxes applied directly to the products. The design of fiscal interventions also needs to be informed by consideration of potential behavioral responses; particularly, the likelihood that some consumers will switch to cheaper versions of the same foods, which may be even less healthy.

Behavioral economics uses insights from psychology to investigate the systematic biases in decision-making that cannot be addressed satisfactorily within the conventional model. Within this model, the failure of individuals to follow their own best interests has been described as an ‘internality’ or within-person externality,^{38,39} but there is considerable debate within economics over who decides what the better choice is when assisting individuals to make better choices and the value judgments this implies. However, there is potential for behavioral economics to contribute to the design of better interventions.

Perhaps, one of the most important insights from behavioral economics is that consumers apply shortcuts when facing complex decisions, and these shortcuts produce systematic bias. For example, status quo bias suggests consumers are more likely to choose the same foods or familiar foods rather than consider all the alternatives. Introducing a fiscal intervention may then be less effective unless the consumer is aware of the price change. If the consumer is unaware of the price change, then the intervention is not salient to their decision-making. Decision-making can also be affected by context or feelings (the affect heuristic); for example, consumers make a different, less healthy, food choice when they are feeling hungry. It has been suggested that this bias could be addressed by per-

commitment devices such as pre-ordering lunch at school or in work places.

Interventions to address these and other potential biases in decision-making have been popularized as ‘nudges’.⁴⁰ However, the most successful examples of applications tend to be those where there is an obvious ‘default’ choice which can be reset.⁴¹ There is, however, potential for a broader range of applications of behavioral interventions that go beyond nudging. Galizzi⁴² proposes clusters of policy formulation instruments where tax and subsidy and nudges are seen, respectively, as purely conventional and purely behavioral. However, the use of information and incentives can be conventional or behaviorally inspired. These clusters can also be debated, but the principle that there is potential overlap or symbiosis between conventional and behavioral approaches appears sound. This awareness may lead to better design of interventions.

Equity considerations are also a factor when considering the role of fiscal instruments, particularly as attention moves beyond the so called ‘sin taxes’ on tobacco and alcohol. Food taxation might be limited to discretionary or treat items but would limit their scope considerably while still having potentially adverse effects on low-income households. Subsidizing healthy foods could offset the higher costs of taxed foods, but if applied across the board could be more beneficial to higher income households.

Conclusion

The use of tax (or subsidy) to affect individual choice has sometimes been described as a shove, rather than a nudge, ‘but though nudges certainly have their place, occasionally a good shove advances individual and social welfare considerably more.’⁴³ Debate around conventional approaches and behavioral approaches to health behaviors will no doubt continue, both from the perspective of adherence to economic principles and in terms of effectiveness in reducing health harms and other social costs. There is clearly scope for a middle-ground based on what works in a particular context and for designing better interventions by incorporating conventional and behavioral perspective. The greatest challenges may lie in developing effective interventions where the emphasis is on increasing healthy choices through subsidies or nudges.

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None declared.

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