

## SUMMARY

### GENERAL INTRODUCTION

This thesis explores the feasibility and effectiveness of food pricing strategies to stimulate healthier food choices, with a key focus on groups with a lower socio-economic status (SES).

In the General Introduction (**Chapter 1**), I provide the main rationales and considerations with respect to the introduction of food pricing strategies. Human food preferences are influenced by a range of factors, including genetic factors, personal characteristics (e.g., attitude or knowledge) and evidently also by the food environment. One important part of our food environment is the *economic* environment. Our current (agricultural) food production system has large effects on food supply, availability and prices. There is substantial international evidence showing that healthier diets (e.g., rich in lean meat, fruits and vegetables) are relatively much more expensive than unhealthy diets (e.g., rich in processed foods, sugar and fat). To put at least, the healthier choice is not the easier (cheaper) choice and price may even form a barrier for healthy food choices in lower SES groups. Therefore, food pricing strategies seem a justifiable tool to stimulate healthier food choices.

Another reason to consider food pricing strategies is *market failure*: Important assumptions of perfect competitive free markets are that individuals are perfectly rational, that the production and consumption of goods force no costs on others and that all information is perfectly accurate and readily available. It can be argued that the free market assumptions are fairly violated. For example, many consumers do not incorporate the ultimate consequences (e.g., overweight, heart disease) when consuming tasty, cheap, convenient foods. Moreover, nearly half of obesity-attributable medical expenditures are eventually financed by the taxpayer and not solely by the individual consumer.

In conclusion, there are strong arguments to suggest that food pricing strategies may be effective. The first economic law of demand states that if prices of a certain product increase, the demand will decrease and vice versa. A confounding issue here

is that food prices constitute by a complex process involving divergent sectors (e.g., government, industry, retail, agriculture, etc.). Therefore, responsibility issues may raise barriers to the deciding stages of the introduction of food pricing strategies.

The studies in this thesis aim to gain insight into what types of pricing strategies are feasible to implement and to what extent they lead to healthier food choices. Findings will be triangulated to make robust recommendations about how food pricing strategies might be designed to assist in decreasing the burden of non-communicable diseases and improve public health.

## MAIN FINDINGS

Do healthier diets cost more than unhealthier diets? This thesis starts by studying the costs of food in the Netherlands by linking dietary intake data from two Dutch cohort studies with retail food prices from the two market leader supermarkets. **Chapter 2** reports that also in the Netherlands it is cheaper to select a diet high in energy density and low in fruit and vegetables compared to a more nutrient rich and less energy dense diet. Food choice in general and the healthier food choice in particular, may therefore be subjective to economic factors. For that reason, pricing strategies seem a fitting intervention to stimulate healthy eating.

**Chapter 3** detects that a panel with experts representing academia, industry, retail, agriculture, government, consumers and non-governmental organizations agreed on the potential success of offering small presents, providing price-cuts on healthy foods, and discounting healthier foods more frequently. However, the results from this Delphi Study also showed that the different sectors did not feel responsible for introducing financial incentives on food and that experts had the tendency to overestimate the potential of pricing strategies for which the implementation responsibilities could be placed elsewhere. Nevertheless, the results do show good potential for pricing strategies focused at lowering the price of healthier foods.

In **Chapter 4**, I describe a focus group study among 59 residents of deprived neighbourhoods to reveal consumers' attitudes and perceptions towards pricing strategies (including those that were found to have good potential in the Delphi Study). A second aim of this study was to gain insight into surrounding contextual variables that should be taken into account when implementing food pricing strategies (such as how the strategies should be communicated). The main findings of this

qualitative study were that consumers indeed consider price to be a core factor in food choice and that they experience financial barriers against buying certain foods. In line with the expert panel, pricing strategies focusing on encouraging healthy eating were valued to be more helpful than pricing strategies which focused on discouraging unhealthy eating. Suggested high reward strategies were: reducing the price of healthier options of comparable products relative to unhealthier options (e.g., whole meal bread in relation to white bread); providing a healthy food discount card for low-income groups; and combining price discounts on healthier foods with other marketing techniques such as displaying cheap and healthy foods at the cash desk.

**Chapter 5** reports the results of a study in which the results of the former qualitative study were quantified and where price and value were studied more precisely. The results affirm the findings from the focus group study by confirming that price is an important factor in food choice and that this counts especially for low-income consumers. The most attractive pricing strategies found in this study were discounting healthy food items more often and applying a lower Value Added Tax (VAT) rate to healthy food.

The next step was to evaluate how consumers truly react upon the suggested price changes. Will consumers actually buy more food if this becomes cheaper? **Chapter 6** reports of a unique research tool that we developed in order to test reactions to price changes experimentally: The Virtual Supermarket. The Virtual Supermarket is a three-dimensional software application in the image of a real supermarket. Unique features of the tool include that it enables researchers to easily modify research conditions (e.g., different pricing or labelling strategies) and in this way study different types of environmental interventions without having to rely on a complex implementation process. This chapter shows how the Virtual Supermarket was developed and how it can be used as a research instrument. Moreover, the chapter reports the results of a pilot-test among consumers ( $n = 66$ ). This test revealed that a large majority of the participants found the program easy to understand and indicated that their virtual purchases largely corresponded to their groceries in real life. This thesis reports the results of three randomized controlled trials (RCT's) that have been conducted using the virtual supermarket.

In **Chapter 7**, I describe the results of the first RCT in the virtual supermarket studying the effects of a 25% discount on fruits and vegetables. The experiment contained two

arms: a control condition with regular prices (n=52) and an experimental condition with a 25% discount on fruits and vegetables (n=63). The results of this study revealed that a 25% discount on fruits and vegetables lead to substantial higher fruit and vegetable purchases (nearly 1 kilo gram per household per week) in the discount versus control group. Also, the study revealed that the discounts neither lead to higher expenditures in other food categories nor to higher calorie purchases.

Subsequently, **Chapter 8** describes the results of a RCT with nine conditions: three levels of price reduction on healthy foods (no; 25%; 50%) x three levels of price increase on unhealthy foods (5%; 10%; 25%). N =125 participants completed the study and it was found that higher discount levels were associated with higher purchases of fruit and vegetables and a higher number of healthy foods overall. However, the discounts also lead to a higher *total* number of items purchased, meaning that the proportion of healthy products was not improved. Furthermore, higher price discounts were associated with a higher number of calories purchased. There were no significant effects of price increases.

**Chapter 9** describes the final virtual supermarket study, being a RCT on the effects of price discounts in combination with sales signs and/or healthy food labels. The trial had nine conditions: three levels of price reduction (10%; 25%; and 50%) and three types of signs ('special offer', 'healthy choice' and 'special offer & healthy choice'). N = 109 participants completed the study and results showed again that the price discounts were effective in stimulating healthy food purchases. However, this effect was not influenced by displaying signs promoting the healthiness or special offer of the products.

An important final step was the validation of the results from the virtual supermarket studies to make them more generalizable to the real world situation. **Chapter 10** presents the results of a nine month (six months intervention) randomized controlled trial examining the effects of a 50% price discount on fruits and vegetables and nutrition education on supermarket food purchases. This study was conducted in four Dutch supermarkets. The discounts were provided by use of coupons. The nutrition education consisted of specifically designed recipe books and telephone counseling calls building upon the principles of *Motivational Interviewing* (MI). The study showed significant positive effects of the price plus education intervention on fruit and vegetable purchases. Moreover, the percentage of participants consuming

recommended amounts of fruits and vegetables increased substantially in the discount groups from baseline to six months while no difference was observed in the non-discount groups. The largest intervention effects were observed at 6 months (at the end of the intervention period) and were generally stronger for fruit than for vegetable purchases. Comparing expenditures on other (food) items at baseline and one month later for the discount groups indicated that participants did not use the saved money from the discounts to purchase other supermarket items. No effects of the education alone were found.

## GENERAL DISCUSSION

This closing chapter (**Chapter 11**) puts the results in a broader perspective and places them in the current societal context. Finally, I provide future directions for research, practice and policy.

From the first part of this thesis it can be concluded that healthy foods are relatively expensive and that food prices may form a barrier for mainly low SES consumers to select healthier foods. Results from one expert and two consumer studies consistently showed that making healthy foods cheaper by either discounts or price cuts has good potential in stimulating healthier food choices. This finding was put to test in three trials in the virtual supermarket and one trial in real supermarkets. Findings unambiguously showed that discounts are effective in stimulating healthier food choices. However, discounting all healthier food items was also found to be related with extra calorie purchases. This may not be a problem in people with a normal weight, but most people with a low SES are overweight or obese. Overall, a subsidy exclusively on fruits and vegetables was found to have the best effects; this strategy did not result in extra calorie purchases and did lead (both in our virtual and real supermarket trials) to a substantial increase in fruit and vegetable purchases. We did not find any effects of the educational intervention alone, but did find that the effects of the food pricing intervention were enforced by the educational program, showing that additional communication may be required to strengthen the effects of food pricing strategies.

### Suggestions for further research

When thinking about future food pricing studies, the most important challenge is to find out whether and how these strategies can be effective in improving *health*. In other words, the suggested pricing strategies must not only result in healthier

food purchases, but also in fewer unhealthy food purchases and should not lead to other undesired outcomes such as higher smoking rates. A limitation of the present studies (included the ones in this thesis) with regard to this aspect is that they are restricted to a limited side of spectrum (in this thesis to supermarket purchases). Food price changes, especially when they are large, can be expected to have effects in various domains. Therefore, future studies should make an effort to incorporate overall household expenditures. Moreover, future studies should differentiate ways to amplify the effects of the price changes (cues or education), effects on different types of consumers, long-term effects, the best type and design of the pricing strategy and measure health outcomes. Here the focus should be on pricing strategies stimulating healthy food purchases and (simultaneously) lowering unhealthy food purchases.

### **Implications for policy and practice**

Today's food supply (and food pricing) is governed by complex systems including our global economy and world trade. When truly thinking about health and constituting food pricing strategies, we cannot ignore the bigger picture showing how our food is produced and the global mechanisms that play a role.

A window of opportunity for lowering fruit and vegetable prices (without government interference) lays within the willingness of the retail sector for serious self-regulation, e.g., corporate social responsibility. Self-regulation is characterized by being a voluntary and socially responsible industry practice having consumer welfare as major goal. Supermarkets form the dominant food environment and have a substantial influence on consumers' food choices. Within the arrangement of their product assortment they can bring major contributions to public health. Another opportunity lays within fairer margin distributions. Within the chain (producers, wholesale, distributive trade and retail trade), supermarkets have by far the largest margins on fruits and vegetables and these margins (and for other fresh products) seem to be higher compared to the margins of the general supermarket assortment. Within the European Union there are plans to bring a new bill to create fairer margin distributions which may result in lower fruit and vegetable prices.

With regard to government policies, I place a focus on opportunities for incorporating health in agricultural policies and suggest putting an end to the purely economic view of our food production. Within the consideration of new food pricing policies, it is relevant to look at how food prices are shaped to begin with. The principal issue is

that food prices do not fairly represent their actual costs, both with respect to their production and externalities (costs relied to others via diseases, to the undeveloped world, or the earth). It can be argued that when priorities in the food chain remain to be economic driven and policies are formed to promote consumption-based growth, plus pertaining in a system that promotes market and trade liberalisation it is inevitable that neither overconsumption nor the consumption of wrong foods can be blocked by purely relying on consumer or industrial responsibility. When thinking about food pricing strategies, it makes sense to develop a food system in which we pay for food what it actually costs, or at least make that these costs are more transparent. In other words, is the price right? Finally, the challenge is not solely to improve the quality of population diets, but also to do this in a way that is sustainable and brings health evenly to the World population and makes an end to problems both related to under-nutrition and over-nutrition.

