

The Impact of Diet Costs on Diet Quality

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Introduction

- Establishment of measures improving population's diet quality requires a profound knowledge of factors that are associated with observed food consumption behavior
- According to studies that found an important impact of costs on food choices¹, this study analyses the association between diet quality and diet costs
- The addressed question is: Does a healthier diet cost more than an unhealthy one? If so, by how much?
- These questions could have important implications in the context of social payments for poor households. In Germany, households get a fixed sum of money which covers the minimum subsistence level. When a healthier diet has to be consumed due to illnesses (e.g. allergies, diabetes, AIDS) the amount of money is possibly too low
- Previous studies that have analyzed the costs of a healthy diet came to different results²

Objectives

- Develop a new diet quality index based on the guidelines of the German Nutrition Society (DGE)
- Analyze the association between diet costs and diet quality
- Determine whether and to what extent a healthier diet costs more than an unhealthy one

Data

- German Consumer Panel Survey 2010 considering 190,961 purchases of 300 households
- This scanner data set records quantities and prices for food items at a very detailed level (EAN Code)
- Further data information: (1) socio-demographic household characteristics and (2) several attitude variables of the person who is responsible for the food purchases
- The Consumer Panel Survey is merged with the German Table of Nutrient Content which has information on 130 nutrients

Methods

Estimation approach:

- Consumer's implicit price of diet quality within the framework of a hedonic analysis is measured³
- Based on Lancaster's theory of consumer demand for product characteristics a diet quality index (DQ) is introduced in a food expenditure equation

$$EXP = \beta_0 + \beta_1 DQ + \beta_2 X + \beta_3 Y + \mu$$

EXP = Household food expenditure Y = Attitude variables
 DQ = Diet Quality μ = Residual term
 X = Household characteristics

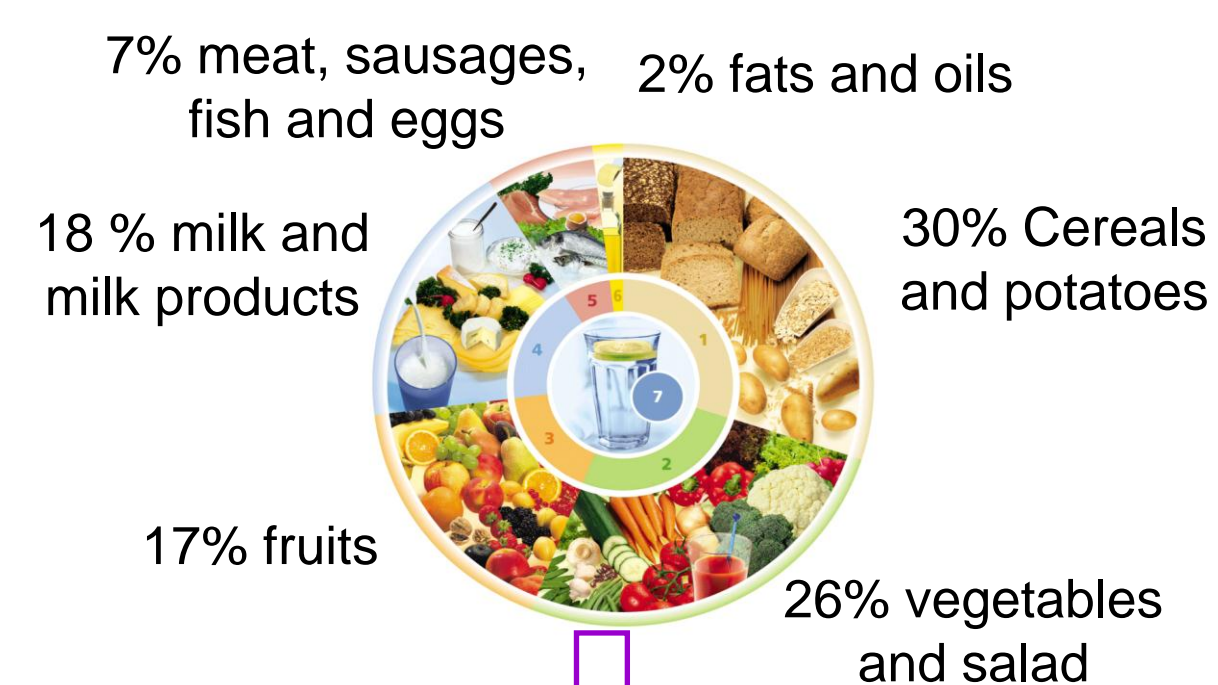
- To check whether DQ is an endogenous variable a Hausman-Test is conducted.
- The hypotheses that DQ is exogenous can't be rejected, therefore DQ is included as an explanatory variable

Develop a new diet quality (DQ) index:

The German Nutrition Society (DGE) recommends:

- The diet should be composed of six main food groups. The shares are given in terms of weight (**Diet Circle**)
- Within the six main food groups healthier items should be consumed more, unhealthy less (**Food Pyramid**)

1. Diet Circle (Main-group DQ)



2. Food Pyramid (Sub-group DQ)

Example: Fat and Oil dimension



Main group DQ (MDQ): It is measured how far the actual consumption structure of single households is away from the optimal structure. Measure: 1 - Euclidian distance

$$0 < MDQ < 1$$

Sub-group DQ (SDQ): Each consumed food item is assigned one of four health factors (hf) according to its position in the pyramid. Measure: weighted average health value for each household consumption basket

$$0 < SDQ < 1$$

$$DQ = (0.5 * MDQ + 0.5 * SDQ)$$

Results and Conclusion

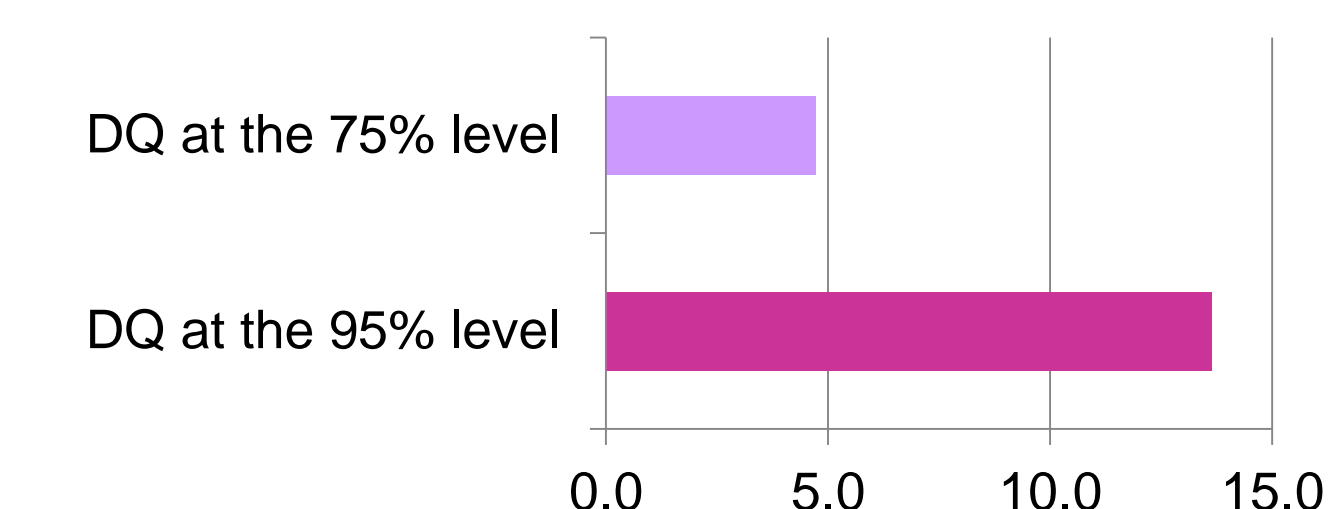
Results of the hedonic regression on food expenditures

Explanatory Variables	Coeff.	t-value
Constant	-103.94	-2.932
Diet Quality	129.26	3.247
Household income per month (€)	0.012	3.268
Number of people in the household	29.98	8.181
Age (head of the household)	1.44	4.880
Price awareness	-7.45	-0.860
Quality awareness	19.49	2.189
R ² (adj.)	0.26	

- The positive and significant coefficient for diet quality imply that consumers are willing to pay to consume a healthier diet according to German food guidelines

Predicted food expenditures with higher adherence to food guidelines

- Additional food expenditures (in %) compared to a reference household (variable values from sample means)



- The additional costs of moving from a medium diet to a diet at the 75% (95%)-percentil is 4,7% (13,6%)
- If this result can be confirmed in further studies, recipients of social payments who have to consume a healthier diet due to illnesses should get additional money of at least 4,7%
- Given that the current social payment food rate for poor individuals in Germany is 128 € per month this amounts to additional support of 6 € per month

References: **1)** Drewnowski, A.; Darmon, N. (2005): Food choices and diet costs: an economic analysis. *The Journal of Nutrition*, 135: 900-904. **2)** Carlson, A.; Lino, M.; Fungwe, T.V.; Guenther, P.M. (2009): Eating a Healthy Diet: Is Cost a Major Factor? USDA Center for Nutrition Policy and Promotion. **3)** Ranney, C.K., McNamara, P.E. (2002): Do Healthier Diets Cost More? Paper presented at the AAEA Meetings in Long Beach, California, July 28-31, 2002. Working Paper 2022-22, Cornell University, Department of Agricultural Economics and Management, Ithaca, New York.