A Nutri-Score Can Benefit Private Label Food Unhealthy Products Better Than Manufacturer Brands

Authors

Florian Dost – Professor of Marketing – Brandenburg University of Technology – Erich-Weinert-Str. 1, 03046 Cottbus, Germany – Email: florian.dost@b-tu.de

Joscha Silomon – MSc of Business Administration – Brandenburg University of Technology – Erich-Weinert-Str. 1, 03046 Cottbus, Germany – Email: silomjos@b-tu.de

Abstract

Private labels have significantly increased their market share in the German food retail sector over the past 50 years, often matching manufacturer brands in quality and offering competitive prices. This trend complicates consumer choices, especially as they seek healthier options but face an overwhelming number of products. Front-of-pack labelling (FOPL), such as the Nutri-Score, is used by manufacturers to signal product quality and aid consumer decision-making. The Nutri-Score, a voluntary and free label, has been shown to improve nutritional awareness and perceived food quality. However, there is limited evidence on the differential effects of FOPL between private labels and manufacturer brands. This research investigates whether private labels and manufacturer brands are differently affected by the Nutri-Score and if the FOPL effect for private labels depends on manufacturer brands also displaying the Nutri-Score. An experiment with eight food categories revealed that private labels benefit more from displaying Nutri-Scores than manufacturer brands, but this advantage diminishes when both display the label. The findings suggest that private labels in nutritionally unhealthy categories can benefit from Nutri-Scores, even with low ratings, as long as manufacturer brands do not also display them. From a public health perspective, the results highlight a potential downside of voluntary FOPL policies, as selective display by brands can still positively influence consumer choice, even for unhealthy products.

Keywords: Front-of-pack labelling, private labels, unhealthy food products, consumer choice

Suggested Tracks: Retailing and E-Commerce; AgriFood Marketing; Consumer Behavior

Introduction

Private labels have steadily gained in importance over the last 50 years and have sustainably increased their market share in the German food retail sector. Many private labels are now similar to manufacturer brands in terms of quality and convince with competitive prices (Calvo Porral & Levy-Mangin, 2016). This trend complicates consumers' choice, who increasingly want to buy healthier options, but are overwhelmed by the often hundreds of products to choose from (Scheibehenne et al., 2010). In order to be able to make an informed choice, consumers need a basic understanding of how healthy or unhealthy certain nutrients are (Campos et al., 2011).

Many manufacturers use front of pack labelling (FOPL) as part of their differentiation strategy (James et al., 2009). Front-of-pack labels often include simplified nutritional labelling (Egnell et al., 2019). While the ultimate intention of the FOPL is to prevent non-communicable chronic diseases such as obesity (Elmadfa & Meyer, 2019), manufacturers decide to use front of pack labelling (FOPL) to signal the quality of a product and help consumers to make a purchase decision between two comparable products (Fotopoulos & Krystallis, 2003). One such label is the Nutri-Score, which can be voluntarily used by food manufacturers, and free of charge. The Nutri-Score is modern and effective FOPL. Overall, the Nutri-Score has prevailed over other FOPLs in a large number of studies and provides useful support for increasing nutritional awareness and improving the perceived nutritional quality of food compared to products without labelling (Egnell et al., 2020).

There is still little evidence on differences in FOPL effects between manufacturer and private labels, specifically regarding the Nutri-Score. However, it has been hypothesized that the Nutri-Score has a stronger influence on private labels because private labels invest less in brand differentiation and consumers are less informed and more uncertain about private labels (De Temmerman et al., 2021). Consequently, the present research asks:

> *Are private labels and manufacturer brands differently affected by displaying a Nutri-Score? And does the FOPL effect for private labels depend on whether or not manufacturer brands also choose to display a Nutri-Score?*

To address these questions, we conducted an experiment where consumers made repeated choices from sets of randomly selected products with or without Nutri-Score label in eight food categories. We used food categories with medium (C) to low (E) ratings on the Nutri-Score, such as cheese, potato chips, or salami sausage, because in these categories using a Nutri-Score or not is a difficult and not an obvious managerial decision. Furthermore, any effect of the FOPL would be due to uncertainty reduction about a specific product and less about (surprisingly) good nutritional scores. Our results indicate that private labels benefit from displaying Nutri scores, and more strongly than manufacturer brands. However, if both products display a Nutri-Score, most of the private label FOPL advantage disappears.

Our findings hold relevance for private labels in competitive, nutritionally unhealthy food categories. Here, private labels can benefit from displaying a Nutri-Score even with the worst scores, as long as brand manufacturers shy away from also doing so. From a public health point of view, the results reveal a potential downside of voluntary policies for FOPL: when brands only selectively choose to display Nutri-Scores, these labels show positive effects on consumer choice, even in cases of low (unhealthy) ratings. Only when all brands display this FOPL, competitive advantages seem to disappear and the whole unhealthy category may be more adequately reviewed by consumers.

Background and Hypotheses

Front-of-pack labels (FOPL) are simplified nutritional labelling on the front of product packaging. These are intended to help consumers make healthier product choices and compare products with one another (Egnell et al., 2019). Food manufacturers are obliged to provide nutritional information on calorific value, fat, saturated fatty acids, carbohydrates, sugar, protein and salt on the back of the packaging of ready-made foods. The nutritional values shown in tabular form often refer to 100 grams or milliliters of a product. Extended nutritional labelling on the front of the product packaging is intended to make it easier for consumers to choose nutritionally beneficial products (unless there are too many labels, Sutherland et al., 2010). In addition, product manufacturers are encouraged to increase the proportion of healthier nutrients, such as fiber and protein, in processed foods, in order to improve their FOPL rating (Max-Rubner-Institut et al., 2020).

The Nutri-Score is a nutritional labelling system for food. It is displayed as a five-level color scale on the front of product packaging. The scale ranges from a green A, which stands for the best nutritional-physiological value, to a red E, which represents the worst value. The Nutri-Score was developed in France based on the nutritional profile of the British Food Standard Agency (*Wissenswertes für Verbraucherinnen und Verbraucher – Der Nutri-Score einfach erklärt*, 2024). Food producers are free to label their products with this nutritional labelling. In addition to France, Belgium, Luxembourg, Spain and Portugal have also spoken out in favor of the Nutri-Score.

The Nutri-Score is calculated on the basis of the energy content as well as the nutritional value and ingredients contained in a food. A distinction is also made between nutritionally favorable and unfavorable nutrients. These are calculated with the help of a specially developed algorithm, resulting in a score. The unfavorable components of a product are given plus points and the favorable components are given minus points. The higher the number of points, the worse the score. The nutrients that are rated with minus points include fruit, vegetables, nuts, pulses, fiber, proteins and selected oils such as rapeseed and walnut oil. Plus points, on the other hand, are awarded for the calorie content and the components of saturated fatty acids, sugar and salt (*Nutri-Score*, n.d.). Figure 1 (from the Lebensmittelverband website) visualizes the distribution of points for solid foods and drinks.

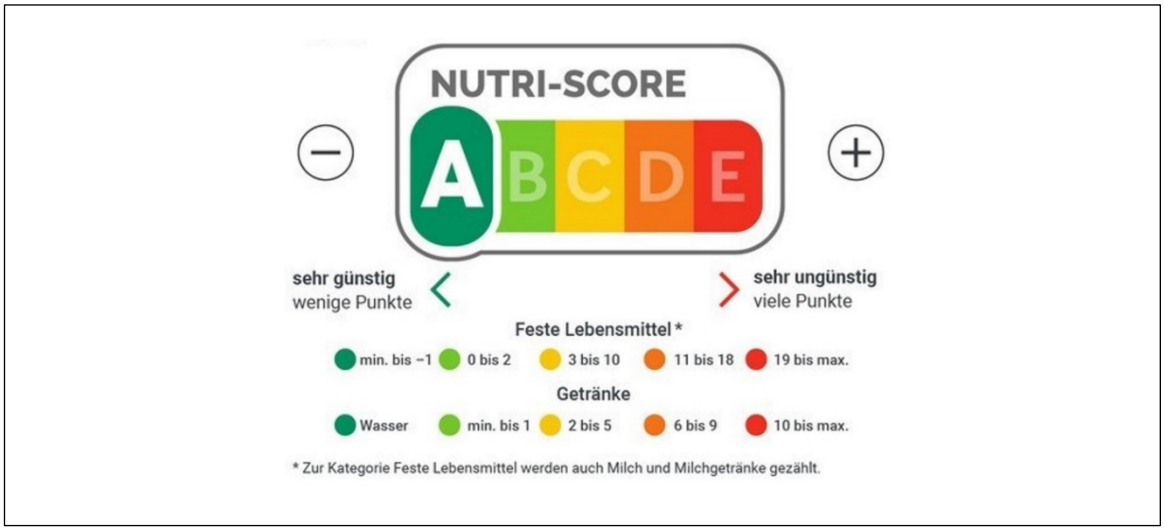

Figure 1: Nutri-Score Points and Corresponding Rating

We argue that private labels and manufacture brands face a similar choice of displaying or not displaying a Nutri-Score for products in the same category, because the nutritional content for comparable products is likely similar. Then, a Nutri-Score serves as uncertainty reducing, or differentiating stimulus only if it is selectively used on the competing products, and its effect should be stronger the more uncertain or uninformed consumers are about a specific product. This should benefit a private label more than a manufacturer brand, because here consumer uncertainty is higher and informedness lower (Konuk, 2018). Furthermore, the effects should only play out when only a private label or the manufacturer brand decide to display their Nutri-Score, but the other does not. Formally, we hypothesize:

- **Hypothesis H1:** Private label products are more often chosen from a category, when they display a Nutri-Score.
- **Hypothesis H2:** Private label products are relatively more often chosen, when they display a Nutri-Score, than they are less often chosen when manufacturer brands display a Nutri-Score.
- **Hypothesis H3:** Private label products are only more often chosen from a category, when only they display a Nutri-Score.

These hypotheses represent the direct effect of a Nutri-Score for private labels (H1), a stronger direct effect when compared to the brand manufacturer Nutri-Score effect (H2), and a negative interaction effect, diminishing the direct effect, when both private label and manufacturer brand display a Nutri-Score. To test these hypotheses, we conduct an experimental study in the context of eight unhealthy food categories with randomly selected choice tasks.

Experimental Study

We designed a choice experiment. Each choice task displayed a comparable manufacturer brand and a private label product pair. Each of the pairs could show no Nutri-Score, a Nutri score for both products, or either a Nutri-Score for the manufacturer brand or for the private label, leading to four possible pairings in each food category. Product pictures and Nutri-Score ratings were taken from actual products common in German grocery supermarkets. Figure 2 displays an exemplary stimulus for yoghurts.

Figure 2: Example Choice Sets from Yoghurt Category

In total, all participants had to compare 32 product pairs, four from each of the eight product categories. Table 1 shows the eight product categories selected for the study: yoghurt, cheese, chips, biscuits, pizza, French fries, lyonnaise, and salami. This selection was made on the basis of the most frequently consumed foods in Germany in the years 2020 to 2022, whereby only the processed foods in the statistics were considered (*Meistgekaufte Lebensmittel des täglichen Bedarfs in Deutschland 2023*, n.d.) IfD Allensbach 2022). Because all categories comprise processed foods, Nutri-Score ratings are all low (C to E), except for French fries (A).

Table 1: Product Pair Categories

Larger Category	category	Product Pairs
Dairy	Yoghurt	4
	Cheese	4
Snacks	Potato chips	4
	Coockies	4
Frozen foods	Pizza	4
	French fries	4
Sausage	Lyonnaise	4
	Salami	4
		∑ **32**

The stimuli pairs were embedded into an online questionnaire on the SosciSurvey platform and randomized. Participants of the experiment were asked to choose from each product pair the one they would most likely choose in a supermarket (forced choice). An attention check in the form of three different FOPLs, including a Nutri-Score, asked which of these FOPL types the participants noticed in the experiment. We considered only participants who correctly selected the shown image as valid respondent. The survey finished with demographic question (Sex, age, income) and a general attitude towards FOPLs.

The dependent variable was choice of the private label product. Independent variables were Nutri-Score for the private label, Nutri-Score for the manufacturer brand, and their interaction (both products with Nutri-Score). Control variables to isolate the Nutri-Score treatments at the individual respondent level were participant fixed effects (which also replaced demographic controls) and product category fixed effects.

As respondents, we contacted German university students via an e-mail newsletter and extended the reach via snowballing to preferably older family members. The survey was completed 227 times, but only 165 completed the experiment and correctly identified the Nutri-Score as the shown FOPL. The resulting sample was well-balanced with 87 women and 78 men (no one identified as diverse), and an average age of 37 years (age ranged from 20 to 81 years). All subsequent analyses were conducted in the JASP software.

Results

To test the hypotheses while controlling for individual level differences and category differences, we estimated a comprehensive choice model, particularly a Logit model with respondent and category fixed effects. Table 2 shows that the resulting model improves on a baseline model and shows an expectable fit of about 20% R-square for choice experiments of this type.

Table 2: Model Summary - PrivateLabel_Choice

Model	Deviance	AIC	BIC	df	X^2	p	McFadden R^2	Nagelkerke R^2	Tjur R^2	Cox & Snell R^2
H_0	7319.506	7321.506	7328.078	5279						
H_1	6112.834	6462.834	7612.878	5105	**1206.672**	**< .001**	0.165	0.204	0.206	0.204

Note: Significant Chi-square tests ($p < 0.05$) marked in bold.

The estimated coefficients for Nutri-Score display (either private label, manufacturer, or both) in the Logit model test the three hypotheses H1-H3 (see Table 3). A hierarchical robustness model with random individual and category intercepts (coefficients not shown) confirms these results. Figure 3 displays the marginal means of the treatment and the distribution of random effects from the different categories.

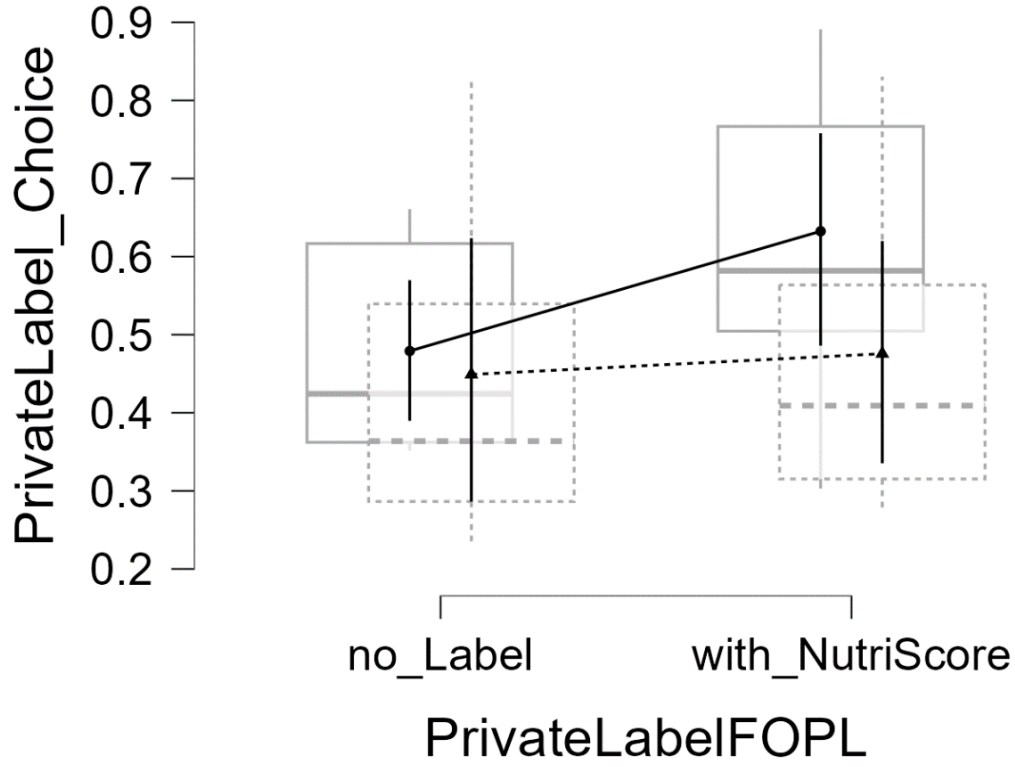

Figure 3: Group Means of Nutri-Score Display for Private Label Choice

The estimated coefficients confirm that participants more likely choose a provate label product, when that private label also displays a Nutri-Score (H1). Furthermore, private label choice is only insignificantly reduced ($p > .05$) when only the manufacturer brand displays a Nutri-Score. This confirms a relatively stronger effect of Nutri-Scores for private lables compared to manufacturer brands (H2). Finally, the private label benefit of a Nutri Score only remains, as long as not both brands display a nutria score: a negative interaction effect erodes most of the benefit for the private label (H3).

Table 3: Choice Model Coefficients

					Wald Test		
	Estimate	**Standard Error**	**Odds Ratio**	**z**	**Wald Statistic**	**df**	**p**
(Intercept)	-1.753	0.437	0.173	-4.014	16.114	1	< .001
ManufacturerBrand_with_NutriScore	-0.163	0.087	0.850	-1.870	3.496	1	0.062
PrivateLabel_with_NutriScore (H1)	**0.664**	**0.088**	**1.942**	**7.552**	**57.034**	**1**	**< .001**
ManufacturerBrand_with_NutriScore) × PrivateLabel_with_NutriScore (H3)	**-0.543**	**0.124**	**0.581**	**-4.387**	**19.247**	**1**	**< .001**
Category fixed effects:							
Product (Yoghurt)	0.540	0.121	1.716	4.446	19.765	1	< .001
Product (Cookies)	0.641	0.122	1.898	5.272	27.793	1	< .001
Product (Cheese)	0.126	0.122	1.135	1.036	1.073	1	0.300
Product (Lyonnaise)	0.287	0.122	1.332	2.362	5.580	1	0.018
Product (Pizza)	-0.618	0.128	0.539	-4.837	23.401	1	< .001
Product (French fries)	1.370	0.126	3.937	10.865	118.045	1	< .001
Product (Salami)	1.116	0.124	3.053	9.012	81.223	1	< .001
Participant fixed effects: 165							

Note. PrivateLabel_Choice level 'PrivateLabel' coded as class 1. Significant Wald tests (p<.05) bold.

Discussion

In an experimental study we address a timely research question: Are private labels and manufacturer brands differently affected by displaying a Nutri-Score? And does the Nutri-Score effect for private labels depend on whether or not manufacturer brands also choose to display a Nutri-Score? Our results confirm these notions: A Nutri-Score benefits a private label food product such that it gets chosen more often. It relatively benefits private labels more than manufacturer brands, in line with a suspected higher consumer uncertainty around private label products. When both private label and manufacturer brand display the Nutri-Score, neither benefit.

We studied these effects in eight product categories which typically are seen as unhealthy and hence receive "bad" Nutri-Scores. Consequently, our results can inform a packaging decision of actual managerial relevance (it would be trivial to display Nutri-Scores in healthy categories). For policy makers, our findings reveal a potential downside of voluntary policies for FOPL: when brands only selectively choose to display Nutri-Scores, these labels show positive effects on consumer choice, even in cases of low (unhealthy) ratings. Only when all brands display this FOPL, competitive advantages seem to disappear and the whole unhealthy category may be more adequately reviewed by consumers.

We presented a limited study with data from German students. The German grocery market has a large share of private label brands and features several nutrition labels. It would be relevant to study similar perception and preference differences in other grocery markets. Furthermore, future research could study how a mandatory display of Nutri-Scores shift consumer choice and spending across categories. That is, when all brands display a Nutri-Score, will consumers finally choose to spend more in healthy rather than in processed food categories?

References

Calvo Porral, C., & Levy-Mangin, J.-P. (2016). Food private label brands: The role of consumer trust on loyalty and purchase intention. *British Food Journal*, *118*(3), 679–696.

Campos, S., Doxey, J., & Hammond, D. (2011). Nutrition labels on pre-packaged foods: A systematic review. *Public Health Nutrition*, *14*(8), 1496–1506.

De Temmerman, J., Heeremans, E., Slabbinck, H., & Vermeir, I. (2021). The impact of the Nutri-Score nutrition label on perceived healthiness and purchase intentions. *Appetite*, *157*, 104995.

Egnell, M., Talati, Z., Galan, P., Andreeva, V. A., Vandevijvere, S., Gombaud, M., Dréano-Trécant, L., Hercberg, S., Pettigrew, S., & Julia, C. (2020). Objective understanding of the Nutri-score front-of-pack label by European consumers and its effect on food choices: An online experimental study. *International Journal of Behavioral Nutrition and Physical Activity*, *17*(1), 146. https://doi.org/10.1186/s12966-020-01053-z

Egnell, M., Talati, Z., Pettigrew, S., Galan, P., Hercberg, S., & Julia, C. (2019). Comparison of front-of-pack labels to help German consumers understand the nutritional quality of food products. Color-coded labels outperform all other systems. *Ernahrungs Umschau*, *66*(5), 76–84.

Elmadfa, I., & Meyer, A. L. (2019). Front-of-pack-labeling as a contribution to improving the dietary habits. A current situation analysis. *Ernahr. Umsch*, *66*, 154–159.

Fotopoulos, C., & Krystallis, A. (2003). Quality labels as a marketing advantage: The case of the "PDO Zagora" apples in the Greek market. *European Journal of Marketing*, *37*(10), 1350–1374.

James, J. S., Rickard, B. J., & Rossman, W. J. (2009). Product differentiation and market segmentation in applesauce: Using a choice experiment to assess the value of organic, local, and nutrition attributes. *Agricultural and Resource Economics Review*, *38*(3), 357–370.

Konuk, F. A. (2018). The role of store image, perceived quality, trust and perceived value in predicting consumers' purchase intentions towards organic private label food. *Journal of Retailing and Consumer Services*, *43*, 304–310. https://doi.org/10.1016/j.jretconser.2018.04.011

Max-Rubner-Institut, Beckh, C., Heyer, A., Hoffmann, I., Hummel, E., Just, T., Koch, F., Roser, S., Merz, B., Willhöft, C., & Watzl, B. (2020). *Beschreibung und Bewertung ausgewählter „Front-of-Pack"-Nährwertkennzeichnungs-Modelle: Finaler Bericht : Juli 2020*. MRI. https://doi.org/10.25826/20200722-124647

Meistgekaufte Lebensmittel des täglichen Bedarfs in Deutschland 2023. (n.d.). Statista. Retrieved September 14, 2024, from https://de.statista.com/statistik/daten/studie/170961/umfrage/in-den-letzten-14-tagen-gekaufte-produkte/

Nutri-Score. (n.d.). Retrieved September 14, 2024, from https://www.lebensmittelverband.de/de/lebensmittel/kennzeichnung/naehrwert/nutri-score

Scheibehenne, B., Greifeneder, R., & Todd, P. M. (2010). Can There Ever Be Too Many Options? A Meta-Analytic Review of Choice Overload. *Journal of Consumer Research*, *37*(3), 409–425. https://doi.org/10.1086/651235

Sutherland, L. A., Kaley, L. A., & Fischer, L. (2010). Guiding stars: The effect of a nutrition navigation program on consumer purchases at the supermarket. *The American Journal of Clinical Nutrition*, *91*(4), 1090S-1094S.

Wissenswertes für Verbraucherinnen und Verbraucher – Der Nutri-Score einfach erklärt. (2024, July 18). BMEL. https://www.bmel.de/DE/themen/ernaehrung/lebensmittel-kennzeichnung/freiwillige-angaben-und-label/nutri-score/nutri-score-erklaert-verbraucherinfo.html