Online-Appendix

„Who Bears the Costs of the UK Soft Drink Tax? An Empirical Study of Medium-Term Effects“

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Annex

Table A 1: Variable Descriptions

Variable Name	Description Unit	Source
$Log(Employees)_{i,t}$ *Microeconomic Analysis*	Logarithmic number of full- and part-time employees of each company (i) per year (t)	Eikon Worldscope Variable WC07011 Refinitiv (2024b)
$Log(Employees)_{i,t}$ *Macroeconomic Analyses*	Logarithmic number of full- and part-time employees of each industry (i) per year (t)	Business Register and Employment Survey Office for National Statistics (2015, 2022a)
$Log(Price)_{i,t}$	Logarithmic real (inflation-adjusted) price per litre of each item (i) per year (t) in GBP	CPI price quotes Office for National Statistics (2024a)
$Volume_{i,t}$	Original volume size in litres the product was sold in when its price was collected	CPI price quotes Office for National Statistics (2024a)
$Unemployment\ Rate_{i,t}$	Proportion of unemployed individuals aged 16 years or older in relation to the working population in percent	Office for National Statistics (2024b)
$GDP_{i,t}$	UK's annual Gross Domestic Product per capita in current US $	World Development Indicators World Bank (2023a)
$Total\ Employment_{i,t}$	All residents in the UK independent of their legal status in the country	World Development Indicators World Bank (2023b)
$Treatment_i$	Indicator variable takes the value one for units in the treatment group and zero for units in the control group	Own calculations
Tax_t	Post indicator equal to one after 2018 (implementation of soft drink tax) and zero before 2018	Own calculations

Note. Author's own detailed overview of variables.

Table A 2: Descriptive Statistics

Variable	N	Mean	SD	Min	Max	Mean Treat. Group	Mean Cont. Group
Microeconomic Analysis							
Log(Employees)	106	6.56	2.34	1.95	10.40	7.03	6.06
Unemployment Rate (%)	106	4.87	1.10	3.9	7.6	4.89	4.84
GDP (thousands, US $)	106	44.27	2.83	40.22	48.87	44.07	44.48
Total Population (mil)	106	66.40	1.30	64.10	68.40	66.30	66.50
Lag Log(Employees)	106	6.50	2.37	1.95	10.40	6.94	6.03
Macroeconomic Analyses							
Log(Employees) *Soft Drink*	71	7.85	1.90	1.61	9.95	9.36	7.58
Unemployment Rate (%)	71	4.84	1.07	3.9	7.6	4.89	4.84
GDP (thousands, US $)	71	44.12	2.83	40.22	48.87	44.07	44.13
Total Population (mil)	71	66.40	1.27	64.10	68.40	66.30	66.40
Lag Log(Employees)	71	7.81	1.92	1.61	9.78	9.33	7.53
Log(Employees) *Beverage*	22	10.75	0.15	10.46	11.00	10.65	10.84
Unemployment Rate (%)	22	4.89	1.11	3.9	7.6	4.89	4.89
GDP (thousands US $)	22	44.07	2.84	40.22	48.87	44.07	44.07
Total Population (mil)	22	66.30	1.29	64.10	68.40	66.30	66.30
Lag Log(Employees)	22	10.73	0.16	10.43	11.02	10.62	10.84
Price Analysis							
Log(Price) (2018 £)	31,957	0.29	1.01	-2.60	2.99	0.67	-0.06
Unemployment Rate (%)	31,957	4.83	1.05	3.9	7.6	4.86	4.80
GDP (thousands, US $)	31,957	44.04	2.81	40.22	48.87	43.92	44.15
Total Population (mil)	31,957	66.40	1.25	64.10	68.40	66.30	66.40
Volume (L)	31,957	1.08	0.61	0.16	2.31	1.03	1.12

Note. Author's own overview based on employment data retrieved from Refinitiv (2024b) and Office for National Statistics (2015, 2022a), as well as price data retrieved from Office for National Statistics (2024a). The variable Log(Employees) in the macroeconomic analyses depicts either the number of employees in the soft drink or beverage manufacturing industry (see Section 3.2 for explanations of variables).

Table A 3: Microeconomic Employment Robustness Checks

Log Employees	(1)	(2)	(3)	(4)	(5)	(6)
Treatment*Tax	0.039	0.144*	0.726	-0.016	0.063	0.065
	(0.069)	(0.079)	(0.427)	(0.064)	(0.079)	(0.072)
Treatment				0.081		
				(0.063)		
Tax	0.325**	-0.052	-0.285	0.036	0.003	0.023
	(0.114)	(0.108)	(0.265)	(0.050)	(0.058)	(0.047)
Unemployment Rate	-0.223***	-0.067	0.036	-0.083*	-0.088	-0.075
	(0.062)	(0.040)	(0.038)	(0.039)	(0.050)	(0.046)
GDP	-0.000**	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Total Population	-0.000***	-0.000	0.000*	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lag Log Employees	0.940***	0.865***		0.977***	0.887***	0.849***
	(0.100)	(0.062)		(0.013)	(0.053)	(0.075)
Observations	69	106	110	106	84	87
Company FE	Yes	Yes	Yes	No	Yes	Yes
Adjusted R^2	0.994	0.995	0.973	0.994	0.989	0.994

Note. Author's own estimations. The following adjustments are made to the main regression Equation (1) (i.e. regression of soft drink tax on the logarithmic number of employees in soft drink and alcoholic beverage companies). Column (1) depicts the regression estimates of the main Equation (1), limiting the observational period of the sample from 2013 to 2020. Column (2) shows the coefficient estimates of regressing the tax announcement on the logarithmic number of employees. Column (3) shows the regression estimates when excluding the lagged dependent variable from the main model specification (Equation (1)). Column (4) shows the regression estimates when excluding fixed effects from the main model specification (Equation (1)). Column (5) depicts the regression coefficients of the main Equation (1), excluding Diageo and Coca-Cola from the analysis. Column (6) depicts the regression coefficients of the main Equation (1), excluding Gusbourne, Artisinal Spirits, Adnams and Distil from the analysis. All specifications except Column (4) control for company fixed effects. All standard errors are heteroskedasticity-robust and clustered at the company level. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A 4: Macroeconomic Employment Robustness Checks

Log (Employees)	Soft Drink Industry					Beverage Industry				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment*Tax	-0.132	-0.070	-0.138	-0.095	-0.163	0.320***	0.160	0.274***	0.327***	0.299***
	(0.134)	(0.123)	(0.111)	(0.130)	(0.240)	(0.095)	(0.104)	(0.068)	(0.076)	(0.081)
Treatment				0.110					-0.422***	
				(0.120)					(0.086)	
Tax	0.131	0.260	0.398**	0.282	0.438**	-0.108	0.052	-0.088	-0.089	-0.121
	(0.343)	(0.299)	(0.176)	(0.173)	(0.203)	(0.107)	(0.145)	(0.093)	(0.095)	(0.087)
Unemployment Rate	0.112	0.104	0.081	-0.026	0.327	0.013	-0.024	-0.044	-0.044	-0.138
	(0.169)	(0.097)	(0.092)	(0.104)	(0.219)	(0.063)	(0.042)	(0.035)	(0.034)	(0.088)
GDP	0.000	0.000	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Total Population	0.000	0.000	0.000	-0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lag Log Employees	0.389	0.368		0.960***	0.273	-0.996**	0.212		-0.253	-0.153
	(0.321)	(0.314)		(0.059)	(0.299)	(0.372)	(0.264)		(0.237)	(0.243)
Observations	50	71	71	71	53	16	22	22	22	16
Industry FE	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Adjusted R^2	0.960	0.955	0.951	0.941	0.958	0.806	0.514	0.704	0.706	0.515

Note. Author's own estimations. The following adjustments are made to the main regression Equation (2). The same robustness checks are conducted for the soft drink manufacturing industry (Columns (1) - (5)) and beverage manufacturing industry (Columns (6) - (10)). Columns (1) and (6) depict the regression estimates of the main Equation (2), with a limited observational period from 2013 to 2020. Columns (2) and (7) show the coefficient estimates of regressing the tax announcement on the logarithmic number of employees. Columns (3) and (8) show the regression estimates when excluding the lagged dependent variable from the main Equation (2). Columns (4) and (9) show the regression estimates when excluding fixed effects from the main Equation (2). Columns (5) and (10) depict the regression estimates of Equation (2), with a limited observational period from 2016 to 2023. All specifications except Columns (4) and (9) control for industry fixed effects. All standard errors are heteroskedasticity-robust but not clustered due to insufficient number of industry groups. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A 5: Price Robustness Checks

Log(Price)	(1)	(2)	(3)	(4)
Treatment*Tax	0.084***	-0.026	0.060**	0.049**
	(0.022)	(0.020)	(0.026)	(0.021)
Treatment	0.540***	0.590***	0.690***	-0.017
	(0.042)	(0.043)	(0.055)	(0.016)
Tax	-0.236***	-0.059***	-0.089***	-0.016
	(0.025)	(0.021)	(0.016)	(0.019)
Unemployment Rate	0.114***	0.044***	0.011	0.059***
	(0.016)	(0.010)	(0.009)	(0.019)
GDP	0.000***	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Total Population	0.000***	0.000	-0.000	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Volume	-1.032***	-0.995***	-0.997***	-0.010
	(0.035)	(0.035)	(0.031)	(0.011)
				0.992***
				(0.008)
Observations	22,983	31,957	25,058	143
Region FE	Yes	Yes	Yes	No
Shop FE	Yes	Yes	Yes	No
Adjusted R^2	0.613	0.586	0.646	0.992

Note. Author's own estimations. The dependent variable Log(Price) encompasses the logarithmic real price per litre (i.e. in constant 2018 pounds). The following adjustments are made to the main regression Equation (3) (i.e. regression of soft drink tax on the logarithmic price of soft drinks and levy-exempt beverages). Column (1) depicts the regression estimates of the main Equation (3), limiting the observational period of the sample from 2013 to 2020. Column (2) shows the coefficient estimates of regressing the tax announcement on logarithmic beverage prices. Column (3) shows the regression estimates of Equation (3), excluding item IDs without pre-tax data from the regression. All standard errors for the latter analyses are heteroskedasticity-robust and clustered at shop code level. Column (4) shows the regression estimates of the artificially constructed panel dataset, using heteroskedasticity-robust standard errors clustered at item level. All specifications except Column (4) control for region and shop code fixed effects. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.