WIFO ÖSTERREICHISCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG

A New Demand System for Food in Austria

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Outline

- Introduction
- Literature Review
- Methodology
- Data
- Preliminary Results
- Conclusions and Outline

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Introduction

Over the past year and a half: high inflation, particularly in the food industry

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Introduction

Over the past year and a half: high inflation, particularly in the food industry

⇒ Analyse the reactions of consumers to market changes

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Introduction

Over the past year and a half: high inflation, particularly in the food industry

- Analyse the reactions of consumers to market changes
- Estimate a demand system and demand elasticities

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Introduction

Over the past year and a half: high inflation, particularly in the food industry

- Analyse the reactions of consumers to market changes
- Estimate a demand system and demand elasticities
- Use the linear approximation of the Exact Affine Stone Index (LA/EASI) demand system

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Review of methods used in food related studies

Paper	Country	Year	Model	Data
Castellón et al.	US	2002-2006	LA/EASI[2] demand system	Food
Eisner et al.	Austria	2004/5, 2009/10, 2014/15	EASI[1] demand system	All goods with focus on energy
Roosen et al.	Germany	2012-2014	LA/AIDS[4] demand system	Fresh meat
Widenhorn & Salhofer	Austria	1997-2009	Generalized demand system	All goods with focus on food and focus on milk and meat products
Wüger	Austria	1973-1984	LES[5]; AIDS[3]	Food

[1]Exact Affine Stone Index (EASI) demand system
[2]Linear Approximation of Exact Affine Stone Index (LA/EASI) demand system
[3]Almost Ideal Demand System (AIDS)
[4]Linear Approximation of the Almost Ideal Demand System (LA/AIDS)
[5]Linear Expenditure System

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Methodology

Censored Linear Approximation of Exact Affine Stone Index (Censored LA/EASI) Demand System (Lewbel & Pendakur, 2009)

$$w = \widehat{\Phi}\left(\sum_{r=0}^{R} b_r y^r + Cz + Dzy + Ap + Bpy\right) + \hat{\phi}\delta + \varepsilon$$

with

w ... vector of budget shares of commodity groups (e.g. dairy)

y ... real total expenditures

z ... vector of observable household characteristics

p ... vector of logarithmic product prices

ε ... vector of unobserved preference characteristics

$\widehat{\Phi}, \hat{\phi}$ ... matrices of probability information of censoring

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b, ... parameters to be estimated

High variability in the shape of Engel curves

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Unobserved preference heterogeneity

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Methodology

Stone-Lewbel price indices (Lewbel, 1989) vli

To get more variation in the price data of commodity groups, construct

$$v_{li} = \frac{1}{k_i} \prod_{j=1}^{n_i} \left(\frac{p_{ij}}{w_{lij}} \right)^{w_{lij}}$$

Indices:
i ... food type
j ... item in food type
l ... household

with

p_{ij} ... price of item j in food type i

w_{lij} ... budget share of item j in food type i for household l

k_i ... scaling factor

n_i ... number of items in food type i

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Data

$$w = \widehat{\Phi}\left(\sum_{r=0}^{R} b_r y^r + Cz + Dzy + Ap + Bpy \right) + \hat{\phi}\delta + \varepsilon$$

Household Budget Survey (HBS; STAT):

- Includes data on budget shares w, real total expenditures y, household characteristics z
- Conducted in waves of five years by Statistics Austria
- samples from 2004/2005, 2009/2010, 2014/2015 and 2019/2020

Consumer Price Index (CPI; STAT):

- Includes data on price indices p (for X food items)
- frequency: monthly, yearly

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Data: aggregated food types and their COICOP items

Types of food	Food items
Cereals & Bakery	Bread, Bakery; Long-life Bakery Products, Pastries, Pizza; Various Cereals and Potato Products
Meats & Eggs	Meat; Sausage and Cured Meats; Preserved and Processed Meat Products; Fish and Seafood; Eggs
Dairy	Yogurt; Milk; Cheese; Curd; Other Dairy Products
Fruit & Vegetables	Fresh Fruit; Preserved and Processed Fruit; Fresh Vegetables; Preserved and Processed Vegetables
Nonalcoholic Bev.	Coffee, Tea, Cocoa; Mineral Water, Lemonades, Juices; Non-Alcoholic Beverages that cannot be allocated
Fats & Oils	Butter; Vegetable Fats, Margarine; Olive Oil; Other Cooking Oils; Animal Fats
Sugar & other Sweets	Sugar, Sweeteners; Jam, Compote, Honey; Chocolate; Sweets; Ice Cream
Miscellaneous Foods	Sauces, Vinegar, Seasonings; Salt, Spices; Baking Ingredients; Ready Meals; Baby Food

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Data

Expenditures and types of food	2004/05	2019/20
total household expenditures	2535.7	3250.0
exp. for food and nonalcoholic bev.	330.6	392.0
Cereals & Bakery	18.3	17.6
Meats & Eggs	26.7	24.6
Dairy	12.6	11.3
Fruit & Vegetables	16.0	18.1
Nonalcoholic Bev.	10.3	10.5
Fats & Oils	3.0	3.0
Sugar & other Sweets	7.7	6.8
Miscellaneous Foods	5.4	8.1

Table 2. Total and food household expenditures in €/month and share of food expenditures for types of food in 2004/05, 2019/20 in %
Source: Statistics Austria, Household Budget Survey. Miscellaneous Foods: prepared meals, spices, baking ingredients, other.

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Preliminary Results: compensated own price elasticities

types of food	total expenditures group of households			
	lowest	low	high	highest
Cereals & Bakery	-0.445	-0.480	-0.516	-0.538
Meats & Eggs	-0.374	-0.420	-0.463	-0.486
Dairy	-0.465	-0.495	-0.525	-0.548
Fruit & Vegetables	-0.433	-0.469	-0.506	-0.528
Nonalcoholic Bev.	-0.323	-0.337	-0.344	-0.375
Fats & Oils	-0.487	-0.404	-0.349	-0.231
Sugar & other Sweets	-0.494	-0.471	-0.464	-0.448
Miscellaneous Foods	-0.755	-0.740	-0.722	-0.706

A price increase of "Cereals & Bakery" of 1% results in decrease of its quantity by 0.445% for the group of households in the lowest expenditure group

Source: own computation.

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Preliminary Results: compensated ow lasticities

Most inelastic

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Most elastic

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Conclusions and outlook

findings regarding results

- Lower income households react less to price increases of "Cereals & Bakery", "Meats & Eggs", "Dairy", "Fruit & Vegetables" and "Nonalcoholic Beverages"

findings regarding estimation strategy

- we interpret our results as long-term elasticities
- comparing estimates of various waves may reveal change over time
- investigation of error terms may give hints on changing preferences

avenues for further research

- separate plant based products from animal based products
- separate "Beef & Veal" from "Meat & Eggs" and "Milk" from "Dairy"
- employ more elaborated approaches for handling censored data

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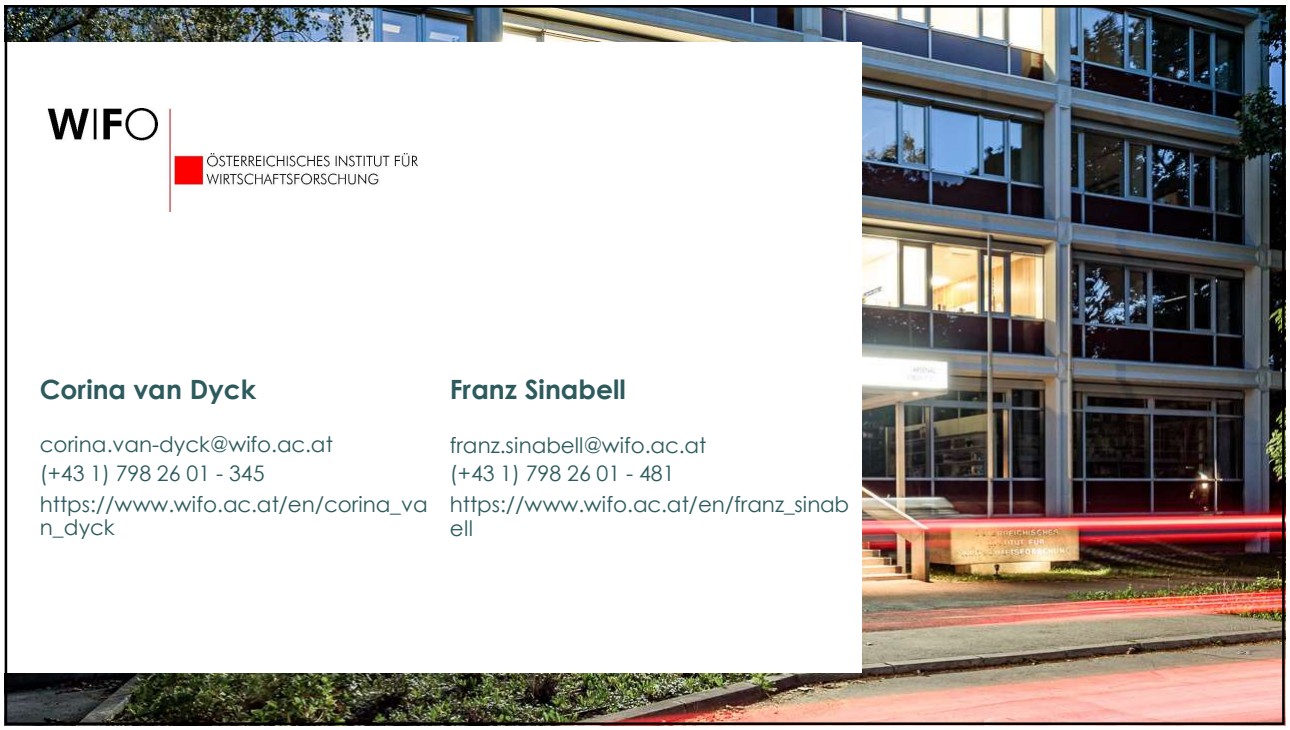

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