



**Comments on
“The Determinants of domestic
Water Use: Cross-Country
Analysis and Policy
Implications”**

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Innovative effort

- Regional coverage: cross-country survey and analysis
- Issues: water use + adoption of water-saving measures + water quality
- Measures: technologies + behaviour
- Factors: socio-economic + attitudes
- Results: new and interesting

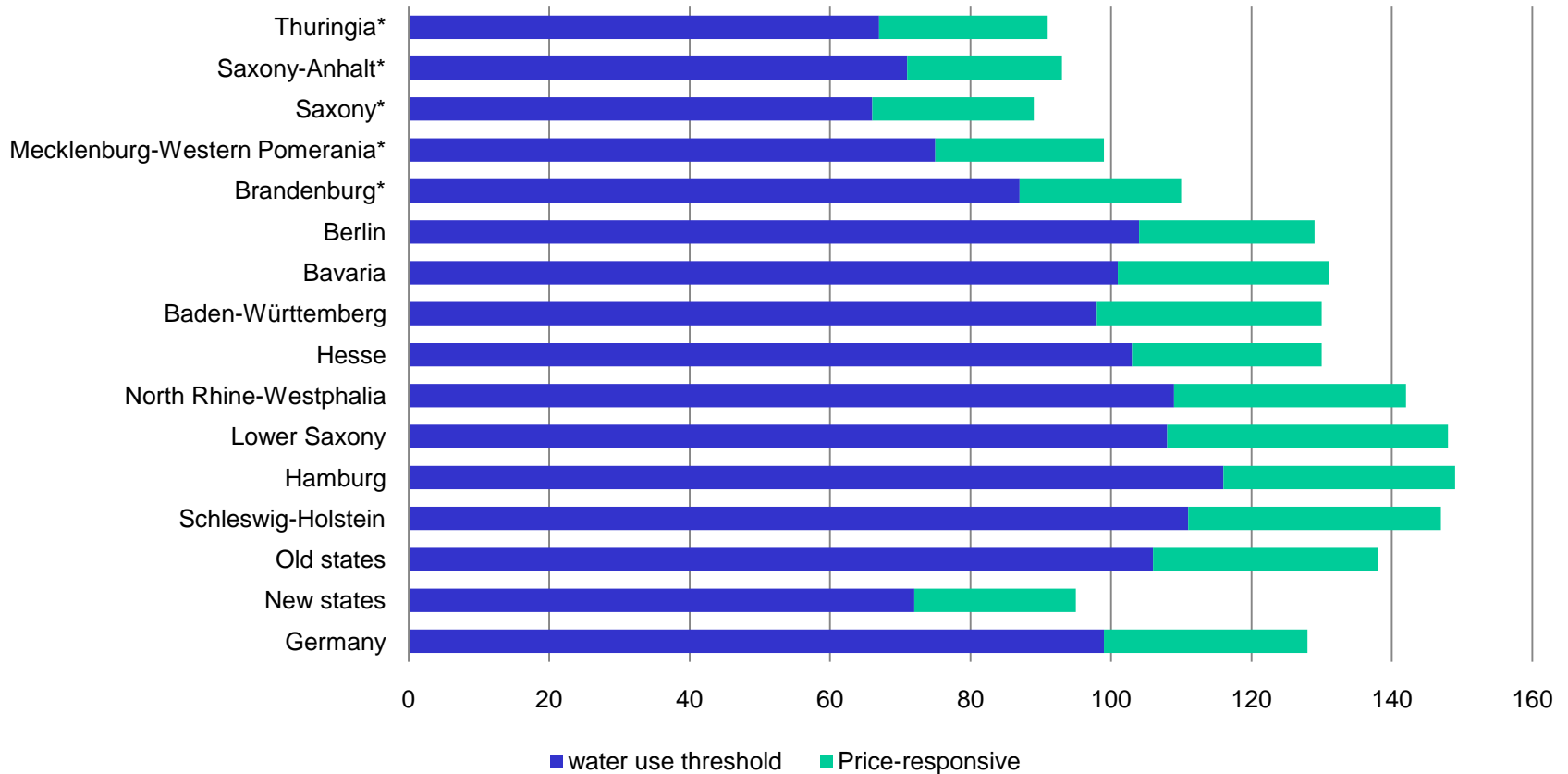
Results: Water prices

Price and water consumption:

- Elasticities are rather high (above 0.5 in absolute value) compared to more recent literature in OECD/EU countries – cross sectional data tends to yield price elasticities well below 0.4 (in absolute value)
- Report suggests that charging for water reduces demand by about 25% (in short run); country-specific differences? Raises issue of share of water consumption which is price-responsive (in short run)? Little empirical evidence so far suggests that 70-80% of water use does not react to price changes (in short run)

Not all water use is price-responsive: results for Germany

Per-capita water use in litres/day in Germany



Schleich, J. (2009): How low can you go? Price responsiveness of German residential water demand. *European Association of Environmental and Resource Economists (EAERE), 17th Annual Conference, Amsterdam, June 24-27.*

Results: Socio-economic factors

Age and water consumption:

- Evidence in literature is mixed; report suggests rather positive relation; could check impact of retirees (i.e. staying at home) and age to get further insights

Household size and water consumption

- Economies of scale could be highlighted

Income and water consumption:

- Small or not statistically significant effect; correlation with residence size (mentioned in report), but also with education (!);
- Relation could be non-linear (i.e. lower income elasticity for higher income levels; e.g. new and old federal States in Germany)

Results: Distributional effects of water pricing

Results don't appear to match the theory at the household (Table 9) and country level (Table 6)

Table 9 - Water Consumption, Average Water Price and Income-Price Interactions (p. 22)

Dependent Variable: LWTRCONS

Included observations: 1359

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LINCOME_CONT	0.109053***	0.023993	4.545255	0.0000
ADULTS	0.134007***	0.019246	6.962692	0.0000
CHILDREN_NEW	0.055380***	0.019271	2.873707	0.0041
HIGHEDUC	-0.021462	0.037209	-0.576797	0.5642
RESDSIZE	0.001480***	0.000385	3.839986	0.0001
RESDAGE	0.000969	0.000706	1.371386	0.1705
AGE	0.002851*	0.001678	1.699329	0.0895
EMPL_FT	0.010258	0.037200	0.275748	0.7828
RESOWNR_NEW	0.023971	0.044608	0.537379	0.5911
AREADSC_URBN	-0.020761	0.038009	-0.546202	0.5850
WTRINV_DUAL_1	-0.066885*	0.037440	-1.786440	0.0743
WTRINV_LOWF_1	-0.010855	0.036265	-0.299324	0.7647
LWTRPRICEUNIT	-0.599684***	0.021864	-27.43205	0.0000
LOWINCOMELPRICE	0.013744	0.061018	0.225238	0.8218
HIGHINCOMELPRICE	0.209174**	0.098638	2.120630	0.0341
C	3.422122***	0.259534	13.18582	0.0000
R-squared	0.550383	Mean dependent var		5.115505
Adjusted R-squared	0.545361	S.D. dependent var		0.918733
S.E. of regression	0.619473	Akaike info criterion		1.891808
Sum squared resid	515.3718	Schwarz criterion		1.953200
Log likelihood	-1269.484	F-statistic		109.5991
Durbin-Watson stat	1.591044	Prob(F-statistic)		0.000000

“It implies that high-income households are *less* responsive to changes in the average price of water than medium and low-income households. This suggests that high-income households will be less affected than low-income households from price changes and, thus, the biggest proportional change in residential water consumption from a price change will come from low and medium-income households.”

Methodology

- Use and interpretation of **ordinal scales** in econometric analyses is critical – need to be careful when interpreting relative size of associated parameter estimates
- If relatively minor effects of behavioural factors are the result of low variance across individuals/countries may need **more discriminating answers in questionnaire** (including e.g. 7 point rather than 5 point Likard scales)
- Water demand analyses could be subject to **selection bias**, since only those households are included which report water use; i.e. observed and unobserved heterogeneity may cause parameter estimates to be biased; (solution: two step Heckman or estimate joint distribution)
- WTP analyses: **imputing data** may result in biased estimates if “missing” do not behave as assumed; to test robustness of results could also run regression (ordered logit) on stated percentages (possibly accounting for selection bias)
- Could **subjective water quality assessment** be corroborated by objective data?

Consider costs and benefits of regulation

- Transaction costs of metering in water-abundant regions?
- Relate WTP for clean water with costs
- How to deal with misperceived benefits reflected in WTP? (e.g. calcium content does not pose a health threat; corroborate stated health/taste problems with objective information?)
- Environmental pressure from water use and water quality problems may be a problem at regional rather than national level (i.e. need more regionally disaggregate data and regionally differentiated policies)

Use of water tariffs to address equity concerns/distributional objectives

- Need to preserve incentive structure
- Discussion about change in tariff structure towards multi-part tariff (e.g. Germany)

Future questionnaire

- Also include sewage together with water prices (to adequately assess incentives and distributional issues)
- Frequency of metering and billing
- Tariff structure (details on fixed, variable components)
- Temperature and climate variables (could also be imputed from external sources)
- Panel data would be ideal