



OESTERREICHISCHE NATIONALBANK

EUROSYSTEM

Analyzing scanner data in PRISMA

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- Two types of scanner data in PRISMA: household scanner data (GfK/Kantar) and supermarket scanner data (IRi)
- Questions to be analyzed with scanner data using information on quantities and precise good id:
 - Inflation heterogeneity across households and countries, consumption behavior, substitution
 - Differences between online and offline prices
 - Degree of state dependence in price setting, pass-through of shocks (tax changes) to consumer prices

- Papers with scanner data in PRISMA:

Kiss, R. and G. Strasser (2022): "Inflation heterogeneity across households"

Messner, T. and F. Rumler (2022): "Inflation heterogeneity across Austrian households. Evidence from household retail scanner data"

Messner, T., F. Rumler and G. Strasser (2022): "Cross-country price and inflation dispersion: Retail network or national border?"

Strasser, G. and D. Wittekopf (2022): "Online shopping, consumer behavior and inflation"

Ampudia, M., M. Ehrmann and G. Strasser (2022): "Monetary Policy and Inflation Inequality"

Karadi, P., J. Amann, J.S. Bachiller, and J. Wursten (2022): "State-dependence in price setting on the two sides of the Atlantic - Evidence from supermarket scanner data"

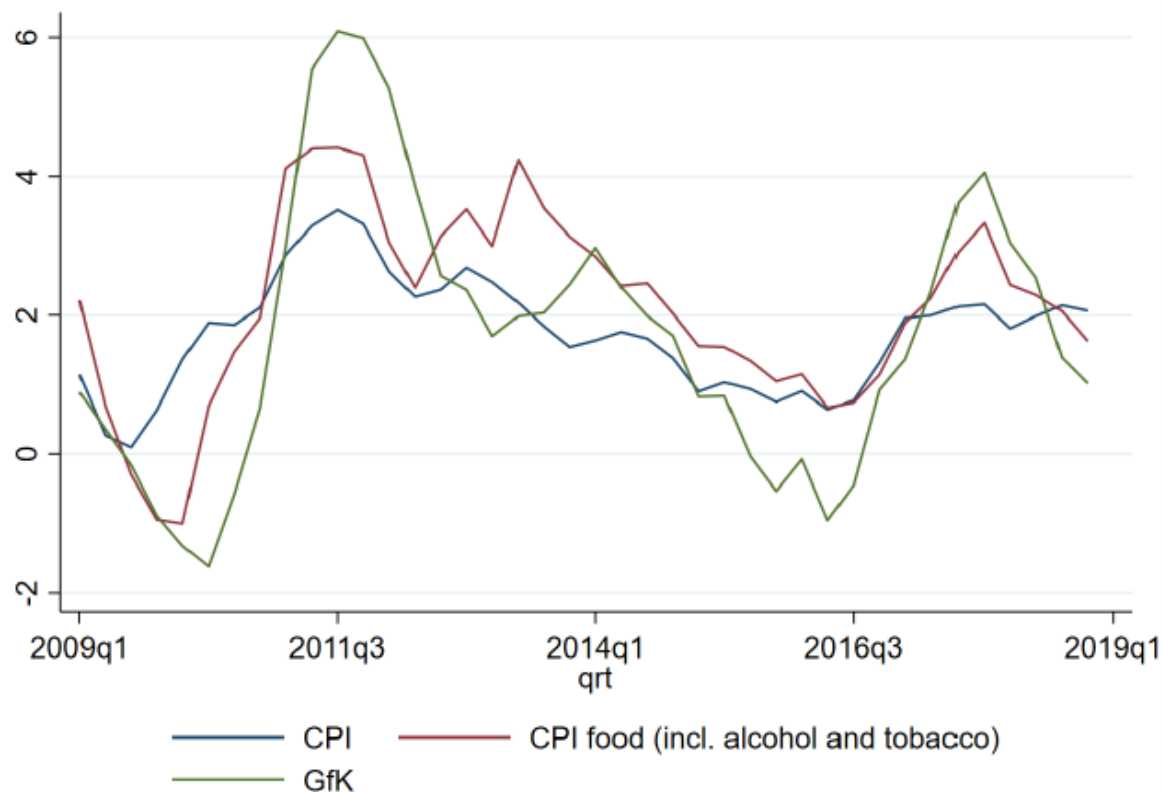
Dedola, L., C. Osbat and T. Reinelt (2022): "Tax thy neighbour: Corporate tax pass-through into downstream consumer prices in a monetary union"

Main differences of supermarket and household scanner data

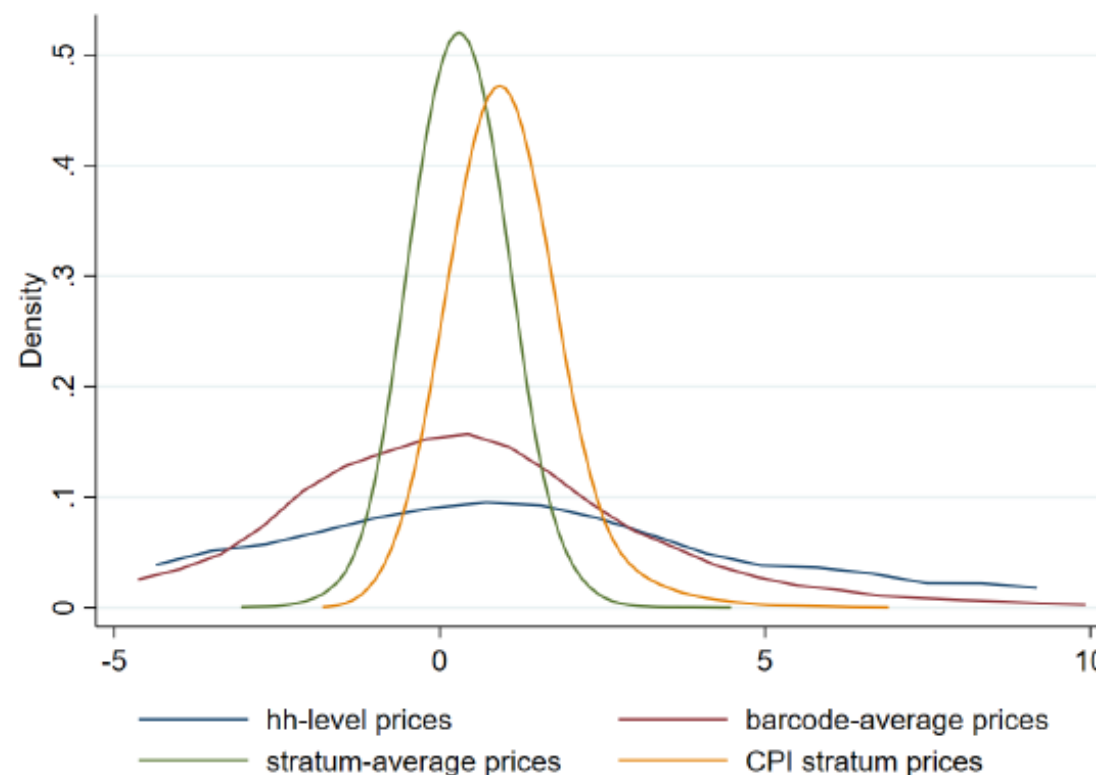
	PRISMA IRi supermarket scanner data	PRISMA GfK household scanner data
Collection point	store	household
Frequency	weekly average quite regular	transaction infrequent
Period	2013-2017	2005-2018 (max.)
Future updates	yes, with delay	no
No. of markets	DE, FR, NL, IT	16 European countries
Regional detail	2-digit zip	varies
Store coverage	participating chains	all
Product coverage	only FMCG	broader, dom. by FMCG
Barcodes	masked EANs/SKUs	SKUs, EANs
Quantities	yes	yes
Store characteristics	store ID, chain, type	chain only
Household characteristics	no	yes
Coupon use/ sales flag	no	no

Household scanner data of FMCG track aggregate CPI food inflation well Household inflation rates with HH-level prices much more dispersed

Aggregate inflation rates (Austria)



Distribution of household-level inflation rates in a typical quarter (2018Q4)

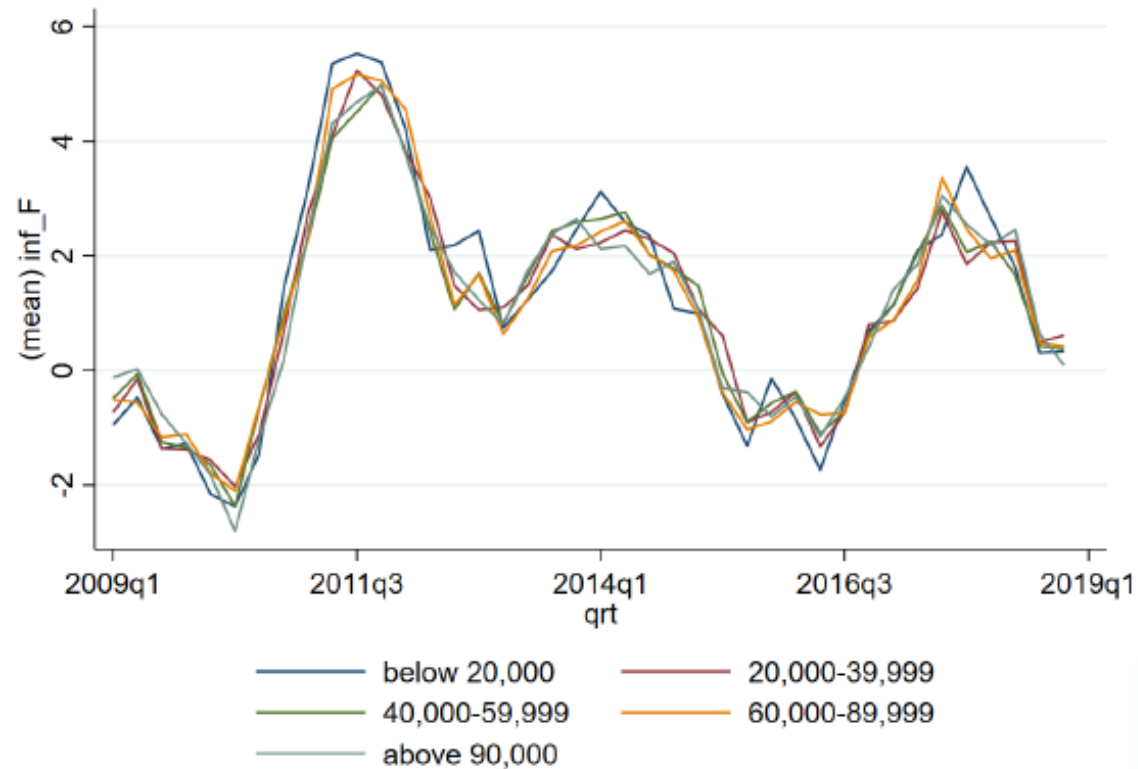


Data: GfK household panel

Source: Messner & Rumler (2022)

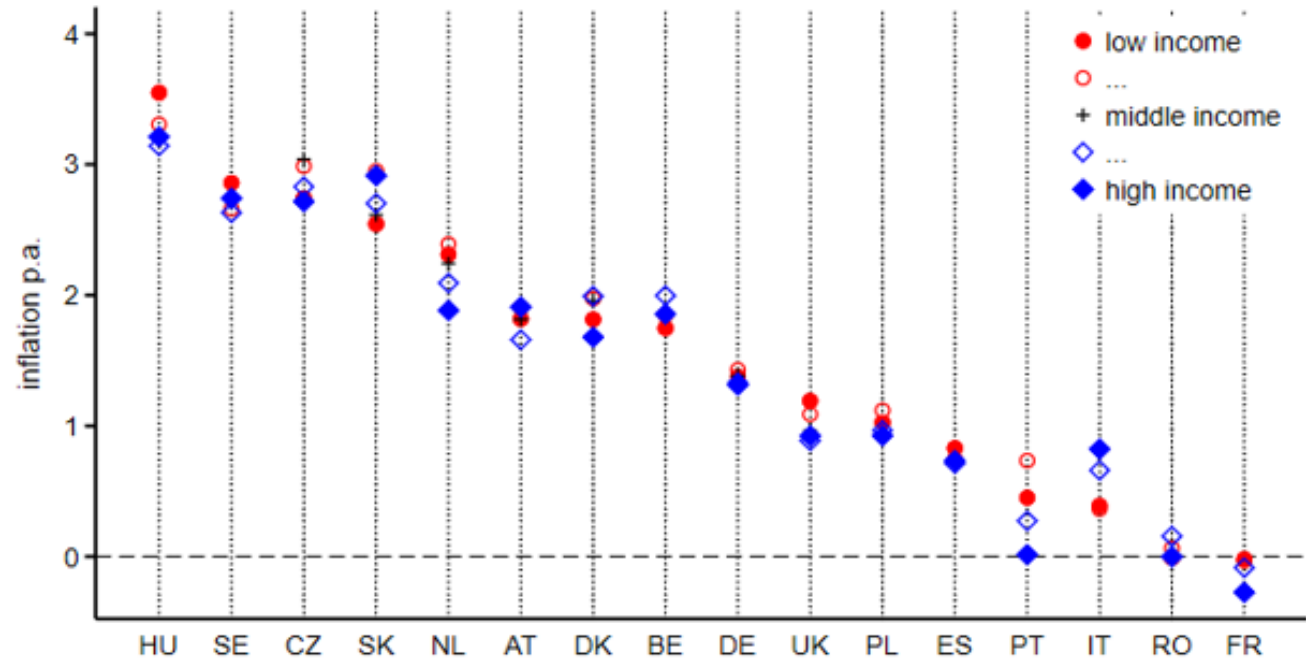
Evidence on the relationship between income and inflation inconclusive in Europe

Inflation rates by income groups over time in Austria



Data: GfK household panel
Source: Messner & Rumler (2022)

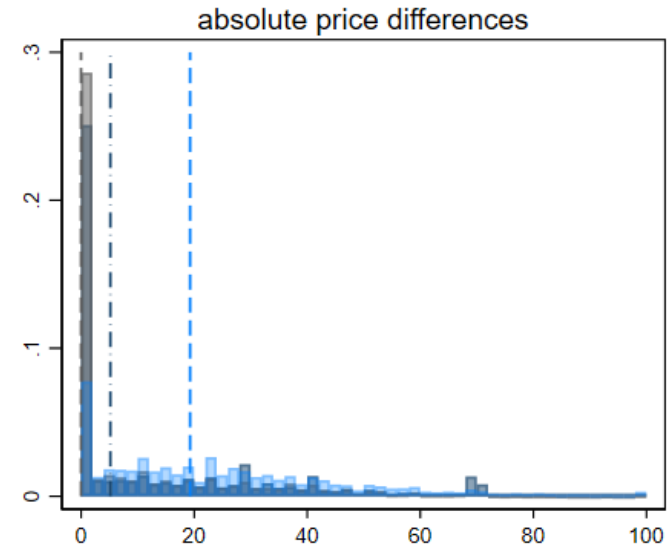
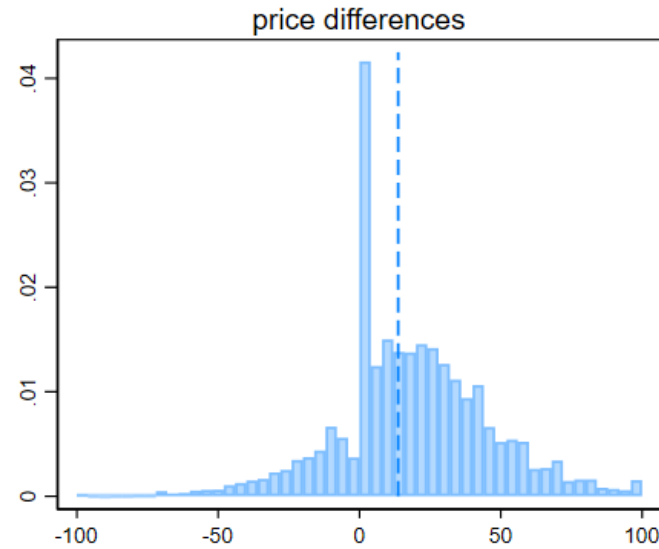
Inflation by income group (t/t-12, p.a., 2015-2018)



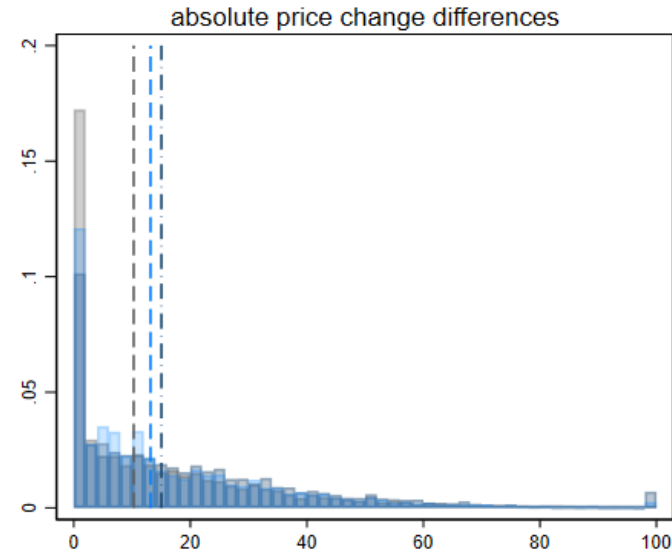
Data: GfK household panel
Source: Ampudia, Ehrmann, Strasser (2022)

Sizeable cross-border price and inflation differences

Price differences



Price change differences

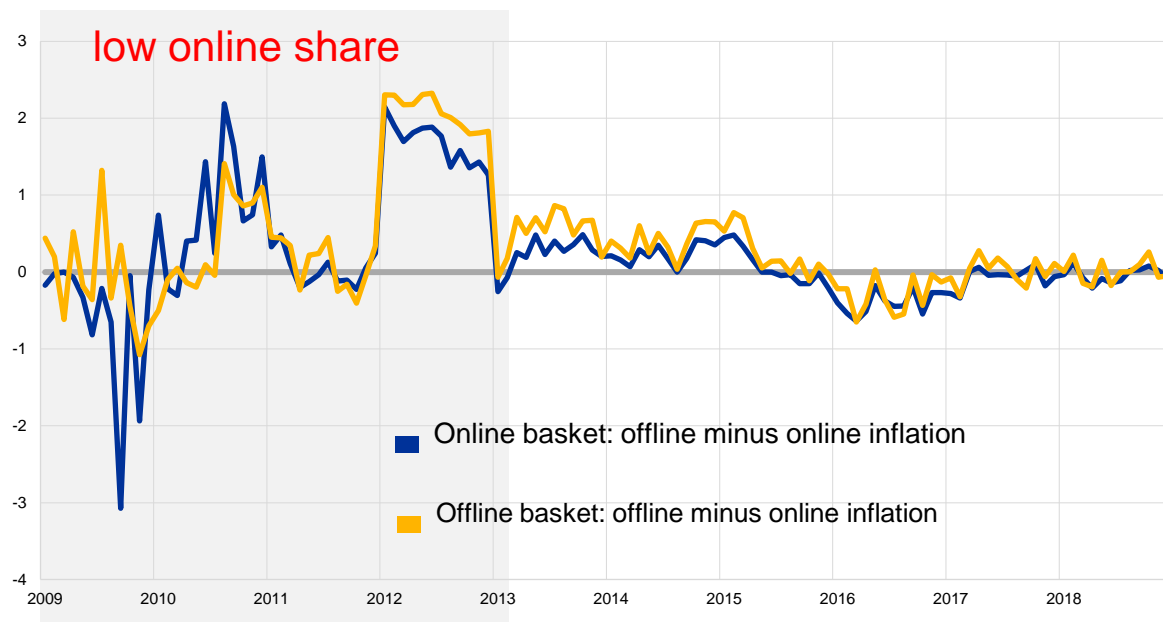


Data: GfK household panel
Source: Messner, Rumler, Strasser (2022)

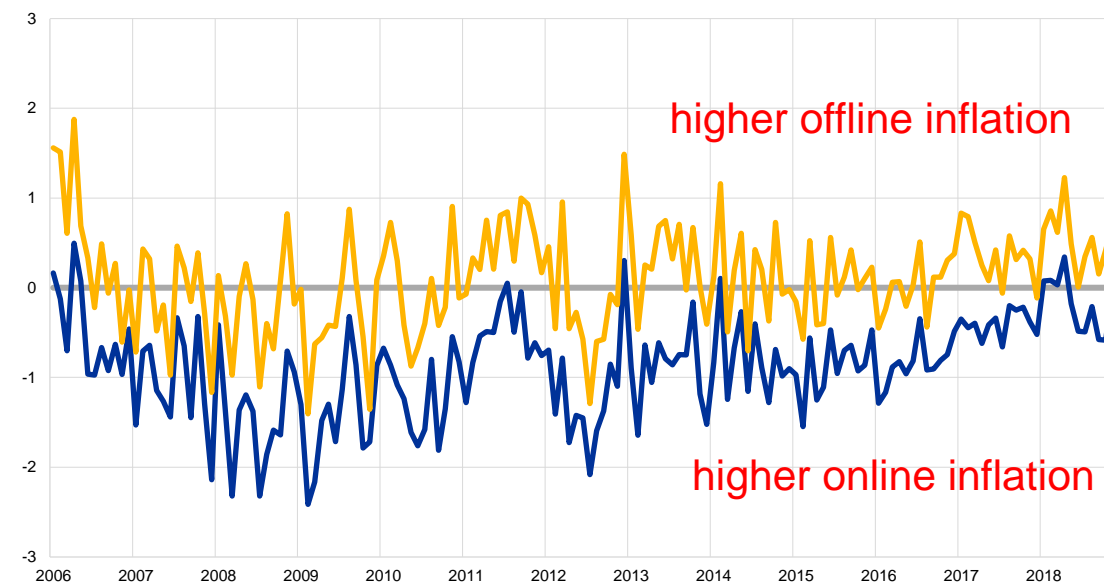
Online and offline inflation converge as markets mature

Inflation rate (supermarket products, % p.a.)

France



UK



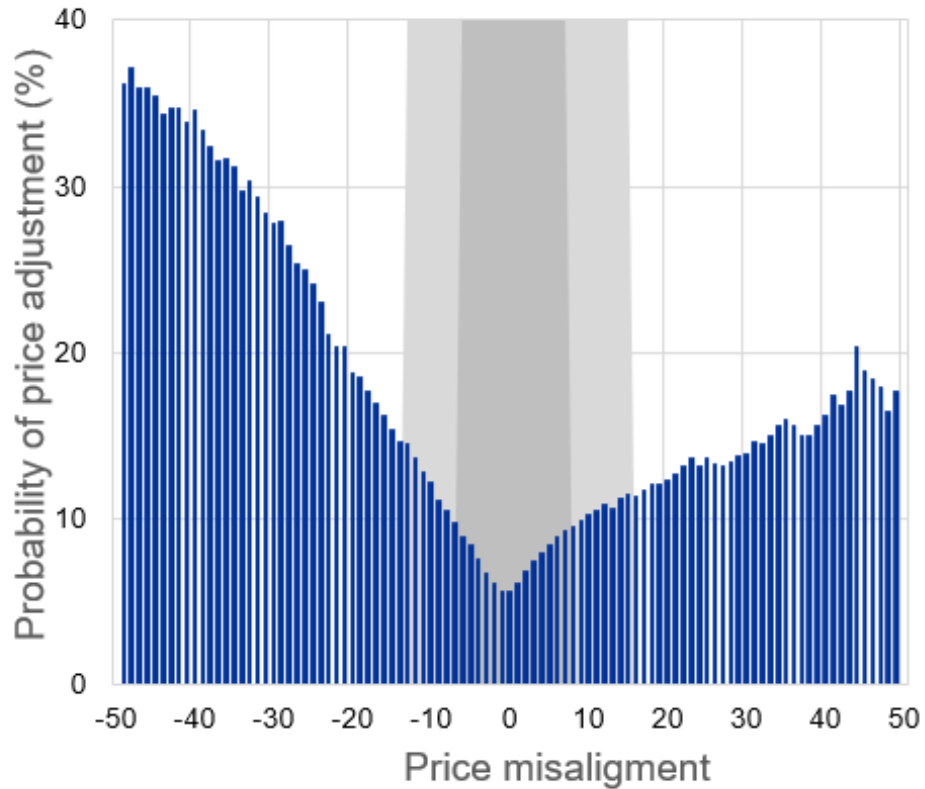
Data: GfK household panel

Source: Strasser & Wittekopf (2022)

Supermarket scanner data: Evidence of moderate state dependence

Strong pass-through of producer corporate taxes in hyper- and supermarkets

Price adjustment hazard

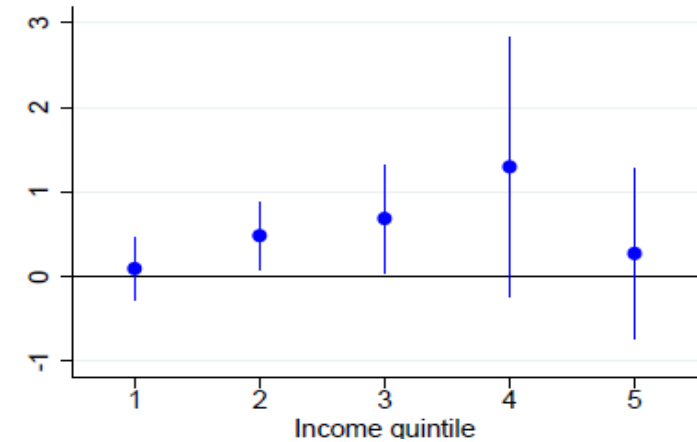


Data: IRI supermarket scanner data (DE, FR, IT, NL, 2013-1017)

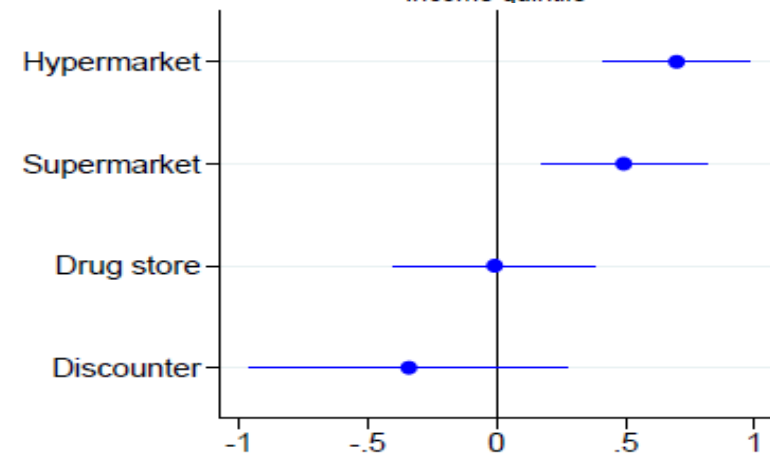
Source: Karadi et. al (2022)

Pass-through of corporate taxes by...

Sales region income



Store type



Data: IRI supermarket scanner data (DE)

Source: Dedola, Osbat, Reinelt (2022)

Danke für Ihre Aufmerksamkeit

Thank you for your attention

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Coverage and properties of the scanner data



Household scanner data from GfK/Kantar

Country	Source	Period	OBS	# panelist	# products	# shops	HH characteristics
AT	GfK	2008 - 2018	24 M	3,973	74,285	257	Age, income, social-class, hh-size, province
BE	GfK	2005 - 2018	71 M	4,576	146,413	151	Age, income, social-class, hh-size, province
CZ	GfK	2013 – 2018	17 M	2,296	104,882	126	Age, income, social-class, hh-size, city
DE	GfK	2005 - 2018	439 M	33,558	232,884	26	Age, income, social-class, hh-size, zip
DK	GfK	2006 – 2018	29 M	2,199	36,686	173	Age, income, social-class, hh-size, city
ES	Kantar	2008 – 2018	116 M	11,414	163,195	234	Age, social-class, hh-size, zip
FR	Kantar	2008 – 2018	152 M	17,952	203,254	398	Age, income, social-class, hh-size, zip
HU	GfK	2010 – 2018	14 M	2,201	51,801	126	Age, income, social-class, hh-size, city
IT	GfK	2012 – 2018	34 M	8,161	166,802	114	Age, social-class, hh-size, region
NL	GfK	2008 – 2018	157 M	9,962	207,082	150	Age, income, social-class, hh-size, province
PL	GfK	2011 – 2018	87 M	7,131	156,320	168	Age, income, social-class, hh-size, city
PT	Kantar	2010 – 2018	20 M	5,207	64,606	256	Age, social-class, hh-size, zip
RO	GfK	2013 – 2018	16 M	3,296	51,991	100	Age, income, social-class, hh-size, city
SE	GfK	2006 – 2018	16 M	2,368	30,512	125	Age, income, hh-size, zip
SK	GfK	2013 – 2018	10 M	1,667	74,303	117	Age, income, social-class, hh-size, city
UK	GfK	2005 - 2018	511 M	29,330	138,639	89	Age, income, social-class, hh-size, zip

Supermarket scanner data from IRI

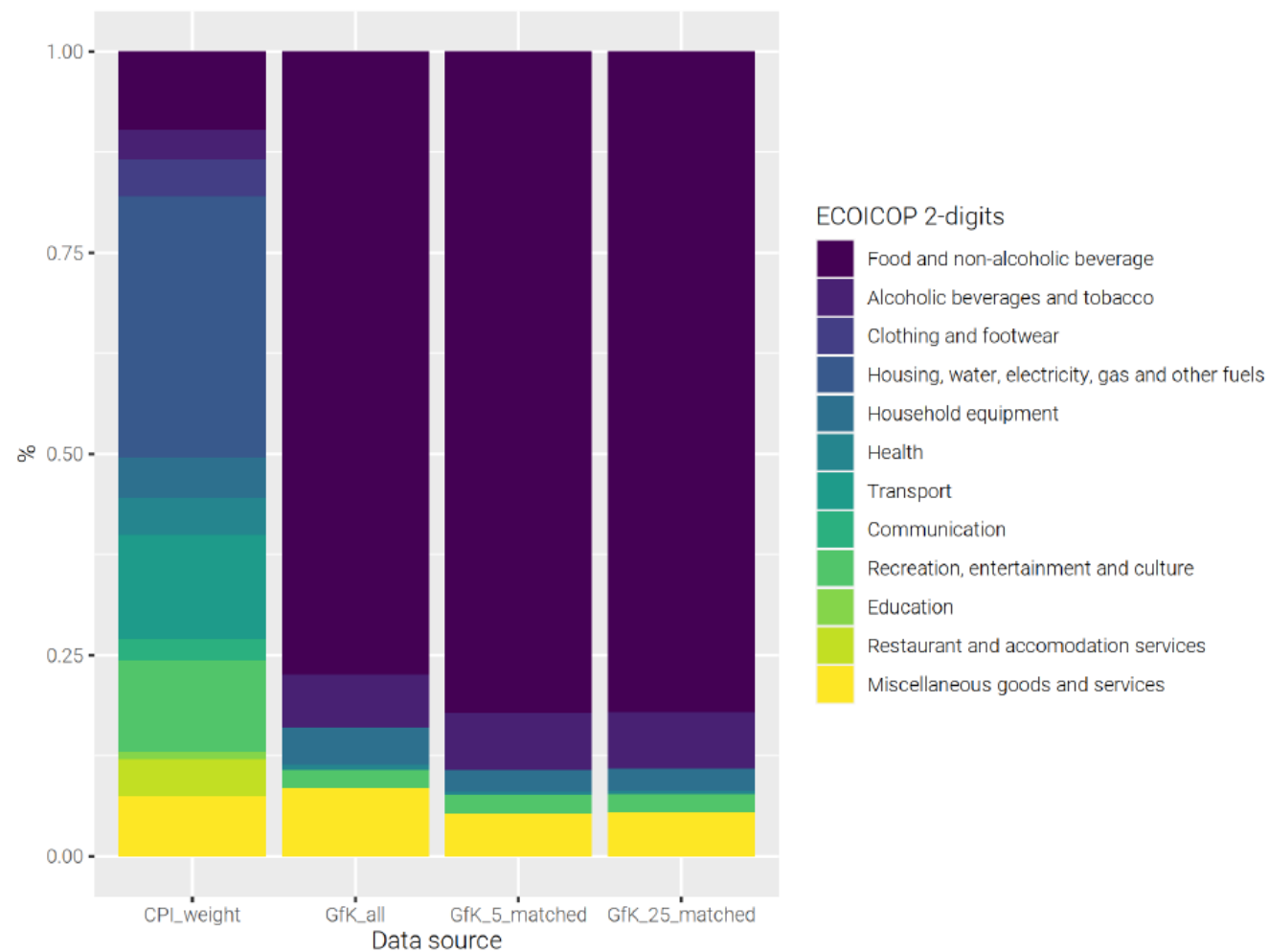
	DE	FR	IT	NL	US
Time series	2013-2017				2001-2012
# 2-digit ZIPs	95	93	103	91	51
# stores	10412	5851	14700	6559	3280
# store types	4	4	6	2	3
# chains	16	43	466	29	147
% in HICP/CPI	18.5	23.3	23.4	20.7	19.6
# products	410276	426153	776521	391507	204519
av. ann. exp. (bn EUR/USD)	24.09	56.19	31.22	30.01	6.2
# observations (bn)	14.26	11.92	11.3	7.66	2.7

Spending shares in household scanner data vs. CPI – dominated by food and beverages

Austria (2008-2018)

COICOP groups	Austrian CPI		GfK all data	matched barcodes
	absolute	relative		
Bread and cereals	2.4	15.4	7.4	6.6
Meat	2.4	15.5	1.4	1.1
Fish and seafood	0.4	2.6	3.3	2.4
Milk, cheese and eggs	1.6	10.6	18.5	24.2
Oils and fats	0.4	2.4	3.9	4.2
Fruit	0.1	1.0	2.1	1.8
Vegetables	0.5	3.1	4.1	3.8
Sugar, jam, honey, chocolate and confectionery	1.0	6.7	9.8	8.5
Food products n.e.c.	0.5	3.4	8.7	7.0
Coffee, tea and cocoa	0.6	3.6	5.0	6.5
Mineral waters, soft drinks, fruit and vegetable juices	0.9	5.8	8.0	9.9
Spirits	0.2	1.4	1.9	1.8
Wine	0.7	4.5	1.0	0.8
Beer	0.6	3.6	3.8	6.1
Non-durable household goods	0.9	6.0	4.6	2.1
Other medical products	0.1	0.4	0.04	0.01
Pets and related products	0.6	3.8	5.3	6.6
Electric appliances for personal care	0.1	0.4	0.3	0.04
Other appliances, articles and products for personal care	1.5	9.9	11.0	6.7
Sum	15.4	100	100	100

Germany (2015)



Similar preferences but price discrimination along national border

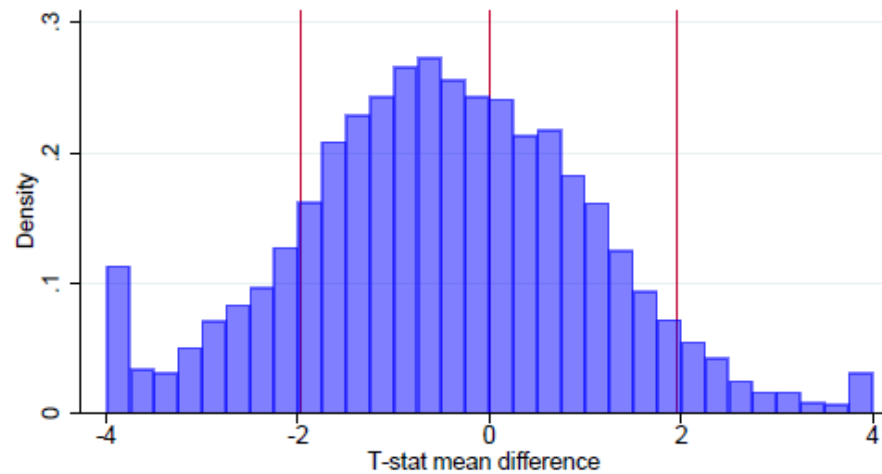
	Basket correlation (COICOP5)	Common barcode share	Absolute price difference	Absolute price change difference
Constant (DE)	0.88***	0.16***	8.19***	11.21***
AT (additional)	0.04***	-0.08***	2.72***	2.31
Border (additional)	-0.14***	-0.14***	14.75***	4.63***
Common trend (DE)	0.01***	0.00***	0.00	0.01
AT trend	-0.005***	-0.00***	0.01	0.03
Border trend	-0.01***	-0.00***	0.01	-0.01
Frequency:	annual	annual	bi-monthly	bi-monthly
Observations:	7733	7733	325,507	44,316
Adj. R2:	0.70	0.93	0.11	0.07

Notes: 2008-2018, 703 region pairs, OLS regression, barcode-clustered standard errors.

Even direct competitors differ in how they price products online vs. offline

Mean difference between offline and online prices (France, t-stat)

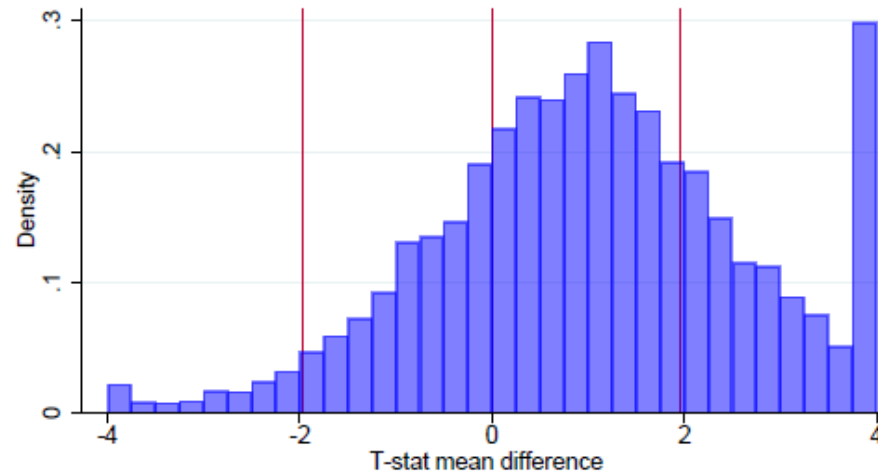
Retailer A



offline > online: 6%
offline < online: 16%

(median offline vs. median online price, H_0 : no difference)

Retailer B



28%
4%

Data: GfK household panel
Source: Strasser & Wittekopf (2022)