Online Appendix

Sin Taxes and Self-Control

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A Dataset

Table A.1: Descriptive statistics

	Overall	Low self-control	High self-control	Unrestricted sample
Equivalized household income in DKK				
<175K	18.7	17.7	19.6	19.3
175K-250K	26.1	28.0	24.4	26.0
250K-325K	18.2	17.5	18.9	17.8
325K-400K	19.6	20.1	19.1	19.5
≥400K	17.4	16.7	18.1	17.4
Age group				
<40	13.0	12.3	13.6	13.7
40-59	48.7	47.4	49.9	47.9
≥60	38.4	40.3	36.5	38.4
Labor market status				
Full time	38.7	42.3	35.3	38.5
Part time	27.2	24.4	29.9	27.7
Not employed	34.1	33.3	34.8	33.9
Education				
No tertiary education	59.4	62.8	56.3	59.4
1-3 years tertiary educ.	15.0	14.3	15.6	14.8
> 3 years tertiary educ.	25.6	22.9	28.1	25.8
Household size	1.921	1.941	1.901	1.909
	(0.985)	(1.041)	(0.928)	(0.988)
Number of child. age 0-6	0.066	0.090	0.044	0.068
	(0.321)	(0.381)	(0.249)	(0.326)
Number of child. age 7-14	0.130	0.147	0.113	0.128
	(0.458)	(0.501)	(0.413)	(0.454)
Number of child. age 15-20	0.100	0.101	0.099	0.099
	(0.367)	(0.365)	(0.370)	(0.365)
Households	1,278	623	655	1,412
Observations (Household-months)	78,137	37,981	40,156	85,400

Notes: Table shows descriptive statistics of the GfK Consumertracking Scandinavia data used in the soft drink tax analysis. Displayed are relative frequencies for values of categorical variables, as well as means and standard deviations (in parentheses) of continuous variables. Household income is equivalized using the OECD scale, that is, dividing household income by the square root of the household size.

A.1 Factor structure of self-control scale

In order to extract the latent dimension of self-control that matters for food choices, we perform a principal component factor analysis. Following the original study by Tangney *et al.* (2004), we extract five factors. In Table A.2, we show the rotated factor loadings of the five factors. The first factor (13.4 percent of the variance) measures a general capacity for self-discipline and loads high on a variety of factors, for example, "I blurt out whatever is on my mind" (0.647). The second factor (9.1 percent of the variance) is related to healthy habits and resistance against temptations. It has the highest loadings on "I eat healthy foods" (0.712), "I have many healthy habits" (0.708), "I am good at resisting temptations" (0.644), and "I have a hard time breaking bad habits" (0.608). The third factor (7.4 percent of the variance) is related to reliability, for example, it has the highest loading on "I am always on time" (0.738). The fourth factor (6.6 percent of the variance) relates to self-restraint and has the highest loading on "I am self-indulgent at times" (0.620). The fifth factor (4.0 percent of the variance) describes being impulsive and loads highest on "People would describe me as impulsive" (0.552). Thus, the factor structure is very similar to that of Tangney *et al.* (2004).

A.2 Robustness of self-control factor

In order to make sure that the self-control factor is not merely picking up revealed preferences about healthy food consumption, we check the robustness of the results to the exclusion of the item "I eat healthy foods" from the factor analysis. In Table A.4, we re-run the factor analysis without the respective item and show the rotated factor loadings of the five factors. The table shows that the factor loadings change slightly compared to Table A.2. Factor 2 now loads highest on "I am good at resisting temptations" (0.695), "I have a hard time breaking bad habits" (0.694), and "I wish I had more self-discipline" (0.623).

We conduct a median split using this newly generated self-control factor and re-run the estimations for the soft drink tax and the fat tax. In Table B.9, we show the estimation results for the soft drink tax. The results turn out to be similar compared to the main specification in Table 4. The same holds true for the fat tax estimations in Table C.7, which yield similar results compared to the main specification in Table C.6. This leads us to conclude that the results are not driven by an item in the self-control scale that captures revealed preferences for healthy nutrition.

Table A.2: Rotated factor loadings (varimax), N=2,387

	Factor1	Factor2	Factor3	Factor4	Factor5
I am good at resisting temptations	0.213	0.644	0.109	0.022	0.051
(R) I have a hard time breaking bad habits	0.298	0.608	0.004	0.069	-0.224
(R) I am lazy	0.273	0.439	0.286	0.135	-0.299
(R) I often say inappropriate things	0.551	0.129	0.130	0.030	-0.003
I never allow myself to lose control	-0.150	0.005	0.111	-0.152	0.533
(R) I do certain things that are bad for me, if they are fun	0.205	0.231	0.055	0.539	0.036
(R) Getting up in the morning is hard for me	0.292	0.173	0.306	0.084	-0.405
(R) I have trouble saying no	0.476	0.234	0.029	-0.057	-0.218
(R) I change my mind fairly often	0.586	0.104	0.159	0.009	-0.154
(R) I blurt out whatever is on my mind	0.647	0.057	-0.011	0.063	0.105
I refuse things that are bad for me	0.114	0.347	0.152	-0.284	0.254
(R) I spend too much money	0.340	0.367	0.177	0.307	-0.024
I keep everything neat	0.082	0.258	0.512	0.005	0.088
(R) I am self-indulgent at times	0.074	0.029	-0.024	0.620	-0.030
(R) I wish I had more self-discipline	0.472	0.459	0.130	0.054	-0.142
I am reliable	0.087	0.058	0.468	-0.343	0.306
(R) I get carried away by my feelings	0.557	0.134	-0.062	0.151	0.043
(R) I do many things on the spur of the moment	0.330	-0.054	-0.054	0.500	0.190
(R) I don't keep secrets very well	0.470	-0.041	0.215	0.045	-0.040
(R) I have worked or studied all night at the last minute	0.349	0.097	0.410	0.300	-0.208
I'm not easily discouraged	0.258	0.293	0.245	-0.514	0.014
(R) I'd be better off if I stopped thinking before acting	0.527	-0.007	0.128	0.037	0.064
(R) Pleasure and fun sometimes keep me from getting work done	0.338	0.104	0.314	0.399	0.004
(R) I have trouble concentrating	0.550	0.178	0.230	-0.076	-0.253
I am able to work effectively toward long-term goals	0.170	0.305	0.325	-0.408	0.122
(R) Sometimes I can't stop myself from doing something, even if I know it is wrong	0.433	0.316	0.119	0.407	0.047
(R) I often act without thinking through all the alternatives	0.575	0.198	0.106	0.186	0.220
(R) I lose my temper too easily	0.537	0.049	-0.042	0.010	0.029
(R) I often interrupt people	0.597	0.062	0.013	0.071	-0.027
I am always on time	0.010	-0.031	0.738	-0.011	-0.043
People can count on me to keep the schedule	0.048	0.072	0.719	-0.014	-0.042
(R) People would describe me as impulsive	0.232	-0.101	-0.050	0.307	0.552
People would say that I have an iron self-discipline	0.157	0.397	0.448	-0.157	0.083
I have many healthy habits	-0.054	0.708	0.019	-0.061	0.021
I eat healthy foods	-0.013	0.712	0.026	0.007	-0.015
(R) I sometimes drink too much alcohol	0.085	0.122	0.139	0.210	0.188

Notes: Table shows rotated factor loadings after principal component factor analysis (varimax rotation), using GfK data. We extract five factors following the original study by Tangney *et al.* (2004). (R) indicates that the item is reverse coded.

Table A.3: Correlations of self-control factors with characteristics and attitudes

	(1) Body Mass Index (BMI)	(2) Obesity (BMI>30)	(3) Intention to reduce weight	(4) "I should eat less sugar"	(5) "I should eat less animal fat"
Low SC (Factor 1)	0.487	0.032	0.083	0.088	0.063
	(0.282)	(0.021)	(0.027)	(0.028)	(0.027)
Low SC (Factor 2)	2.131	0.094	0.202	0.110	0.112
	(0.269)	(0.021)	(0.027)	(0.028)	(0.027)
Low SC (Factor 3)	0.459	0.026	0.029	-0.007	0.012
	(0.283)	(0.021)	(0.027)	(0.027)	(0.027)
Low SC (Factor 4)	0.735	0.035	0.019	0.024	0.026
	(0.286)	(0.022)	(0.027)	(0.028)	(0.028)
Low SC (Factor 5)	0.167	-0.002	-0.015	-0.084	0.016
	(0.288)	(0.022)	(0.027)	(0.028)	(0.027)
Controls	✓	✓	✓	✓	✓
Mean	26.023	0.174	0.618	0.480	0.354
Households	1238	1238	1278	1278	1278

Notes: Table shows results from regressing the dependent variable in the respective column on the self-control factor and controls, using GfK data. The controls are income, age, education, labor market status, and number of children. Columns (1) and (2) are based on weight and height data from the pre-tax year 2011. BMI is calculated as ([weight in kg]/[height in m]^2). The dependent variable in column (3) is an indicator whether respondents indicate in the 2013 survey that they would like to weigh at least 1 kg less. The dependent variable in columns (4) and (5) are indicators whether respondents agree that they should consume "A lot less" or "A little less" sugar or animal fat to eat healthier. Robust standard errors in parentheses.

Table A.4: Rotated factor loadings (varimax) without item "I eat healthy foods", N=2,387

	Factor1	Factor2	Factor3	Factor4	Factor5
I am good at resisting temptations	0.068	0.695	0.092	0.063	0.104
(R) I have a hard time breaking bad habits	0.158	0.694	-0.021	0.084	-0.175
(R) I am lazy	0.199	0.489	0.278	0.123	-0.315
(R) I often say inappropriate things	0.579	0.149	0.150	0.032	-0.084
I never allow myself to lose control	-0.175	-0.016	0.108	-0.088	0.583
(R) I do certain things that are bad for me, if they are fun	0.139	0.235	0.051	0.543	-0.046
(R) Getting up in the morning is hard for me	0.255	0.259	0.286	0.079	-0.373
(R) I have trouble saying no	0.357	0.430	-0.027	0.003	-0.084
(R) I change my mind fairly often	0.520	0.274	0.120	0.060	-0.086
(R) I blurt out whatever is on my mind	0.663	0.105	-0.001	0.094	0.065
I refuse things that are bad for me	0.016	0.419	0.130	-0.220	0.343
(R) I spend too much money	0.249	0.420	0.163	0.333	-0.031
I keep everything neat	0.043	0.267	0.511	0.025	0.077
(R) I am self-indulgent at times	0.028	0.030	-0.035	0.617	-0.095
(R) I wish I had more self-discipline	0.323	0.623	0.084	0.109	-0.055
I am reliable	0.133	0.022	0.492	-0.316	0.293
(R) I get carried away by my feelings	0.448	0.306	-0.112	0.233	0.146
(R) I do many things on the spur of the moment	0.242	0.055	-0.096	0.570	0.226
(R) I don't keep secrets very well	0.494	0.018	0.215	0.067	-0.049
(R) I have worked or studied all night at the last minute	0.302	0.190	0.386	0.319	-0.203
I'm not easily discouraged	0.219	0.371	0.236	-0.476	0.098
(R) I'd be better off if I stopped thinking before acting	0.528	0.069	0.121	0.080	0.079
(R) Pleasure and fun sometimes keep me from getting work done	0.299	0.147	0.303	0.427	-0.017
(R) I have trouble concentrating	0.495	0.330	0.199	-0.042	-0.190
I am able to work effectively toward long-term goals	0.110	0.378	0.311	-0.359	0.203
(R) Sometimes I can't stop myself from doing something, even if I know it is wrong	0.326	0.402	0.095	0.450	0.037
(R) I often act without thinking through all the alternatives	0.523	0.269	0.098	0.245	0.211
(R) I lose my temper too easily	0.569	0.074	-0.025	0.018	-0.031
(R) I often interrupt people	0.631	0.091	0.031	0.071	-0.110
I am always on time	0.026	-0.010	0.732	0.002	-0.030
People can count on me to keep the schedule	0.047	0.094	0.715	-0.001	-0.036
(R) People would describe me as impulsive	0.239	-0.134	-0.040	0.365	0.506
People would say that I have an iron self-discipline	0.089	0.435	0.441	-0.121	0.121
I have many healthy habits	-0.079	0.538	0.073	-0.094	-0.020
(R) I sometimes drink too much alcohol	0.090	0.066	0.160	0.206	0.090

Notes: Table shows rotated factor loadings after principal component factor analysis (varimax rotation), using GfK data. We extract five factors following the original study by Tangney *et al.* (2004). The items exclude the item "I eat healthy foods". (R) indicates that the item is reverse coded.

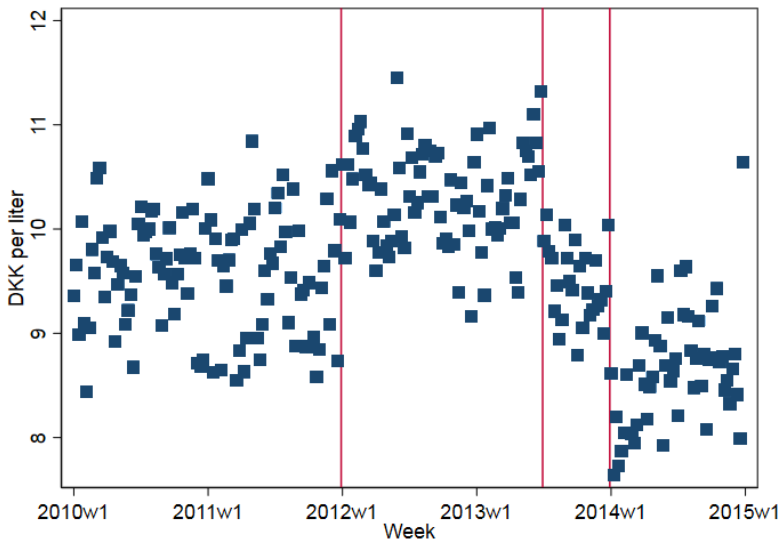
B Soft Drink Tax

B.1 Outlier detection

We implement the following procedure to detect and drop anomalous values in the data. In terms of reported quantity, we drop observations that report a volume per unit of more than 900 cl and less than 25 cl. In terms of prices, we drop observations that report a price of less than 0.40 DKK per cl or more than 40.00 DKK per cl. Moreover, we drop observations that report an overall expenditure per shopping trip of less than 1.50 DKK and an expenditure per unit of more than 75.00 DKK, unless they are for large unit sizes of 500, 792, or 900 cl (as these are standard sizes for bundles, e.g., 792 cl is one box of 24 x 0.33 liter cans and 900 cl is a six-pack of 1.5 liter bottles).

B.2 Pass-through of soft drink tax to prices

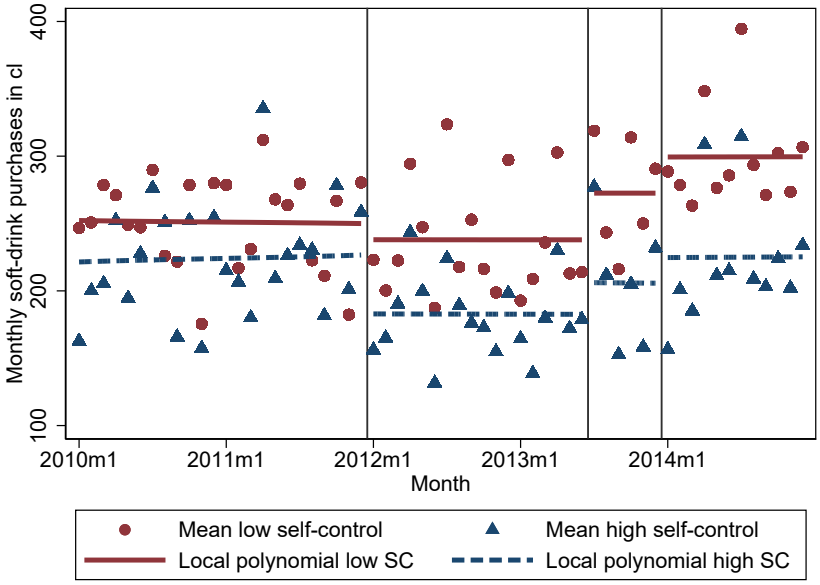
Figure B.1: Average soft drink prices over time (based on Schmacker and Smed (2020))



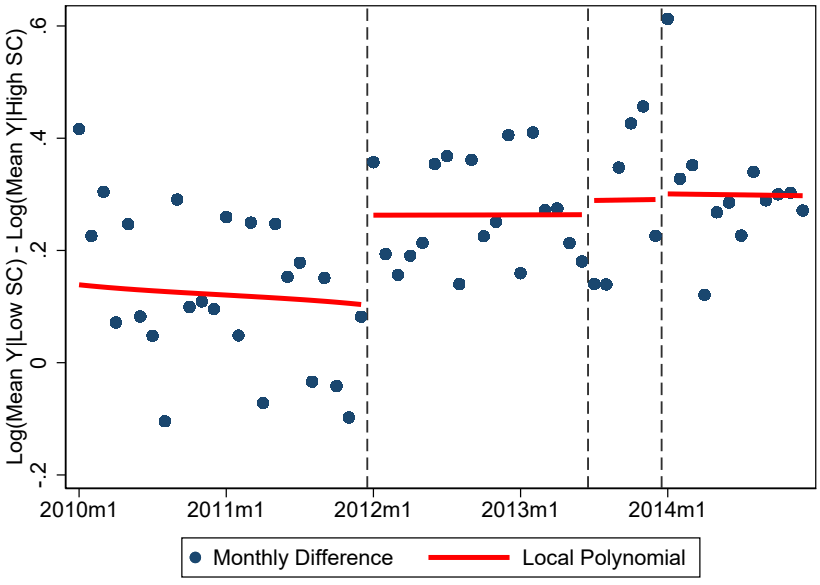
Notes: Graph shows weekly average soft drink prices around the tax increase in January 2012 and the tax cuts in July 2013 and January 2014, using GfK data. Dots represent weekly averages and the vertical lines indicate the timing of tax changes. The graph is reproduced from Schmacker and Smed (2020).

B.3 Robustness of soft drink tax estimations

Figure B.2: Monthly soft drink purchases by self-control (unadjusted)



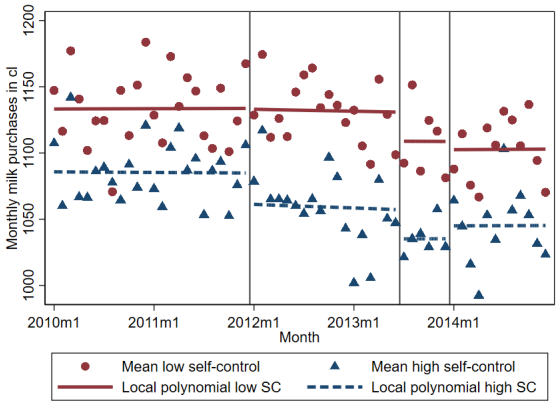
(a) Monthly quantity



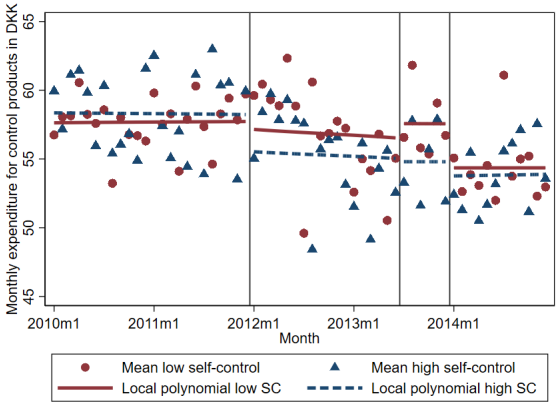
(b) Differences in log(quantity) by self-control

Notes: Panel A shows monthly averages of soft drink purchase quantity by self-control. Panel B shows the monthly differences in log(quantity) between high and low self-control consumers. Local polynomials use degree 0 and 12 month bandwidth. The vertical lines indicate the timing of soft drink tax changes. Source: GfK ConsumerScan.

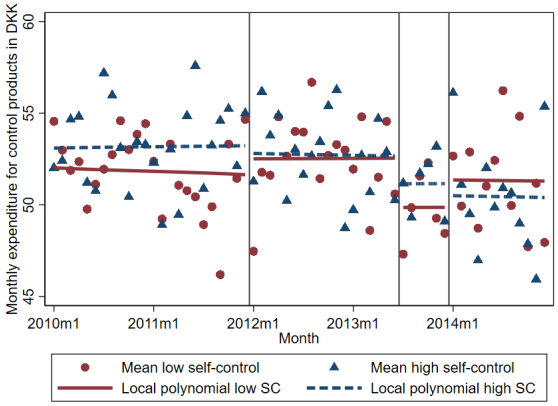
Figure B.3: Monthly purchases of placebo products by self-control (deseasonalized)



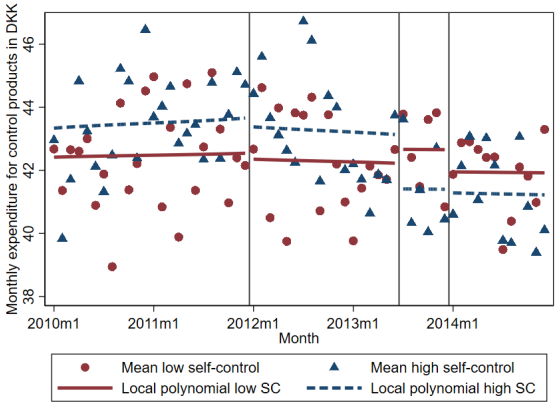
(a) Milk



(b) Toiletries



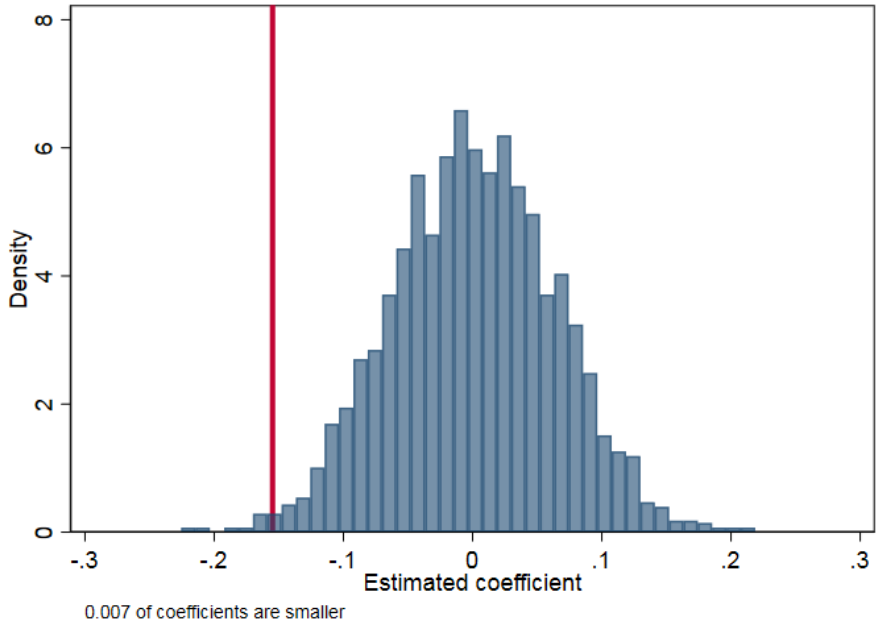
(c) Cleaning supplies



(d) Toilet and kitchen paper

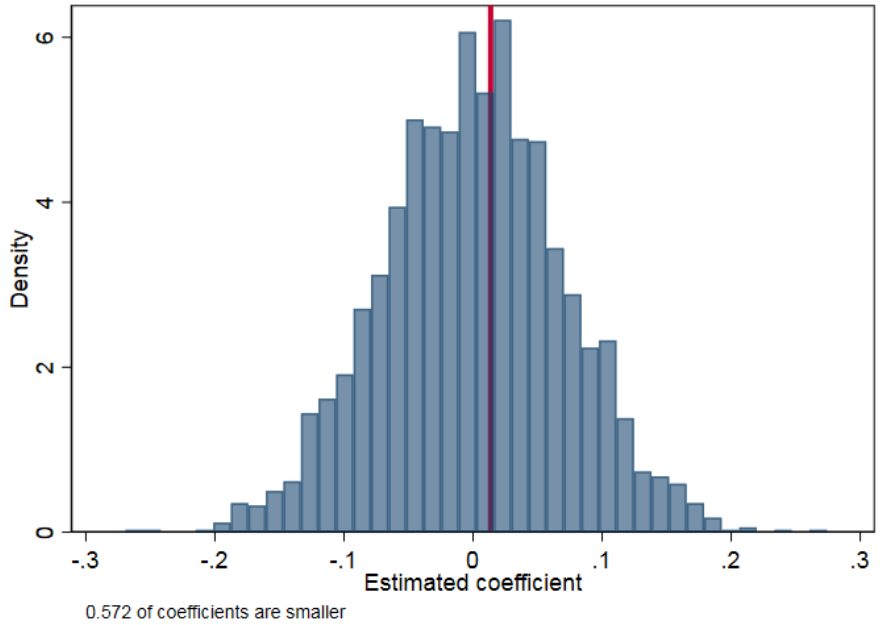
Notes: The figure shows monthly average residuals from a regression of placebo product purchases on consumer and month fixed effects. The residuals are added to the sample mean. Panel (a) shows purchase quantity of milk, Panel (b) to (d) monthly average expenditures for toiletries (toothpaste, deo, shampoo, soap, shower gel, hair styling), cleaning products (cleaning supplies, dishwashing and laundry detergent, rinse aid), and paper and tissues (toilet and kitchen paper), respectively. Local polynomials use degree 0 and 12 month bandwidth. Source: GfK ConsumerScan.

Figure B.4: Permutation test for soft drink tax hike

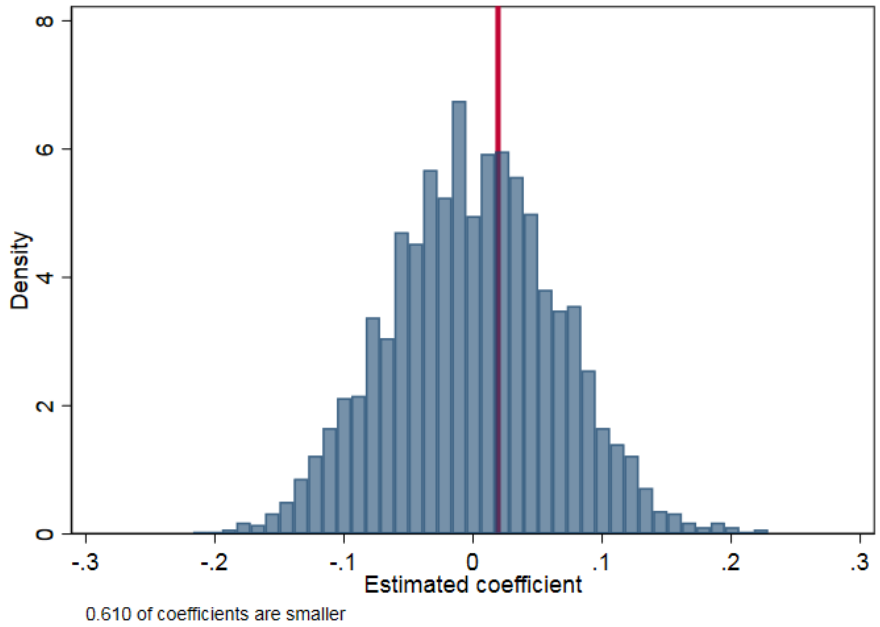


Notes: Graph shows the distribution of estimated interaction coefficients "Tax hike x High self-control" from the Poisson QMLE model, when randomly reshuffling the classification in high and low self-control 2,500 times. The red line shows the estimated coefficient from the main specification. Source: GfK ConsumerScan.

Figure B.5: Permutation test for soft drink tax repeal



(a) Tax cut 07/2013



(b) Tax cut 01/2014

Notes: Graph shows the distribution of estimated interaction coefficients "Tax cut x High self-control" from the Poisson QMLE model, when randomly reshuffling the classification in high and low self-control 2,500 times. The red line shows the estimated coefficient from the main specification. Source: GfK ConsumerScan.

Table B.1: Soft drink purchases in response to placebo tax changes by self-control

	Placebo 01/2010		Placebo 01/2011	
	(1) Absolute change	(2) Relative change	(3) Absolute change	(4) Relative change
Tax Placebo	-12.111	-0.042	-3.882	-0.015
	(11.150)	(0.039)	(11.123)	(0.041)
Tax Placebo × High self-control	1.874	0.002	12.990	0.052
	(15.116)	(0.056)	(14.682)	(0.056)
Households	1024	1024	1100	1100
Household Months	18629	18629	19596	19596
Household FE	✓	✓	✓	✓
Month-of-the-year FE	✓	✓	✓	✓

Notes: Table shows regression results with standard errors clustered on household level, using GfK data. In columns (1) and (3), estimations are conducted using OLS, i.e., coefficients can be interpreted as absolute changes. In columns (2) and (4) the estimation uses Poisson quasi maximum likelihood estimation, i.e., coefficients can be interpreted as relative changes. The dependent variable is monthly quantity in centiliters. The estimations only include observations that exhibit within-household variation in purchases.

Table B.2: Placebo product purchases in response to soft drink tax changes by self-control

	(1)	(2)	(3)	(4)
	Milk	Toiletries	Cleaning	Paper & Tissues
Panel A: Tax Hike				
Tax hike 01/12	0.013	0.022	0.049	0.016
	(0.012)	(0.021)	(0.021)	(0.016)
Tax hike 01/12 × High SC	-0.024	-0.033	-0.026	-0.004
	(0.016)	(0.030)	(0.028)	(0.022)
Households	1249	1094	1119	1081
Household Months	22103	11493	12065	12180
Panel B: Tax Repeal				
Tax cut 07/13	-0.031	0.018	-0.041	0.028
	(0.014)	(0.027)	(0.026)	(0.020)
Tax cut 01/14	0.011	-0.040	0.017	-0.037
	(0.013)	(0.025)	(0.025)	(0.020)
Tax cut 07/13 × High SC	0.004	-0.025	0.024	-0.056
	(0.017)	(0.037)	(0.033)	(0.025)
Tax cut 01/14 × High SC	0.004	0.043	-0.057	0.029
	(0.017)	(0.035)	(0.032)	(0.025)
Households	1251	1098	1122	1088
Household Months	28097	14731	15237	15745
Controls	✓	✓	✓	✓
Household FE	✓	✓	✓	✓
Month-of-the-year FE	✓	✓	✓	✓

Notes: Table shows regression results with standard errors clustered on household level, using GfK data. The estimation uses Poisson quasi maximum likelihood estimation. Column (1) uses purchase quantity of milk as dependent variable, while columns (2) to (4) use expenditure for toiletries (toothpaste, deo, shampoo, soap, shower gel, hair styling), cleaning products (cleaning supplies, dishwashing and laundry detergent, rinse aid), and paper and tissues (toilet and kitchen paper). Controls include household size, income, and labor market status. The estimations only include observations that exhibit within-household variation in purchases.

Table B.3: Change in soft-drink purchases based on predicted values from two-part model

	Absolute change	Relative change
Panel A: Tax Hike		
Low self-control	-7.917	-0.038
	$(18.310)^b$	$(0.035)^b$
High self-control	-43.723	-0.212
	$(14.898)^b$	$(0.028)^b$
Panel B: Tax Cut 07/2013		
Low self-control	27.266	0.156
	$(19.151)^b$	$(0.039)^b$
High self-control	23.334	0.130
	$(20.180)^b$	$(0.040)^b$
Panel B: Tax Cut 01/2014		
Low self-control	25.249	0.125
	$(20.419)^b$	$(0.040)^b$
High self-control	22.270	0.109
	$(20.074)^b$	$(0.037)^b$

Notes: Table shows predicted values from a two-part model, using GfK data. The predicted values are based on estimates from the extensive margin (purchase incidence as dependent variable) and intensive margin (log(quantity) given purchase as dependent variable), as shown in Table 2. Predicted values are calculated using Duan smearing factors (Duan, 1983). For the absolute change, the unit of measurement is in monthly centiliters. ^{b} Standard errors are bootstrapped with 2,000 replications and clustered on the household level.

Table B.4: Soft drink purchases in response to soft drink tax changes, collapsed standard errors

	(1) Absolute Change	(2) Absolute Change	(3) Relative Change	(4) Relative Change
Panel A: Tax Hike				
Tax hike 01/12	-13.062	-16.870	-0.048	-0.072
	(12.692)	(12.781)	(0.046)	(0.045)
Tax hike 01/12 × High SC	-36.646	-35.078	-0.170	-0.160
	(15.852)	(16.024)	(0.062)	(0.061)
Households	1085	1085	1085	1085
Household Months	2170	2170	2170	2170
Panel B: Tax Repeal				
Tax cut 07/13	31.128	40.211	0.115	0.134
	(12.401)	(13.543)	(0.045)	(0.047)
Tax cut 01/14	29.833	30.024	0.099	0.099
	(14.098)	(14.118)	(0.047)	(0.047)
Tax cut 07/13 × High SC	-11.756	-7.607	-0.021	0.002
	(17.233)	(17.122)	(0.072)	(0.071)
Tax cut 01/14 × High SC	1.860	1.576	0.039	0.039
	(17.198)	(17.220)	(0.063)	(0.063)
Households	1141	1141	1141	1141
Household Months	3403	3403	3403	3403
Controls		✓		✓
Household FE	✓	✓	✓	✓

Notes: Table shows regression results with observations collapsed to average monthly quantities before and after the tax changes, using GfK data. Robust standard errors are in parentheses. In columns (1) and (2), estimations are conducted using OLS, i.e., coefficients can be interpreted as absolute changes. In columns (3) and (4) the estimation uses Poisson quasi maximum likelihood estimation, i.e., coefficients can be interpreted as relative changes. Controls include household size, income, and labor market status. The estimations only include observations that exhibit within-household variation in purchases.

Table B.5: Difference in soft drink purchases between high and low self-control groups, Donald-Lang standard errors

	Tax hike		Tax repeal	
	(1) Absolute change	(2) Relative change	(3) Absolute change	(4) Relative change
Tax Hike 01/12	-39.703	-0.175		
	(13.534)	(0.051)		
	[10.097]	[0.038]		
Tax Cut 07/13			-9.541	-0.021
			(17.838)	(0.072)
			[16.172]	[0.071]
Tax Cut 01/14			-5.446	0.011
			(16.711)	(0.071)
			[17.311]	[0.075]
Constant	-15.632	-0.065	-58.692	-0.255
	(11.142)	(0.042)	(7.946)	(0.027)
	[8.868]	[0.033]	[5.713]	[0.020]
N	20	20	25	25

Notes: Table shows regression results based on the two-step procedure proposed by Donald and Lang (2007), using GfK data. First, we calculate monthly average purchase quantity by self-control group. Next, we calculate the monthly difference in average quantity (Columns 1 and 3) and log average quantity (Columns 2 and 4) between low and high self-control groups. The time series of monthly differences in purchase quantity is regressed on the tax dummy. Robust standard errors are in parentheses and Newey-West standard errors in square brackets.

Table B.6: Soft drink purchases in response to soft drink tax changes, only single households

	(1) Absolute Change	(2) Absolute Change	(3) Relative Change	(4) Relative Change
Panel A: Tax Hike				
Tax hike 01/12	9.391	10.063	0.049	0.036
	(13.408)	(13.450)	(0.070)	(0.068)
Tax hike 01/12 × High SC	-47.845	-46.922	-0.296	-0.274
	(18.652)	(18.563)	(0.102)	(0.102)
Households	391	391	391	391
Household Months	6764	6764	6764	6764
Panel B: Tax Repeal				
Tax cut 07/13	30.730	31.594	0.160	0.141
	(14.700)	(17.681)	(0.074)	(0.083)
Tax cut 01/14	11.418	7.719	0.052	0.038
	(18.026)	(19.386)	(0.084)	(0.092)
Tax cut 07/13 × High SC	-25.002	-24.090	-0.122	-0.118
	(25.483)	(25.446)	(0.158)	(0.155)
Tax cut 01/14 × High SC	20.091	19.350	0.151	0.147
	(24.310)	(24.354)	(0.138)	(0.138)
Households	402	402	402	402
Household Months	8904	8904	8904	8904
Sample	Single HH	Single HH	Single HH	Single HH
Controls		✓		✓
Household FE	✓	✓	✓	✓

Notes: Table shows regression results with standard errors clustered on household level, using GfK data. The sample is restricted to single households. In columns (1) and (2), estimations are conducted using OLS, i.e., coefficients can be interpreted as absolute changes. In columns (3) and (4) the estimation uses Poisson quasi maximum likelihood estimation, i.e., coefficients can be interpreted as relative changes. Controls include household size, income, labor market status, temperature, and month-of-the-year FE. The estimations only include observations that exhibit within-household variation in purchases.

Table B.7: Soft drink purchases in response to soft drink tax changes, sample split into terciles

	(1) Absolute Change	(2) Absolute Change	(3) Relative Change	(4) Relative Change
Panel A: Tax Hike				
Tax hike 01/12	-9.040	-6.216	-0.030	-0.032
	(15.557)	(15.615)	(0.052)	(0.053)
Tax hike 01/12 × Medium SC	-25.815	-23.696	-0.114	-0.100
	(20.508)	(20.363)	(0.075)	(0.073)
Tax hike 01/12 × High SC	-37.427	-34.907	-0.175	-0.150
	(19.632)	(19.615)	(0.076)	(0.076)
Households	1104	1104	1104	1104
Household Months	19543	19543	19543	19543
Panel B: Tax Repeal				
Tax cut 07/13	39.327	35.671	0.131	0.113
	(16.623)	(17.515)	(0.054)	(0.057)
Tax cut 01/14	46.731	52.270	0.134	0.159
	(18.626)	(20.406)	(0.054)	(0.061)
Tax cut 07/13 × Medium SC	-24.899	-22.703	-0.067	-0.055
	(22.637)	(22.544)	(0.088)	(0.088)
Tax cut 07/13 × High SC	-6.441	-3.155	0.020	0.039
	(21.149)	(20.995)	(0.080)	(0.078)
Tax cut 01/14 × Medium SC	-24.159	-24.855	-0.038	-0.040
	(23.620)	(23.656)	(0.081)	(0.082)
Tax cut 01/14 × High SC	-25.092	-26.125	-0.046	-0.049
	(22.233)	(22.263)	(0.073)	(0.074)
Households	1141	1141	1141	1141
Household Months	25904	25904	25904	25904
Controls		✓		✓
Household FE	✓	✓	✓	✓

Notes: Table shows regression results with standard errors clustered on household level, using GfK data. In columns (1) and (2), estimations are conducted using OLS, i.e., coefficients can be interpreted as absolute changes. In columns (3) and (4) the estimation uses Poisson quasi maximum likelihood estimation, i.e., coefficients can be interpreted as relative changes. Controls include household size, income, labor market status, temperature, and month-of-the-year FE. The estimations only include observations that exhibit within-household variation in purchases.

Table B.8: Soft drink purchases in response to soft drink tax changes, alternative measures of self-control

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Tax hike						
Tax hike 01/12	-0.124	-0.050	-0.055	-0.121	-0.118	-0.117
	(0.034)	(0.043)	(0.057)	(0.033)	(0.033)	(0.033)
Tax hike 01/12						
× High SC	-0.085	-0.165	-0.086	-0.089	-0.089	-0.062
	(0.028)	(0.060)	(0.066)	(0.029)	(0.030)	(0.032)
Households	1104	1111	1110	1110	1108	1104
Household Months	19543	19678	19658	19658	19621	19543
Panel B: Tax repeal						
Tax cut 07/13	0.112	0.069	0.110	0.112	0.113	0.113
	(0.041)	(0.048)	(0.063)	(0.041)	(0.040)	(0.040)
Tax cut 01/14	0.128	0.166	0.111	0.129	0.130	0.130
	(0.040)	(0.050)	(0.064)	(0.040)	(0.040)	(0.040)
Tax cut 07/13						
× High SC	0.018	0.102	-0.006	0.031	0.037	0.040
	(0.030)	(0.072)	(0.074)	(0.031)	(0.033)	(0.036)
Tax cut 01/14						
× High SC	-0.022	-0.079	0.040	-0.034	-0.031	-0.028
	(0.030)	(0.064)	(0.068)	(0.030)	(0.032)	(0.035)
Self-control measure	Continuous SC factor	Temptation resistance	Healthy habits	Index of 3 items	Index of 4 items	Complete SC scale
Controls	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓
Households	1141	1147	1146	1146	1145	1141
Household Months	25904	26054	26029	26029	26004	25904

Notes: Table shows Poisson QMLE regression results with standard errors clustered on household level, using GfK data. The dependent variable is monthly quantity in centiliters. In column (1), we use the z-standardized continuous self-control factor. In column (2) and (3), High SC are individuals who agree with the statements "I am good at resisting temptations" and "I have many healthy habits", respectively. In columns (4) and (5), we form a z-standardized index of the highest loading items, i.e., the items from Columns (2) and (3) and "I have a hard time breaking bad habits" (reversed) and "I wish I had more self-discipline" (reversed). Column (6) uses the (z-standardized) mean of the entire self-control scale. Controls include household size, income, labor market status, temperature, and month-of-the-year FE. The estimations only include observations that exhibit within-household variation in purchases.

Table B.9: Soft-drink purchases in response to soft drink tax changes, factor without item "I eat healthy foods"

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Tax hike						
Tax hike 01/12	-0.049	-0.063	-0.049	-0.048	-0.111	-0.110
	(0.046)	(0.051)	(0.051)	(0.055)	(0.062)	(0.070)
Tax hike 01/12						
× High self-control	-0.126	-0.131	-0.128	-0.119	-0.107	-0.105
	(0.060)	(0.060)	(0.063)	(0.062)	(0.064)	(0.067)
× Interaction term		0.048	-0.042	-0.003	0.098	
		(0.060)	(0.086)	(0.069)	(0.066)	
Households	1104	1104	1033	1104	1033	1033
Household Months	19543	19543	18297	19543	18297	18297
Panel B: Tax repeal						
Tax cut 07/13	0.095	0.114	0.084	0.071	0.112	0.072
	(0.052)	(0.056)	(0.056)	(0.059)	(0.068)	(0.079)
Tax cut 01/14	0.138	0.111	0.126	0.180	0.134	0.171
	(0.053)	(0.055)	(0.059)	(0.062)	(0.070)	(0.080)
Tax cut 07/13						
× High SC	0.027	0.033	0.041	0.030	0.031	0.041
	(0.069)	(0.071)	(0.073)	(0.070)	(0.074)	(0.075)
× Interaction term		-0.065	-0.009	0.047	-0.054	
		(0.071)	(0.093)	(0.070)	(0.073)	
Tax cut 01/14						
× High SC	-0.011	-0.021	0.005	-0.007	0.002	-0.001
	(0.064)	(0.065)	(0.067)	(0.065)	(0.069)	(0.069)
× Interaction term		0.096	0.033	-0.080	-0.002	
		(0.070)	(0.090)	(0.066)	(0.069)	
		High	Lacks	High	Unhealthy	
Interaction term	None	education	knowledge	income	taste	All
Households	1141	1141	1068	1141	1068	1068
Household Months	25904	25904	24307	25904	24307	24307
Controls	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓

Notes: Table shows Poisson QMLE regression results with standard errors clustered on household level, using GfK data. The dependent variable is monthly quantity in centiliters. The "High self-control" factor excludes the item "I eat healthy food". "High education" means tertiary education (ref.: vocational education), "Lacks knowledge" identifies consumers who agree with the statement "I believe I would make healthier food choices if I had more information on how to eat healthy", "High income" indicates consumers in the top half of the distribution of equivalized incomes, "Unhealthy taste" indicates that consumers agree with the statement "I believe I would make healthier food choices if unhealthy food was less tasty". Controls include household size, income, labor market status, temperature, and month-of-the-year FE. The estimations only include observations that exhibit within-household variation in purchases.

Table B.10: Soft drink purchases in response to soft drink tax changes, 2013 self-control factor instrumented with 2015 factor (continuous SC factor)

	Absolute change			Relative change		
	(1)	(2)	(3)	(4)	(5)	(6)
	2013	2015	IV	2013	2015	IV
Panel A: Tax hike						
Tax hike	-23.705	-23.618	-24.938	-0.132	-0.122	-0.130
	(7.454)	(8.791)	(9.128)^b	(0.035)	(0.039)	(0.043)^b
Tax hike						
× High SC (continuous)	-19.003	-14.243	-18.478	-0.086	-0.069	-0.089
	(7.901)	(9.351)	(13.781)^b	(0.029)	(0.031)	(0.048)^b
$\hat{\nu}$			10.646			0.061
			(19.231)			(0.079)
1st stage F			500.2			463.7
Households	1197	948	867	1033	821	750
Household Months	20887	16508	15198	18297	14568	13322
Panel B: Tax repeal						
Tax repeal	57.311	66.286	63.650	0.254	0.273	0.267
	(10.664)	(12.680)	(13.065)^b	(0.046)	(0.053)	(0.056)^b
Tax repeal						
× High SC (continuous)	-14.111	-18.701	-22.599	-0.002	-0.002	0.006
	(9.343)	(9.408)	(13.593)^b	(0.028)	(0.029)	(0.043)^b
$\hat{\nu}$			2.108			-0.045
			(17.593)			(0.075)
1st stage F			498.2			469.9
Households	1197	948	867	1050	834	762
Household Months	21389	17130	15772	19005	15246	13988
Controls	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓

Notes: Table shows OLS regression results in Columns (1) to (3) and Poisson QMLE results in Columns (4) to (6) with standard errors clustered on household level, using GfK data. Columns (1) and (4) use the 2013 self-control measure and Columns (2) and (5) the 2015 measure. Columns (3) and (6) employ an IV approach, in which the 2013 self-control measure is instrumented with the 2015 measure. IV is implemented using a control function approach, such that the coefficient of the residuals, $\hat{\nu}$, can be interpreted as a test of the null that the 2013 self-control measure is exogenous. Standard errors marked with ^{b} are bootstrapped with 2000 replications and clustered on the household level, while the unmarked standard errors are clustered on the household level. Controls include household size, income, labor market status, temperature, and month-of-the-year FE.

Table B.11: Soft drink purchases by access to German border

	Absolute change		Relative change	
	(1)	(2)	(3)	(4)
	No toll	Toll	No toll	Toll
Panel A: Tax hike				
Tax hike 01/12	-4.722	-11.949	-0.021	-0.064
	(16.497)	(20.057)	(0.061)	(0.070)
Tax hike 01/12 × High SC	-35.402	-40.618	-0.134	-0.165
	(21.552)	(24.373)	(0.083)	(0.090)
Households	617	486	617	486
Household Months	11015	8508	11015	8508
Panel B: Tax repeal				
Tax cut 07/13	11.387	52.143	0.050	0.160
	(17.122)	(23.322)	(0.065)	(0.070)
Tax cut 01/14	60.907	3.328	0.217	0.011
	(20.632)	(25.996)	(0.071)	(0.080)
Tax cut 07/13 × High SC	4.253	-16.003	0.030	0.006
	(24.179)	(25.235)	(0.102)	(0.089)
Tax cut 07/13 × High SC	-18.578	18.989	-0.038	0.087
	(24.091)	(26.263)	(0.089)	(0.088)
Households	650	491	650	491
Household Months	14720	11184	14720	11184
Controls	✓	✓	✓	✓
Household FE	✓	✓	✓	✓

Notes: Table shows regression results with standard errors clustered on household level, using GfK data. In columns (1) and (2), estimations are conducted using OLS, i.e., coefficients can be interpreted as absolute changes. In columns (3) and (4), the estimations use Poisson QMLE, i.e., coefficients can be interpreted as relative changes. The estimations are performed separately on the sample of "toll" and "no toll" households. "Toll" indicates that a consumer has to use a toll bridge or ferry to reach the cross-border shops in Germany. Controls include household size, income, labor market status, and month-of-the-year FE. The estimations only include observations that exhibit within-household variation in purchases.

Table B.12: Soft drink prices and market shares by brand

	Price in DKK per liter			Market share in percent		
	2011	2012	2014	2011	2012	2014
Brand 1	11.541	14.670	10.134	1.536	1.642	1.074
	(7.587)	(7.803)	(6.429)			
Brand 2	9.655	13.725	11.397	1.238	0.588	0.549
	(6.965)	(7.473)	(8.244)			
Brand 3	10.136	11.659	8.960	3.358	2.871	3.499
	(6.967)	(6.931)	(5.256)			
Brand 4	11.108	12.219	10.201	6.825	6.342	8.949
	(6.534)	(6.579)	(6.354)			
Brand 5	9.693	10.486	8.687	3.123	2.627	3.758
	(6.434)	(5.586)	(4.872)			
Brand 6	13.623	14.694	11.091	19.693	20.494	20.328
	(7.803)	(7.589)	(7.272)			
Brand 7	11.794	12.839	9.521	3.650	3.413	4.334
	(6.995)	(6.926)	(6.211)			
Brand 8	9.222	7.808	6.851	3.517	3.634	3.163
	(6.902)	(4.761)	(4.535)			
Brand 9	8.007	8.347	6.034	0.806	1.159	2.610
	(3.525)	(3.465)	(3.075)			
Brand 10	15.070	16.263	13.108	3.212	2.254	2.831
	(8.561)	(8.555)	(8.820)			
Brand 11	6.553	6.987	6.433	2.362	2.324	2.204
	(1.799)	(1.993)	(3.206)			
Brand 12	6.387	7.343	5.385	20.842	20.092	15.695
	(2.130)	(2.044)	(1.929)			
Brand 13	6.833	7.520	4.828	2.704	3.215	1.623
	(1.186)	(1.421)	(1.405)			
Brand 14	8.571	9.389	8.164	1.803	1.008	0.991
	(5.116)	(4.121)	(3.838)			

(continued on next page)

	Price in DKK per liter			Market share in percent		
	2011	2012	2014	2011	2012	2014
(continued)						
Brand 15	7.171	7.595	5.661	4.945	8.637	7.718
	(2.283)	(2.335)	(2.416)			
Brand 16	10.978	10.970	11.800	1.028	1.765	1.392
	(8.495)	(6.462)	(8.515)			
Brand 17	5.606	6.057	4.051	2.660	3.669	3.002
	(1.836)	(2.473)	(1.704)			
Brand 18	5.349	5.403	3.457	2.184	1.345	1.074
	(0.462)	(0.480)	(0.567)			
Brand 19	5.026	5.481	3.341	0.648	0.553	0.470
	(0.565)	(0.909)	(0.177)			
Brand 20	5.528	5.984	3.779	0.749	1.543	1.047
	(0.976)	(0.802)	(0.559)			
Brand 21	8.195	8.422	6.653	1.238	1.072	1.273
	(3.520)	(3.031)	(3.578)			
Brand 22	6.029	22.130	17.822	0.825	0.082	0.682
	(0.783)	(9.339)	(8.012)			
Brand 23	22.916	22.251	22.262	0.381	0.623	0.853
	(5.249)	(3.311)	(5.543)			
Brand 24	22.089	23.408	25.091	1.162	1.380	1.858
	(8.548)	(8.333)	(8.616)			
Brand 25	16.906	16.798	20.700	0.590	0.815	0.982
	(12.134)	(10.505)	(10.409)			
Other	11.908	12.360	13.416	8.920	6.855	8.041
	(7.484)	(8.537)	(9.320)			
Total	9.974	10.699	9.243	100	100	100
	(6.827)	(6.790)	(7.159)			

Notes: Table shows average prices of soft drinks in DKK per liter and market shares in percent by brand and year. Displayed are the pre-tax-hike year 2011, the post-tax-hike year 2012, and the post-tax-repeal year 2014. Market shares are calculated according to the number of observed purcases. Standard deviations are given in parentheses.

Table B.13: Soft drink prices and market shares by packaging

	Price in DKK per liter			Market share in percent		
	2011	2012	2014	2011	2012	2014
2l plast bottle	7.476	8.002	5.247	20.772	23.062	19.180
	(3.940)	(3.246)	(2.750)			
Glass bottle	11.423	13.450	13.464	6.196	3.832	4.698
	(8.390)	(8.954)	(8.510)			
1.5l plast bottle	8.070	9.272	7.296	41.309	37.610	41.597
	(3.536)	(4.229)	(2.811)			
Can	17.393	16.487	14.373	6.863	6.505	6.985
	(8.256)	(7.237)	(7.138)			
0.5l plast	12.798	12.012	10.846	22.486	23.720	20.490
	(9.089)	(8.701)	(9.287)			
Other	12.984	17.624	19.047	2.374	5.271	7.050
	(8.982)	(9.411)	(10.164)			
Total	9.974	10.699	9.243	100	100	100
	(6.827)	(6.790)	(7.159)			

Notes: Table shows average prices of soft drinks in DKK per liter and market shares in percent by packaging type and year. Displayed are the pre-tax-hike year 2011, the post-tax-hike year 2012, and the post-tax-repeal year 2014. Market shares are calculated according to the number of observed purchases. Standard deviations are given in parentheses.

Table B.14: Soft drink prices and market shares by shoptype

	Price in DKK per liter			Market share in percent		
	2011	2012	2014	2011	2012	2014
Discount	8.816	9.776	8.491	50.057	53.513	58.289
	(5.770)	(6.014)	(6.607)			
Internet	13.181	12.918	10.734	0.070	0.315	0.485
	(7.509)	(6.637)	(7.172)			
Small Store	24.151	27.627	26.348	0.497	0.414	0.208
	(11.416)	(8.177)	(11.101)			
Supermarket	10.943	11.563	10.152	49.376	45.757	41.017
	(7.368)	(7.254)	(7.631)			
Total	9.946	10.677	9.220	100	100	100
	(6.803)	(6.771)	(7.149)			

Notes: Table shows average prices of soft drinks in DKK per liter and market shares in percent by shop type and year. Displayed are the pre-tax-hike year 2011, the post-tax-hike year 2012, and the post-tax-repeal year 2014. Market shares are calculated according to the number of observed purcases. Standard deviations are given in parentheses.

Table B.15: Soft drink tax pass-through on price indices by self-control

	(1) Laspeyres	(2) Paasche
Panel A: Tax Hike		
Tax hike 01/12	0.121	0.093
	(0.005)	(0.006)
Tax hike 01/12 × High self-control	0.001	0.007
	(0.007)	(0.008)
Constant	2.195	2.188
	(0.002)	(0.002)
Households	1008	984
Household Months	17935	17342
Panel B: Tax Repeal		
Tax cut 07/13	-0.068	-0.068
	(0.005)	(0.006)
Tax cut 07/13 × High self-control	0.001	-0.015
	(0.008)	(0.008)
Tax cut 01/14	-0.154	-0.151
	(0.007)	(0.006)
Tax cut 01/14 × High self-control	0.022	0.005
	(0.011)	(0.009)
Constant	2.295	2.351
	(0.002)	(0.002)
Households	1009	1019
Household Months	26764	27328
Household FE	✓	✓

The table shows OLS regression results of individual log price indices on a tax dummy interacted with self-control, as well as household FE and time-variant control variables. In Column (1), prices are weighted by the individual pre-tax change product basket (Laspeyres) and in Column (2) by the post-tax change product basket (Paasche). Standard errors clustered on household level in parentheses.

C Fat tax

C.1 Outlier detection

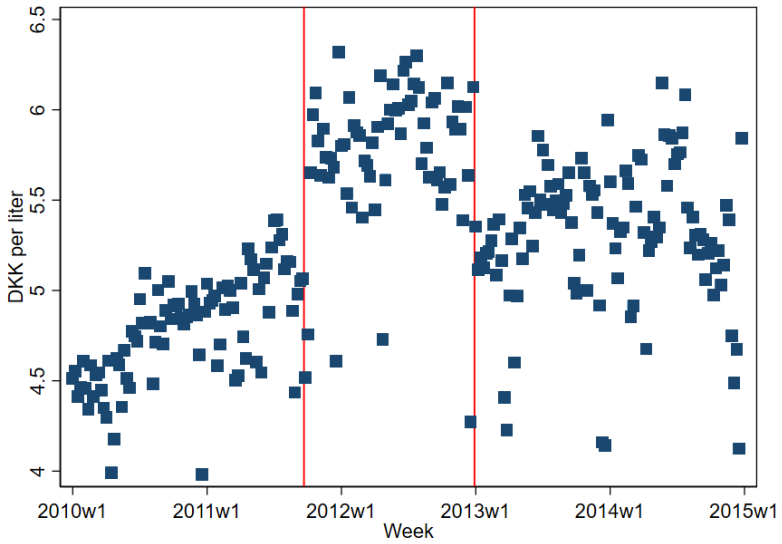
We implement the following procedure to detect and drop anomalous values in the data. In terms of reported quantity, we drop observations that report a volume per unit of more than 1kg. For the analysis of price pass-through, we drop observations that report a price of more than 65.00 DKK per unit, more than 30 DKK per gram or less than 1 DKK per gram.

C.2 Pass-through of fat taxes to butter prices

In this section, we show that the fat tax indeed had an effect on the price of butter. Figure C.1 illustrates the development of prices around the fat tax introduction and repeal. The graph plots average weekly prices. It is apparent that during the time window when the fat tax was enacted, prices for butter were higher than before and after.

In Table C.1 we quantify the extent of the price changes by regressing absolute and log-transformed prices on a tax dummy while controlling for product fixed effects. Since we use a bandwidth of one year around the tax changes, the regression amounts to comparing the average prices one year before the tax change to one year after the tax change. We observe that prices per 100g of butter increased by DKK 0.761 after the tax introduction and decreased by DKK 0.611 after the tax repeal. Hence, the magnitude of price changes is indeed very similar for the tax introduction and the repeal.

Figure C.1: Average butter prices over time



Notes: Graph shows butter prices around the tax introduction in October 2011 and the tax repeal in January 2013, using GfK data. Dots represent weekly average prices. The vertical lines indicate the timing of tax changes.

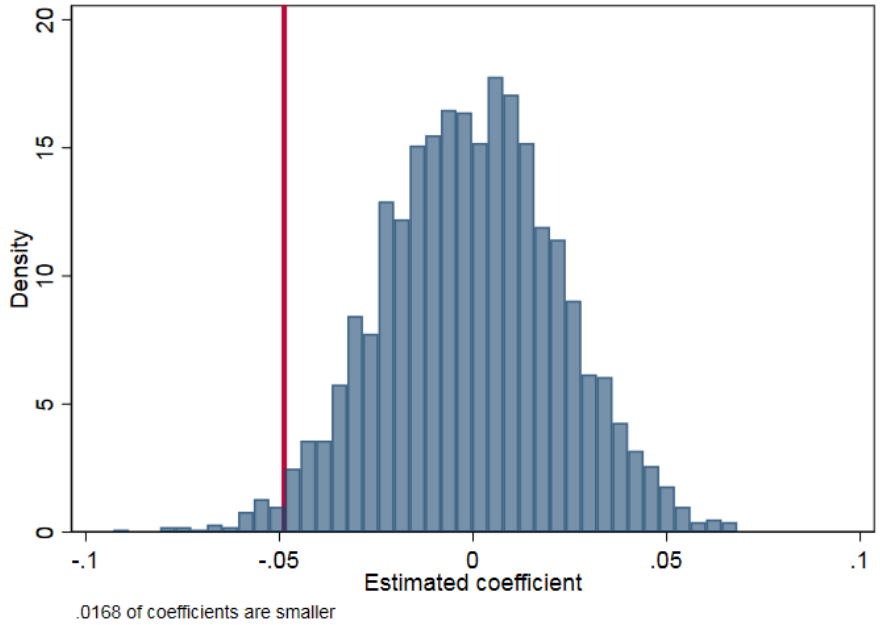
Table C.1: Butter prices in response to tax changes

	Tax introduction		Tax repeal	
	(1)	(2)	(3)	(4)
	Absolute price	Log price	Absolute price	Log price
Tax change	0.759	0.150	-0.610	-0.124
	(0.041)	(0.010)	(0.050)	(0.009)
Constant	4.937	1.551	5.780	1.713
	(0.022)	(0.005)	(0.026)	(0.005)
EAN fixed effects	✓	✓	✓	✓
Observations	52400	52400	59850	59850

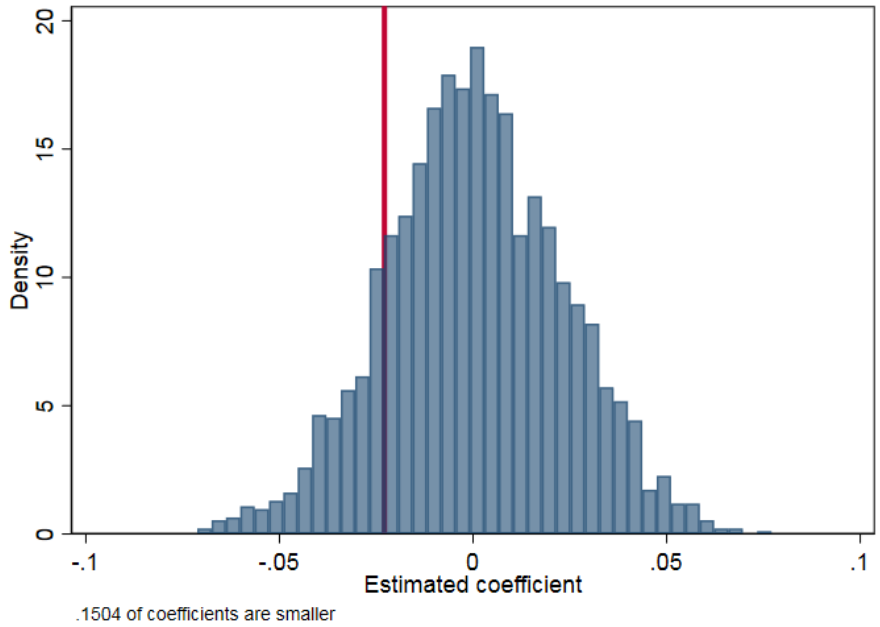
Notes: Table shows results for a regression of absolute price (in DKK per 100g) and relative price (the log of absolute price) on the tax dummy and EAN (product code) fixed effects, using GfK data. In all specifications the sample includes one year before and one year after the respective tax change. Standard errors clustered on EAN level in parentheses.

C.3 Robustness of fat tax estimations

Figure C.2: Permutation test for fat tax



(a) Tax introduction



(b) Tax repeal

Notes: Graph shows the distribution of estimated interaction coefficients "Tax change x High self-control" when randomly reshuffling the classification in high and low self-control 2,500 times. The red line shows the estimated coefficient from the main specification. Source: GfK ConsumerScan.

Table C.2: Change in butter purchases based on predicted values from two-part model by self-control

	Absolute change	Relative change
Panel A: Tax Introduction		
Low self-control	-46.228	-0.072
	(12.232)[b]	(0.012)[b]
High self-control	-63.933	-0.102
	(11.343)[b]	(0.012)[b]
Panel B: Tax Repeal		
Low self-control	33.964	0.055
	(11.812)[b]	(0.013)[b]
High self-control	18.869	0.032
	(11.198)[b]	(0.013)[b]

Notes: Table shows predicted values from a two-part model, using GfK data. The predicted values are based on estimates from the extensive margin (purchase incidence as dependent variable) and intensive margin (log(quantity) given purchase as dependent variable), as shown in Table 2. Predicted values are calculated using Duan smearing factors (Duan, 1983). For the absolute change, the unit of measurement is in monthly grams. [b] Standard errors are bootstrapped with 2,000 replications and clustered on the household level.

Table C.3: Butter purchases in response to placebo tax changes by self-control

	Placebo 01/2010		Placebo 10/2010	
	(1) Absolute change	(2) Relative change	(3) Absolute change	(4) Relative change
Tax Placebo	-10.686	-0.016	20.819	0.032
	(10.827)	(0.017)	(10.830)	(0.017)
High self-control × Tax Placebo	1.952	0.001	7.914	0.016
	(13.802)	(0.022)	(14.717)	(0.023)
Households	1199	1199	1261	1261
Household Months	26079	26079	26836	26836
Household FE	✓	✓	✓	✓
Month-of-the-year FE	✓	✓	✓	✓

Notes: Table shows regression results with standard errors clustered on household level, using GfK data. In columns (1) and (3), estimations are conducted using OLS, i.e., coefficients can be interpreted as absolute changes. In columns (2) and (4) the estimation uses Poisson quasi maximum likelihood estimation, i.e., coefficients can be interpreted as relative changes. The dependent variable is monthly quantity in grams. The estimations only include observations that exhibit within-household variation in purchases.

Table C.4: Butter purchases in response to fat tax changes, collapsed standard errors

	(1) Absolute Change	(2) Absolute Change	(3) Relative Change	(4) Relative Change
Panel A: Tax Introduction				
Tax hike	-34.288	-30.363	-0.056	-0.051
	(10.865)	(10.881)	(0.018)	(0.017)
Tax hike × High SC	-23.163	-25.725	-0.044	-0.044
	(14.803)	(14.755)	(0.025)	(0.024)
Households	1248	1248	1248	1248
Household Months	2496	2496	2496	2496
Panel B: Tax Repeal				
Tax repeal	25.968	28.882	0.041	0.047
	(10.358)	(11.676)	(0.016)	(0.019)
Tax repeal × High SC	-15.714	-15.264	-0.023	-0.024
	(14.014)	(14.086)	(0.023)	(0.023)
Households	1288	1288	1288	1288
Household Months	2576	2576	2576	2576
Controls		✓		✓
Household FE	✓	✓	✓	✓

Notes: Table shows regression results with observations collapsed to average monthly quantities before and after the tax changes, using GfK data. Robust standard errors are in parentheses. In columns (1) and (2), estimations are conducted using OLS, i.e., coefficients can be interpreted as absolute changes. In columns (3) and (4) the estimation uses Poisson quasi maximum likelihood estimation, i.e., coefficients can be interpreted as relative changes. Controls include household size, income, labor market status, and temperature. The estimations only include observations that exhibit within-household variation in purchases.

Table C.5: Butter purchases in response to fat tax changes, sample split into terciles

	(1) Absolute Change	(2) Absolute Change	(3) Relative Change	(4) Relative Change
Panel A: Tax Introduction				
Tax hike	-37.731	-34.749	-0.057	-0.053
	(13.450)	(13.466)	(0.020)	(0.020)
Tax hike × Medium SC	-22.583	-22.536	-0.050	-0.046
	(17.760)	(17.610)	(0.029)	(0.028)
Tax hike × High SC	-15.463	-15.104	-0.029	-0.029
	(17.763)	(17.789)	(0.028)	(0.027)
Households	1296	1296	1296	1296
Household Months	27692	27692	27692	27692
Panel B: Tax Repeal				
Tax repeal	27.363	28.350	0.040	0.043
	(12.885)	(13.920)	(0.019)	(0.021)
Tax repeal × Medium SC	-6.686	-5.983	-0.004	-0.005
	(16.726)	(16.747)	(0.026)	(0.027)
Tax repeal × High SC	-26.355	-27.275	-0.038	-0.040
	(17.690)	(17.796)	(0.028)	(0.028)
Households	1302	1302	1302	1302
Household Months	28483	28483	28483	28483
Controls		✓		✓
Household FE	✓	✓	✓	✓

Notes: Table shows regression results with standard errors clustered on household level, using GfK data. In columns (1) and (2), estimations are conducted using OLS, i.e., coefficients can be interpreted as absolute changes. In columns (3) and (4) the estimation uses Poisson quasi maximum likelihood estimation, i.e., coefficients can be interpreted as relative changes. Controls include household size, income, labor market status, and month-of-the-year FE. The estimations only include observations that exhibit within-household variation in purchases.

Table C.6: Butter purchases in response to fat tax changes, alternative explanations

	(1) Main	(2) Education	(3) Knowledge	(4) Income	(5) Taste	(6) All
Panel A: Tax introduction						
Tax hike	-0.052	-0.056	-0.050	-0.048	-0.039	-0.037
	(0.016)	(0.019)	(0.018)	(0.021)	(0.020)	(0.026)
Tax hike						
× High SC	-0.049	-0.049	-0.045	-0.050	-0.049	-0.051
	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)
× Interaction term		0.010	-0.043	-0.011	-0.038	
		(0.024)	(0.033)	(0.024)	(0.024)	
Households	1296	1296	1217	1296	1217	1217
Household Months	27692	27692	26083	27692	26083	26083
Panel B: Tax repeal						
Tax repeal	0.040	0.038	0.047	0.033	0.043	0.043
	(0.017)	(0.020)	(0.019)	(0.023)	(0.021)	(0.028)
Tax repeal						
× High SC	-0.023	-0.023	-0.026	-0.023	-0.025	-0.026
	(0.022)	(0.022)	(0.023)	(0.022)	(0.023)	(0.023)
× Interaction term		0.006	-0.016	0.010	0.000	
		(0.023)	(0.030)	(0.025)	(0.023)	
Households	1302	1302	1224	1302	1224	1224
Household Months	28483	28483	26841	28483	26841	26841
Interaction term	None	High education	Lacks knowledge	High income	Unhealthy taste	All
Controls	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓

Notes: Table shows Poisson QMLE regression results with standard errors clustered on household level, using GfK data. The dependent variable is monthly butter purchases in grams. "High education" means tertiary education (ref.: vocational education), "Lacks knowledge" indicates consumers who agree that they would make healthier food choices if they had more information, "High income" indicates consumers in the top half of the distribution of equivalized incomes, "Unhealthy taste" indicates consumers who agree that they would make healthier food choices if unhealthy food was less tasty. Controls include household size, income, labor market status, and month-of-the-year FE. The estimations only include observations that exhibit within-household variation in purchases.

Table C.7: Butter purchases in response to fat tax changes, factor without item "I eat healthy foods"

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Tax introduction						
Tax hike	-0.057	-0.060	-0.052	-0.051	-0.041	-0.037
	(0.017)	(0.019)	(0.019)	(0.022)	(0.021)	(0.027)
Tax hike						
× High self-control	-0.037	-0.037	-0.037	-0.038	-0.041	-0.044
	(0.023)	(0.023)	(0.024)	(0.023)	(0.024)	(0.024)
× Interaction term		0.009	-0.043	-0.012	-0.038	
		(0.024)	(0.033)	(0.025)	(0.025)	
Households	1296	1296	1217	1296	1217	1217
Household Months	27692	27692	26083	27692	26083	26083
Panel B: Tax repeal						
Tax repeal	0.047	0.045	0.055	0.041	0.053	0.055
	(0.018)	(0.020)	(0.020)	(0.024)	(0.023)	(0.029)
Tax cut						
× High SC	-0.036	-0.036	-0.039	-0.036	-0.039	-0.042
	(0.022)	(0.022)	(0.023)	(0.022)	(0.023)	(0.023)
× Interaction term		0.006	-0.018	0.010	-0.004	
		(0.023)	(0.030)	(0.025)	(0.023)	
Households	1302	1302	1224	1302	1224	1224
Household Months	28483	28483	26841	28483	26841	26841
Interaction term	None	High education	Lacks knowledge	High income	Unhealthy taste	All
Controls	✓	✓	✓	✓	✓	✓
Household FE	✓	✓	✓	✓	✓	✓

Notes: Table shows Poisson QMLE regression results with standard errors clustered on household level, using GfK data. The dependent variable is monthly quantity in grams. The "High self-control" factor excludes the item "I eat healthy foods". "High education" means tertiary education (ref.: vocational education), "Lacks knowledge" identifies consumers who agree with the statement "I believe I would make healthier food choices if I had more information on how to eat healthy", "High income" indicates consumers in the top half of the distribution of equivalized incomes, "Unhealthy taste" indicates that consumers agree with the statement "I believe I would make healthier food choices if unhealthy food was less tasty". Controls include household size, income, labor market status, and month-of-the-year FE. The estimations only include observations that exhibit within-household variation in purchases.

Table C.8: Butter purchases by access to German border

	Absolute change		Relative change	
	(1)	(2)	(3)	(4)
	No toll	Toll	No toll	Toll
Panel A: Tax Introduction				
Tax hike	-34.581	-31.056	-0.056	-0.047
	(14.668)	(13.796)	(0.023)	(0.022)
Tax hike × High self-control	-26.129	-30.698	-0.042	-0.059
	(19.192)	(20.426)	(0.030)	(0.033)
Households	737	559	737	559
Household Months	15782	11910	15782	11910
Panel B: Tax Repeal				
Tax Repeal	22.984	29.455	0.034	0.045
	(15.281)	(16.743)	(0.023)	(0.026)
High self-control × No Tax	-22.191	-7.922	-0.032	-0.007
	(19.221)	(19.551)	(0.031)	(0.031)
Households	743	558	743	558
Household Months	16200	12275	16200	12275
Controls	✓	✓	✓	✓
Household FE	✓	✓	✓	✓

Notes: Table shows regression results with standard errors clustered on household level, using GfK data. In columns (1) and (2), estimations are conducted using OLS, i.e., coefficients can be interpreted as absolute changes. In columns (3) and (4), the estimations use Poisson QMLE, i.e., coefficients can be interpreted as relative changes. The estimations are performed separately on the sample of "toll" and "no toll" households. "Toll" indicates that a consumer has to use a toll bridge or ferry to reach the cross-border shops in Germany. Controls include household size, income, labor market status, and month-of-the-year FE. The estimations only include observations that exhibit within-household variation in purchases.

D Bounding approach

To investigate the impact of potential selection on unobservables, we follow the approach by Oster (2019). Since the approach makes use of movements in the explained variance, we focus on the absolute demand changes that we estimate using OLS. The coefficient of interest is the interaction between the tax change indicator and the self-control indicator, α_2. First, we estimate the baseline estimate $\dot{\alpha}_2$ in a fixed-effects regression of purchases on the tax indicator and the tax indicator interacted with the self-control indicator. Second, we estimate the controlled estimate, $\tilde{\alpha}_2$, from a regression that includes the full set of controls and the tax dummy interacted with income, education, nutritional knowledge, and unhealthy taste. We consider proportional selection on unobservables that goes in the same direction as selection on observables ($\tilde{\delta} = 1$) and in the opposite direction ($\tilde{\delta} = -1$). The bound can then be approximated by

$$\alpha_2^* \approx \tilde{\alpha}_2 - \tilde{\delta}\frac{(\dot{\alpha}_2 - \tilde{\alpha}_2)(R_{max} - \tilde{R})}{\tilde{R} - \dot{R}} \tag{10}$$

where $\dot{R}$ is the within R-squared from the baseline regression and $\tilde{R}$ is the within R-squared from the controlled regression. R_{max} is the highest possible R-squared and is set to $R_{max} = min(2.2\tilde{R}, 1)$ following Hener *et al.* (2019). Hence, the movement in coefficients is weighted by the movement in R-squared relative to the potential change in R-squared.

Table D.1: Coefficient bounds based on Oster (2019)

	Soft drink tax		Fat tax	
	Tax hike	Tax repeal	Tax introduction	Tax repeal
Baseline estimate $\dot{\alpha}_2$	-32.498	-10.080	-23.832	-16.951
	(14.509)	(13.838)	(14.274)	(13.981)
Baseline Within R-squared $\dot{R}$	0.002	0.002	0.002	0.000
Controlled estimate $\tilde{\alpha}_2$	-30.456	-9.392	-31.390	-17.970
	(15.430)	(13.816)	(14.680)	(14.012)
Controlled Within R-squared $\tilde{R}$	0.010	0.012	0.034	0.040
Bound α_2^* for $\delta = 1$	-33.367	-10.434	-41.054	-19.202
Bound α_2^* for $\delta = -1$	-27.545	-8.349	-21.725	-16.738

Notes: Table shows results for bounding approach based on (Oster, 2019) with $R_{max} = min(2.2\tilde{R}, 1)$, using GfK data. The baseline estimate corresponds to the coefficient of "Tax change x High self-control" from a fixed effects regression of purchases on the tax dummy interacted with self-control. The controlled estimate is obtained from a fixed effects regression including the full set of controls and interactions with the tax dummy as in the sixth column of Tables 4 and C.6.

E Alternative Calculation of Price Elasticities

In Section 6, we use the soft drink tax variation to instrument prices. In the following, we employ the price instruments proposed by Allcott *et al.* (2019a) to estimate the price elasticities for soft drinks in the pre-tax period 2010 and 2011.

Allcott *et al.* (2019a) exploit the observation in DellaVigna and Gentzkow (2019) that national retail chains typically vary prices in a coordinated way. Using the prices outside the consumer's region as instruments, thus, controls for local demand shocks that may simultaneously affect prices and demand. For each product (defined by brand and packaging type) in a given quarter, we calculate the average price in all other regions (we use the GfK differentiation in eight Danish regions). To control for national-level, brand-specific demand shocks like advertising campaigns, these price instruments are subtracted from the national average price for the same product.

More formally, we define a product, j, by its brand and packaging type. For each product j sold in store s in a given quarter q, we observe the log price, $\log(p_{jsq})$. To construct the instrument, we calculate the average price for the respective product in all other regions: $\log(p_{jsq,-r})$ (where r denotes the region according to the GfK differentiation in eight Danish regions). The national average log price, $\log(p_{jq})$, is subtracted to control for nation-wide demand shocks. Hence, the resulting instrument is: $\log(\tilde{p}_{jsq,-r}) = \log(p_{jsq,-r}) - \log(p_{jq})$.

Consequently, in the first stage of the 2SLS model we regress the log price, $\log(p_{jsq})$, on the constructed instrument:

$$\log(p_{jsq}) = \tau_{10} + \tau_{11}\log(\tilde{p}_{jsq,-r}) + \phi_{1t} + \delta_{1i} + \epsilon_{it}, \tag{11}$$

where j indexes product, s the store chain, q the quarter, ϕ_{1t} are consumer fixed effects and δ_{1i} quarter-of-the-year fixed effects.

In the second stage, we regress the log quantity, $\log(q_{jsq})$, on the predicted price from the first stage:

$$\log(q_{jsq}) = \tau_{20} + \tau_{21}\widehat{\log(p_{jsq})} + \phi_{2t} + \delta_{2i} + \epsilon_{it}. \tag{12}$$

Table E.1 presents the results. We find that in the pre-tax period too, consumers with low self-control exhibit lower price elasticities than consumers with high self-control, but the elasticities are rather imprecisely measured and the difference is not statistically significant. For consumers with low self-control we estimate a price elasticity of -0.78 and for those with high self-control -1.17. Although these estimates support the results from Section 6, they should be interpreted with caution for the following reasons.

While we follow the instrument construction in Allcott *et al.* (2019a), there are a number of notable differences with regard to the data. In contrast to Allcott *et al.* (2019a), we do not observe marketing variables that often coincide with product sales (e.g., whether a product is on display or featured in retailer advertising), hence, our estimates may deviate from the true price elasticities. Moreover, since the Nielsen data used in Allcott *et al.* (2019a) contain store-level data, they have more granular price information that can be used to construct the instruments. In contrast, we only observe prices when another consumer buys the same product in the same quarter in another region, requiring us to use rather coarse product definitions to reduce the number of missing values. This may also be a reason why the F statistic is smaller than in Allcott *et al.* (2019a).

Furthermore, there are a number of differences compared to our analysis in the main paper. We include only consumers that report a purchase, that is, consumers who report a store trip but do not buy a soft drink are not included unlike in the main analysis. While this restricts responses to price variation to the intensive margin, the constraint is necessary because we can only observe prices for consumers who make a purchase. Moreover, we follow Allcott *et al.* (2019a) and aggregate data to the quarterly level, while we aggregate them to the monthly level in the main analysis.

Table E.1: Price elasticities based on Allcott *et al.* (2019a) instrument

	Total	Low self-control	High self-control
Price elasticity	-0.976	-0.778	-1.173
	(0.281)	(0.390)	(0.404)
First stage			
Price instrument	0.279	0.273	0.289
	(0.045)	(0.069)	(0.059)
First stage F	38.583	15.742	24.227
Households	923	462	461
Household Quarters	4658	2371	2287
Quarter FE	✓	✓	✓
Household FE	✓	✓	✓

Notes: The table shows regression results from a regression of log quantity of soft drinks in a quarter on average log prices following the IV strategy in Allcott *et al.* (2019a). The price of a product is instrumented with the average log price at retailers of the same chain outside the consumer's region, differenced from the national average price of that product. Standard errors are clustered on the household level.