



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# Healthy meals on the menu: A Swedish field experiment on labelling and restaurant sales

Linda Thunström\*

HUI Research AB, Stockholm, Sweden; Department of Economics and Finance, University of Wyoming, Laramie WY.  
E-mail: lthunstr@uwyo.edu

Jonas Nordström

Department of Economics, Lund University, Lund, Sweden; Department of Food and Resource Economics, University of Copenhagen, Frederiksberg C, Denmark. E-mail: jonas.nordstrom@nek.lu.se

Jason F. Shogren

Department of Economics and Finance, University of Wyoming, Laramie WY. E-mail: jramses@uwyo.edu

\* Corresponding author

## Abstract

*Menu labelling of meals prepared away from home is a policy designed to help consumers make healthier food choices. In this paper we use a field experiment in Sweden to examine if a restaurant benefits from introducing a meal labelled as healthy on its menu by experiencing an overall increase in sales. We cannot reject the hypothesis that sales are the same before and after the introduction of a meal labelled as healthy on the menu, i.e. our data does not support the idea that restaurants increase their sales from supplying a meal labelled as healthy.*

**Key words:** meals labelled healthy; sales; field experiment

## 1. Introduction

Diet-related illnesses, such as several types of cancer, diabetes, cardiovascular disease, osteoporosis and dental caries, and overweight and obesity – conditions that themselves constitute risk factors for many of the diseases mentioned – have become an important public health issue in many countries. Much of the increase in obesity and overweight rates has been attributed to changes in environmental factors (Binkley *et al.* 2000; Chou *et al.* 2004; Boumtje *et al.* 2005; Binkley 2006; Rashad 2006), with increased consumption of food prepared away from home as one of the most important changes (Chou *et al.* 2004; Binkley 2006; Rashad 2006).

In the US, where obesity rates are the highest in the world, food prepared away from home amounts to nearly 50% of the total household food budget (Variyam 2005), and in Sweden, food prepared away from home amounts to around 25% of the total household food budget (Statistics Sweden 2010). The negative effect on health of food prepared away from home is likely to be a result of the lower nutritional quality. Studies have found that food prepared away from home is generally higher in calories, fat, saturated fat, salt and cholesterol, and lower in fibre, calcium and iron (e.g. Lin *et al.* 1999; 2001; Guthrie *et al.* 2002).

One way to promote healthy eating may be to increase health awareness and information to consumers who eat food away from home, such as via legislated menu labelling, or private initiatives for menu labelling. For instance, in 2008, New York City implemented mandatory menu labelling, and

many states are following suit. In Sweden, the “Keyhole symbol” has been a symbol for healthy food choices in retail for more than 20 years, and is well known amongst the public. Restaurants may voluntarily obtain “Keyhole certification”, which enables them to serve Keyhole-labelled meals.<sup>1</sup> The Keyhole-labelled meals are known as the “healthy-labelled” meals.

Herein we report on the design of a field experiment to explore what is in it for the restaurants: does introducing a meal labelled as healthy on the menu increase overall sales?<sup>2</sup> The idea is that, by offering a meal that is labelled as healthy on the menu, restaurants may increase sales by attracting new consumers (who are particularly interested in healthy meals), and/or by creating a “health halo” sales effect – by offering healthy meals, the restaurant may increase its overall appeal to consumers.<sup>3</sup> We used data from a workplace lunch restaurant field experiment to perform our analysis. Our experimental design is a “before-after”, i.e. we compared meal sales before and after the introduction of the Keyhole label.<sup>4</sup>

## 2. Data and analysis

We based our analysis on data from a field experiment in a lunch restaurant at an industrial company in southern Sweden (see Thunström and Nordström (2011)).<sup>5</sup> Restaurant sales were monitored during the 12 weeks (57 business days) from 2 March to 29 May 2010, and the restaurant was Keyhole certified (and introduced a healthy-labelled meal to its menu) on 20 April, i.e. six weeks into the study period. Keyhole certification entails training restaurant staff and communicating the Keyhole certification to customers. A Keyhole-certified restaurant must provide at least one meal labelled healthy per day, and the meal must fulfil certain criteria. The general criteria that apply for a meal labelled as healthy are: the meal should contain 400 to 750 calories, with a maximum of 30% of energy from fat (more is allowed for seafood), a maximum of 3 grams of sugar per 100 gram, a maximum of 1 gram of salt per 100 gram, be well-balanced and contain at least 100 gram of vegetables (excluding potatoes).<sup>6</sup>

We worked with a company that runs several restaurants to identify one restaurant suitable for the experiment. The selection criteria for our restaurant were the following: (a) the management was willing to introduce the Keyhole-labelled meal, (b) the workers who ate there had limited outside

---

<sup>1</sup> Certification is granted by the non-profit organisation the “KeyHole Restaurant Association,” established in January 2009 and founded by the National Food Administration, the Swedish National Institute of Public Health (FHI), the Swedish Hotel and Restaurant Association (SHR), the Swedish Food Federation (Li), the Swedish Food Retail Federation (DLF), the School of Hospitality, Culinary Arts & Meal Science, Örebro University, Campus Grythyttan and Culinary Arts and Food Sciences, Kristianstad University.

<sup>2</sup> We are implicitly assuming that profits increase as sales increase. Wagner *et al.* (2007) show that more nutritious school meals do not necessarily cost more to produce, but that it may be necessary to adjust the production process to attain this result.

<sup>3</sup> For a discussion on health halos, see, for example, Chandon and Wansink (2007).

<sup>4</sup> Note that we lack the counterfactual – the control group, holding everything else constant, that would not have received the Keyhole-labelled menu. We had access to data on sales before and after the healthy label was introduced from one restaurant. Typically, Swedish workplace canteens or restaurants do not allow researchers to affect their actual business operations because they operate under a contract with the company whose workers are buying the meals, i.e. they have little to no flexibility to randomise menus with and without healthy meals. We appreciate that this design limits the robustness of our findings. For example, we were unable to control for potential seasonal effects (e.g. holidays, weather) or policy reforms (e.g. information), which could affect our results.

<sup>5</sup> Although the current study is based on the same experimental data, the scope of the two studies differs. Thunström and Nordström (2011) focus on the consumer side of healthy labels, examining how a healthy label affects choices of healthy meals and health variables. They found that introducing the Swedish Keyhole-labelled meal did not have an effect on healthy behaviour (e.g. calories consumed). Herein we focus on the producer’s side, exploring whether a restaurant has incentive to provide healthy-labelled meals based on increased sales.

<sup>6</sup> See [www.nyckelhalsrestaurang.se](http://www.nyckelhalsrestaurang.se).

meal options, (c) the management was willing to collect data, (d) they were willing to vary the order on the menu for the Keyhole-labelled alternative, and (e) they accepted that there would be no compensation for assisting us with the experiment.

The restaurant selected for the field experiment was open all workdays, from Monday to Friday, and closed at 6 pm all weekdays, except for Fridays, when it closed at 3 pm. The restaurant served three meals each day: one healthy-labelled and two standard meals (except on 30 April, when only two meals were served). After 20 April, one of the meals was labelled healthy. The actual meals served differed each day (e.g. chicken on Monday, fish on Tuesday), but the composition of one healthy to two standard did not change. The three meals were listed on a whiteboard-style menu where the subjects entered the restaurant. The order in which the healthy meal was listed changed each day, listed either first, second or third throughout the study period. The lunch menu was posted inside and outside the restaurant every day and could be obtained via e-mail: the e-mail list contained 50 to 60 people. The Keyhole label was displayed in two ways: (1) highlighting the healthy meal on the daily whiteboard-style menu inside and outside the restaurant, and (2) highlighting the healthy meal on the menu sent to the e-mail list.

The price of all meals was the same throughout the study period (equivalent to USD 7.20). The restaurant is open to the general public, even though it primarily serves contract employees. Subject characteristics were not formally collected due to lack of resources, but restaurant staff estimated that around 70% of customers were male and 80% were blue-collar workers. There are a couple of other restaurants serving lunch within walking distance.

We lacked data on the sales of the nearby restaurants. To address this challenge, as noted above, one of the selection criteria for the experiment restaurant was that it would be located in an area with few substitute restaurants. Noteworthy is that no national policy changes occurred during the experimental period that may have incentivised other restaurants to implement Keyhole-labelled meals.

We used a linear regression to examine if the introduction of the healthy-labelled meal on the menu had an impact on the restaurant's overall sales, as defined by number of meals sold per day. We controlled for weekdays. Table 1 presents our descriptive statistics of the variables included in the regression, and Table 2 reports our results. We used Durbin's alternative test for autocorrelation and cannot reject the null hypothesis of no autocorrelation ( $\text{Chi}^2(1) = 0.225$ ,  $\text{Prob} > \text{Chi}^2 = 0.6356$ ), but a Breusch-Pagan/Cook-Weisberg test for heteroscedasticity implied that we cannot confirm the null hypothesis of constant variance ( $\text{Chi}^2(1) = 60.86$ ,  $\text{Prob} > \text{Chi}^2 = 0.000$ ). We estimated the model with White's robust standard errors.

**Table 1: Descriptive statistics**

Variable	Mean	Std. dev.	Min.	Max.	No. of observations
Number of meals sold per day	346.930	41.324	82	381	57
Healthy-labelled meal on the menu	0.491	0.504	0	1	57
Monday	0.193	0.398	0	1	57
Tuesday	0.211	0.411	0	1	57
Wednesday	0.211	0.411	0	1	57
Thursday	0.193	0.398	0	1	57
Friday	0.193	0.398	0	1	57

Healthy labelled meal on the menu, yes = 1; no = 0, Monday, yes = 1; no = 0, etc.

Table 2 reveals that we cannot reject the hypothesis that introducing a healthy-labelled meal on the menu has no effect on overall restaurant sales: the estimated coefficient for the dummy variable indicating that the restaurant offers a healthy-labelled meal is both small and not statistically significant (and negative; - 3 meals per day).

**Table 2: OLS regression results of determinants of restaurant sales**

Variable	Coefficient	Standard error	t-value	p-value
<i>Dependent variable:</i> Number of meals sold daily				
Constant	362.741***	6.191	58.59	0.000
Healthy-labelled meal on the menu	-2.859	10.900	-0.26	0.794
Tuesday	-1.062	6.754	-0.16	0.876
Wednesday	-3.395	5.860	-0.58	0.565
Thursday	-18.805**	8.842	-2.13	0.038
Friday	-50.987**	23.927	-2.13	0.038

No. of observations: 57, R-squared = 0.2172, Prob > F = 0.0023. \*\* > 0.95 statistical significance, and \*\*\* > 0.99 statistical significance

Consumer habits may take time to change, as may consumer perceptions of the restaurant. The lack of impact on sales from introducing a meal labelled healthy, as suggested by the results in Table 2, could be a result of the fact that it takes time for new consumers to switch to the healthy-labelled restaurant, and that it takes some time for a potential health halo sales effect to occur. We estimated an alternative model where we dropped the immediate three weeks after the introduction of the healthy-labelled meal to the menu, i.e. we examined if sales during the six weeks before the introduction of the meal labelled were significantly different from sales during the last three weeks of the study period, controlling for weekdays. However, our results remained unchanged – we cannot reject the null hypothesis that sales are unaffected by the introduction of the healthy-labelled meal.

### 3. Concluding remarks

Herein we reported on a field lunch restaurant experiment to examine if a restaurant benefits from serving meals labelled as healthy. We explored if a restaurant experienced a sales increase from introducing a meal labelled as healthy to its menu. We implicitly were assuming that increased sales also mean increased profits. Our results imply that restaurants do not increase sales from introducing a healthy-labelled meal on their menu. This is in line with previous field research showing that calorie information does not change consumer purchasing behaviour (e.g. Harnack *et al.* 2008; Elbel *et al.* 2009; 2011; Vadiveloo 2011; Thunström & Nordström 2011).

Why would restaurants introduce meals labelled as healthy on their menus if they do not increase sales? Due to limitations in the data, we cannot observe profits directly. One could speculate that, if profits increased due to introducing the healthy-labelled meal on the menu, even if sales did not, it would motivate firms to serve meals labelled healthy. That is unlikely, however, given the constant meal prices in the experiment and, if anything, inputs for healthy food (amount of labour and ingredients) are more costly than those for unhealthy food. However, restaurants may want to position themselves for the future, i.e. expect future pay-offs from offering a healthy-labelled meals, given consumer trends. Restaurants targeted at serving meals to employees of certain companies, like the one in our experiment, may also be forced by contractors to serve meals labelled as healthy, which could give rise to a situation that not serving healthy-labelled meals means no business.<sup>7</sup> Our results are not surprising, since if restaurants would experience significant profit gains from introducing healthy-labelled meals, we would expect to see a lot more healthy meals and voluntary menu labelling amongst restaurants.

We recognise that one shortcoming of our study is that consumers may engage in compensatory behaviour toward drinks and side dishes when offered a healthy meal. It was cost-prohibitive to

<sup>7</sup> Firms may have different motivations to offer their employees healthy food, such as labelling themselves as a health-conscious firm, thereby attracting employees with an interest in health, or productivity gains amongst employees from improving their dietary intake (see Jensen 2011).

collect the data on the restaurant's or the subjects' potential compensatory behaviour. Given the Keyhole requirements, we know that Swedish restaurants must offer healthy side dishes to go with the Keyhole meals. But we do not know the extent to which consumers actually chose those healthy side dishes. This implies that we do not know whether restaurants (via the consumers' choices) see healthy meals as complementary to or substitutes for healthy drinks and side dishes, given the introduction of the healthy label, and the resulting impact on restaurant sales. Further, the time period covered in our field experiment is relatively short – six weeks before and after the introduction of a Keyhole-labelled meal. We found that, overall, meal sales did not change significantly after the label was introduced. This could be either because (1) our subjects were uninterested in changing their food choices, or (2) because food is habitual (see, for example, Ji Song & Wood 2006; Daunfeldt *et al.* 2011), and habits would have been hard to break within our given time frame.<sup>8</sup> Verplanken and Wood (2006) show that changes in the environment can promote changes in habits. Here, at best, we can speculate whether the introduction of a Keyhole-labelled meal changes the “food environment” enough to almost instantaneously break habits. If so, people would change how they eat, and we would have seen the change in our data. If the introduction of a Keyhole-labelled meal would have a slower impact on habitual consumption, however, the open question for future research is if a sales increase may be obtained in the long run. Finally, our analysis is based on data from only one restaurant. Other types of restaurants, targeted at other groups of consumers, may experience sales effects from introducing healthy labels to the menu. We leave these questions for future research.

### Acknowledgements

Financial support from the Swedish Council for Working Life and Social Research is gratefully acknowledged. We thank Eurest Dining Services for enabling this study by providing data.

### References

- Binkley JK, 2006. The effect of demographic, economic and nutrition factors on the frequency of food away from home. *The Journal of Consumer Affairs* 40(2): 372–91.
- Binkley JK, Eales J & Jekanowski M, 2000. The relation between dietary change and rising US obesity. *International Journal of Obesity* 24(8): 1032–9.
- Boumtje PI, Huang CL, Lee JY & Lin BH, 2005. Dietary habits, demographics, and the development of overweight and obesity among children in the US. *Food Policy* 30(2): 115–28.
- Chandon P & Wansink B, 2007. The biasing health halos of fast-food restaurant health claims: Lower calorie estimations and higher side-dish consumption intentions. *Journal of Consumer Research* 34 (October): 301–14.
- Chou S-Y, Grossman M & Saffer H, 2004. An economic analysis of adult obesity: Results from the Behavioural Risk Factor Surveillance System. *Journal of Health Economics* 23(3): 565–87.
- Daunfeldt S-O, Nordström J & Thunström L, 2011. Habit formation in food consumption. In Lusk JL, Roosen J & Shogren JF (eds.), *The Oxford handbook of the economics of food consumption and policy*. Oxford: Oxford University Press.
- Elbel B, Gyamfi J & Kersh R, 2011. Child and adolescent fast-food choice and the influence of calorie labeling: A natural experiment. *International Journal of Obesity* 35(4): 493–500.
- Elbel B, Kersh R, Brescoll VL & Dixon LB, 2009. Calorie labeling and food choices: A first look at the effects on low-income people in New York City. *Health Affairs* 28(6), 1110–21.
- Guthrie JF, Lin B-H & Frazao E, 2002. Role of food prepared away from home in the American diet, 1977-78 versus 1994-96: Changes and consequences. *Journal of Nutrition Education and Behavior* 34(3): 140–50.

---

<sup>8</sup> Lally *et al.* (2009), for example, find that even a minor new habit (i.e., eating an extra fruit or going for a short run) can take about 66 days to establish, in which “establish” is measured by the amount of “automaticity” with which the action is performed.

- Harnack LJ, French SA, Oakes JM, Story MT, Jeffery RW & Rydell SA, 2008. Effects of calorie labeling and value size pricing on fast food meal choices: Results from an experimental trial. *International Journal of Behavioral Nutrition and Physical Activity* 5(63): doi:10.1186/1479-5868-5-63
- Jensen DJ, 2011. Can worksite nutritional interventions improve productivity and firm profitability? A literature review. *Perspectives in Public Health* 131(4): 184–92.
- Ji Song M & Wood W, 2007. Purchase and consumption habits: Not necessarily what you intend. *Journal of Consumer Psychology* 17(4): 261–76.
- Lally P, Van Jaarsveld CHM, Potts HWW & Wardle J, 2009. How are habits formed: Modelling habit formation in the real world. *European Journal of Social Psychology* 40(6): 998–1009.
- Lin B-H, Guthrie JF & Frazao E, 1999. Away-from-home foods increasingly important to quality of American diet. *Agriculture Information Bulletin No. 749*, US Department of Agriculture, Economic Research Service, Washington DC.
- Lin B-H, Guthrie JF & Frazao E, 2001. American children's diets not making the grade. *FoodReview* 24(2): 8–17.
- Rashad I, 2006. Structural estimation of caloric intake, exercise, smoking, and obesity. *The Quarterly Review of Economics and Finance* 46(2): 268–83.
- Statistics Sweden, 2010. Household Budget Survey (HBS) 2007–2009. Expenditure and Income Report. Stockholm, Sweden.
- Thunström L & Nordström J, 2011. Does easily accessible nutritional labelling increase consumption of healthy meals away from home? A field experiment measuring the impact of a point-of-purchase healthy symbol on lunch sales. *Food Economics – Acta Agriculturae Scandinavica* 8(4): 200–7.
- Vadiveloo MK, Dixon LB & Elbel B, 2011. Consumer purchasing patterns in response to calorie labeling legislation in New York City. *International Journal of Behavioral Nutrition and Physical Activity* 8(51): doi:10.1186/1479-5868-8-51
- Variyam JN, 2005. Nutrition labelling in the food-away-from-home-sector. An economic assessment. *Economic Research Report No. ERR-4*, Department of Agriculture, Economic Research Service, Washington DC.
- Verplanken B & Wood W, 2006. Interventions to break and create consumer habits. *Journal of Public Policy & Marketing* 25(1): 90–103.
- Wagner B, Senauer B & Runge CF, 2007. An empirical analysis of and policy recommendation to improve the nutritional quality of school meals. *Applied Economic Perspectives and Policy* 29(4): 672–88.