

Supplementary material

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1. List of drinks

Table S1. List of drinks sold at Jamie’s Italian restaurant during the study period

| Levied SSBs | Fruit juice (main menu) | Fruit juice (children’s menu) | Diet cola | Bottled water | Levied SSBs not on the menu | Mixer | Fruit juice and water mix | Children’s fruity water | Children’s milk | Other soft drinks (not on the menu) |
|---------------------|-------------------------|-------------------------------|-----------|-----------------|-----------------------------|-------------------|---------------------------|-------------------------|-----------------|-------------------------------------|
| Home Lemonade | Orange juice | Apple juice | Diet Coke | Still water | Cranberry juice | Tonic | Cawston apple | Fruity water | Organic milk | Light/slim tonic |
| Limonata | Apple juice | Orange juice | | Sparkling water | Mango juice | Slim Tonic | Orange and spark.w | | Refill milk | Milk |
| Aranciata | Pineapple juice | Refill (apple) | | Soda water | Tonic | Tonic water | Apple and spark.w | | | Pomegranate juice |
| Bottlegreen Pressés | Grapefruit juice | Refill (orange) | | | Lemonade | Lemonade | Pineapple and spark.w | | | Slimline tonic |
| Coca Cola | | | | | Orange juice & lemonade | Bitter lemon | Grapefruit. and spark.w | | | Tomato juice |
| | | | | | Bitter lemon | Soda | Pomegranate. and spark.w | | | Strawberry smoothie |
| | | | | | Ginger beer | Coca Cola | Orange and still w. | | | Mango smoothie |
| | | | | | Ginger ale | Diet Coke | Apple and still w. | | | Red berry smoothie |
| | | | | | Lime & soda | Apple Juice | Pineapple and still w. | | | Forest fruit smoothie |
| | | | | | Blackcurrant & soda | Cranberry juice | Grapefruit and still w. | | | Orange & basil smoothie |
| | | | | | Lime cordial | Orange juice | Pomegranate and still w. | | | Feel Good juices |
| | | | | | Blackcurrant cordial | Pineapple juice | | | | Orange juice and soda |
| | | | | | Orange cordial | Tomato Juice | | | | Grapefruit juice and soda |
| | | | | | Ginger cordial | Pomegranate juice | | | | |
| | | | | | Apple cordial | Grapefruit juice | | | | |
| | | | | | Elderflower cordial | Mango juice | | | | |
| | | | | | Dandelion cordial | Lime Cordial | | | | |
| | | | | | Ice Tea | Ginger beer | | | | |
| | | | | | Sprite | Dry Ginger | | | | |
| | | | | | Chinotto | Ginger ale | | | | |
| | | | | | Crodino | | | | | |
| | | | | | Pompelmo | | | | | |
| | | | | | Abbondio drinks | | | | | |
| | | | | | Claceau drinks | | | | | |

2. Regions

Table S2. Regional classification of Jamie's Italian restaurants

| | |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| London | Angel Islington, Bluewater, Canary Wharf, Covent Garden, Greenwich, London Bridge (opened in Apr 2015), Norwich, Piccadilly, Westfield, Westfield Stratford, Victoria (opened in May 2015) |
| South | Bath, Brighton, Bristol, Cambridge, Cardiff, Cheltenham, Exeter (opened in Jan 2015), Gatwick, Guildford, Kingston, Milton Keynes, Oxford, Portsmouth, Reading, St Albans |
| North | Aberdeen, Birmingham, Edinburgh, Glasgow, Harrogate, Leeds, Liverpool, Manchester, Newcastle, Nottingham, York |

3. Models

a) Model to analyse the impact of levy on weekly number of beverages sold per customer

$$\ln(y_{jt}) = b_0 + b_1 \text{time}_t + b_2 \text{levy}_t + e_t$$

Where:

$\ln(y_{jt})$ is the log-transformed series of volume of number of beverages sold per customer in each of the drink categories ($j=7$) aggregated over 37 restaurants

$\text{levy}_t = 1$ after 1st of September and 0 before

time_t is a linear time trend ($t = 1, \dots, 24$ weeks); 1 indicates week commencing 8th of June 2015

First order autocorrelation in the estimated model residuals was tested using Cumby-Huizinga test.

b) Model to analyse the impact of levy on four-weekly number of beverages sold per customer

$$\ln(y_{jit}) = b_0 + b_1 \text{time}_{it} + b_2 \text{levy}_{it} + b_3 S1_{it} + b_4 S2_{it} + b_5 S3_{it} + u_{0i} + u_{1i} \text{time}_{it} + e_{it}$$

Where in addition to the above,

$\ln(y_{jit})$ is the log-transformed series of volume of number of beverages sold per customer in each of the drink categories ($j=7$) in individual restaurants ($i=37$)

$S1 = 1$ if summer (23.06.14 – 14.09.14; 22.06.15 – 13.09.15); 0 otherwise

$S2 = 1$ if autumn (15.09.14 – 07.12.14; 14.09.15 – 06.12.15); 0 otherwise

$S3 = 1$ for winter (08.12.14 – 01.03.15; 07.12.15 – 28.02.16); 0 otherwise
(spring period: 02.03.15 – 21.06.15)

u_{0i} – random intercept at restaurant level

u_{1i} – random slope at restaurant level

time_t is a linear time trend ($t = 1, \dots, 23$ four – weekly periods); 1 indicates week commencing c 23rd of June 2014

Data were tested for serial correlation using Wooldridge test for first-order autocorrelation.

4. Additional tables of results

Table S3. Weekly data (n=24 weeks)

| | Levied SSBs on menu | Fruit juice (main menu) | Fruit juice (children's menu) | Diet cola | Water | Levied SSBs off menu | Mixers |
|--------------------------------------|--------------------------------|------------------------------------|------------------------------------------|------------------|-----------------|---------------------------------|-----------------|
| Time | -0.002 | -0.008 | 0.017 | <0.0001 | -0.012 | 0.004 | -0.007 |
| 95% CI | [-0.009,0.005] | [-0.014,-0.001] | [-0.015,0.049] | [-0.003,0.004] | [-0.017,-0.007] | [-0.003,0.011] | [-0.017,0.002] |
| P-value | 0.594 | 0.022 | 0.283 | 0.927 | <0.0001 | 0.231 | 0.108 |
| Levy_1Sept | -0.117 | 0.033 | -0.426 | -0.019 | 0.053 | -0.084 | 0.195 |
| | [-0.190,-0.044] | [-0.046,0.113] | [-0.808,-0.044] | [-0.062,0.025] | [-0.012,0.119] | [-0.179,0.012] | [0.079,0.312] |
| | 0.003 | 0.394 | 0.031 | 0.377 | 0.104 | 0.084 | 0.002 |
| Constant | -1.922 | -3.261 | -3.603 | -2.897 | -2.340 | -3.729 | -3.722 |
| | [-1.986,-1.858] | [-3.312,-3.211] | [-3.848,-3.358] | [-2.931,-2.862] | [-2.377,-2.303] | [-3.782,-3.676] | [-3.794,-3.649] |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| R ² | 0.701 | 0.365 | 0.195 | 0.067 | 0.766 | 0.194 | 0.453 |
| BIC | -70.5 | -65.1 | 12.0 | -88.2 | -84.0 | -70.0 | -54.0 |
| Autocorrelation at lag1 ^s | | | | | | | |
| P-value | 0.380 | 0.066 | 0.041 | 0.452 | 0.681 | 0.498 | 0.914 |

Notes: is the log-transformed series of volume of number of beverages sold per customer in each of the drink categories (j=7) aggregated over 37 restaurants; robust standard errors; ^sCumby-Huizinga test for autocorrelation in first lag (test applied to models with non-robust SE's).

Table S4. Monthly data (all Jamie's Italian restaurants)

| n=820 restaurant weeks | Levied SSBs on menu | Fruit juice (main menu) | Fruit juice (children's menu) | Diet cola | Water | Levied SSBs off menu | Mixers |
|-------------------------------|----------------------------|--------------------------------|--------------------------------------|------------------|-----------------|-----------------------------|-----------------|
| Time | 0.001 | -0.006 | -0.014 | -0.002 | <0.0001 | 0.001 | -0.001 |
| 95% CI | [-0.003,0.005] | [-0.010,-0.002] | [-0.023,-0.005] | [-0.005,0.001] | [-0.005,0.005] | [-0.003,0.006] | [-0.006,0.003] |
| P-value | 0.595 | 0.003 | 0.002 | 0.111 | 0.957 | 0.559 | 0.545 |
| Levy_1Sept | -0.098 | 0.197 | -0.104 | -0.076 | -0.067 | -0.043 | 0.024 |
| | [-0.165,-0.032] | [0.131,0.264] | [-0.184,-0.024] | [-0.124,-0.028] | [-0.117,-0.017] | [-0.108,0.021] | [-0.032,0.080] |
| | 0.004 | <0.0001 | 0.011 | 0.002 | 0.009 | 0.187 | 0.402 |
| Sum. | 0.050 | 0.009 | -0.109 | -0.042 | 0.023 | 0.053 | -0.077 |
| | [0.030,0.070] | [-0.025,0.044] | [-0.188,-0.029] | [-0.066,-0.018] | [-0.006,0.052] | [0.023,0.082] | [-0.112,-0.041] |
| | <0.0001 | 0.596 | 0.007 | 0.001 | 0.120 | <0.001 | <0.001 |
| Aut. | -0.005 | -0.015 | -0.108 | -0.006 | 0.004 | 0.002 | 0.011 |
| | [-0.014,0.005] | [-0.030,-0.0001] | [-0.135,-0.082] | [-0.016,0.004] | [-0.009,0.018] | [-0.011,0.015] | [-0.005,0.027] |
| | 0.330 | 0.045 | <0.0001 | 0.237 | 0.537 | 0.749 | 0.185 |
| Wint. | -0.003 | 0.006 | -0.008 | 0.011 | -0.031 | 0.025 | 0.038 |
| | [-0.008,0.003] | [-0.003,0.014] | [-0.025,0.009] | [0.003,0.018] | [-0.041,-0.022] | [0.014,0.035] | [0.025,0.051] |
| | 0.302 | 0.210 | 0.349 | 0.007 | <0.0001 | <0.0001 | <0.0001 |
| Constant | -1.814 | -3.624 | -3.042 | -2.635 | -2.563 | -3.631 | -3.656 |
| | [-1.893,-1.734] | [-3.759,-3.488] | [-3.217,-2.867] | [-2.723,-2.547] | [-2.689,-2.437] | [-3.761,-3.502] | [-3.789,-3.522] |
| | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| BIC | -1084.783 | -713.9 | 625.9 | -1222.0 | -834.9 | -588.531 | -225.9 |
| p-value\$ | 0.048 | 0.009 | <0.001 | 0.595 | 0.002 | 0.066 | 0.004 |

Notes: Dependent variable is the log-transformed series of volume of number of beverages sold per customer in each of the drink categories; robust standard errors; \$ Wooldridge test for autocorrelation in lag 1.

Table S5. Monthly data (Jamie's Italian restaurants in London)

| London; n=230 restaurant weeks | Levied SSBs on menu | Fruit juice (main menu) | Fruit juice (children's menu) | Diet cola | Water | Levied SSBs off menu | Mixers |
|-----------------------------------|---------------------------|----------------------------|----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Time | <0.0001 | -0.003 | -0.016 | -0.003 | -0.001 | 0.005 | -0.002 |
| 95% CI | [-0.006,0.005] | [-0.011,0.006] | [-0.044,0.011] | [-0.008,0.003] | [-0.008,0.006] | [-0.006,0.016] | [-0.012,0.009] |
| P-value | 0.904 | 0.539 | 0.241 | 0.359 | 0.834 | 0.382 | 0.771 |
| Levy_1Sept | -0.142 [-0.219,-0.066] | 0.095 [0.013,0.176] | -0.093 [-0.303,0.117] | -0.123 [-0.197,-0.049] | -0.092 [-0.152,-0.032] | -0.122 [-0.231,-0.013] | 0.014 [-0.080,0.107] |
| | <0.0001 | 0.023 | 0.386 | 0.001 | 0.003 | 0.029 | 0.772 |
| Sum. | 0.044 [0.001,0.086] | -0.002 [-0.082,0.079] | -0.029 [-0.245,0.188] | -0.026 [-0.056,0.005] | -0.035 [-0.100,0.031] | 0.062 [-0.005,0.130] | -0.075 [-0.153,0.003] |
| | 0.045 | 0.969 | 0.796 | 0.099 | 0.298 | 0.068 | 0.061 |
| Aut. | -0.003 [-0.023,0.018] | -0.007 [-0.041,0.026] | -0.087 [-0.156,-0.017] | 0.003 [-0.019,0.025] | 0.017 [-0.002,0.035] | 0.002 [-0.030,0.034] | 0.022 [-0.011,0.055] |
| | 0.807 | 0.669 | 0.015 | 0.781 | 0.078 | 0.895 | 0.182 |
| Wint. | -0.005 [-0.014,0.005] | 0.001 [-0.020,0.022] | 0.018 [-0.027,0.062] | 0.009 [-0.005,0.024] | -0.025 [-0.039,-0.011] | 0.022 [-<0.0001,0.044] | 0.042 [0.019,0.065] |
| | 0.317 | 0.915 | 0.432 | 0.217 | 0.001 | 0.052 | <0.0001 |
| Constant | -1.762 [-1.915,-1.610] | -3.507 [-3.671,-3.343] | -3.137 [-3.509,-2.765] | -2.640 [-2.828,-2.451] | -2.210 [-2.440,-1.980] | -3.894 [-4.099,-3.689] | -3.765 [-4.022,-3.508] |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| bic | -314.4 | -196.4 | 278.9 | -348.3 | -240.0 | -73.2 | -31.7 |
| p-value [§] | 0.814 | 0.012 | 0.026 | 0.365 | 0.003 | 0.12 | 0.008 |

Notes: Dependent variable is the log-transformed series of volume of number of beverages sold per customer in each of the drink categories; robust standard errors; [§] Wooldridge test for autocorrelation in lag 1.

Table S6. Monthly data (Jamie's Italian restaurants in North)

| North; n=253 restaurant weeks | Levied SSBs on the menu | Fruit juice (main menu) | Fruit juice (children's menu) | Diet cola | Water | Levied SSBs off the menu | Mixers (sold with alcohol) |
|----------------------------------|----------------------------|----------------------------|----------------------------------|-----------------|-----------------|-----------------------------|-------------------------------|
| Time | -0.002 | -0.010 | -0.020 | -0.004 | 0.005 | -0.002 | 0.005 |
| 95% CI | [-0.013,0.008] | [-0.017,-0.003] | [-0.035,-0.005] | [-0.009,0.001] | [-0.003,0.013] | [-0.012,0.007] | [-0.005,0.014] |
| P-value | 0.668 | 0.007 | 0.008 | 0.094 | 0.233 | 0.664 | 0.315 |
| Levy_1Sept | <0.0001 | 0.284 | -0.097 | -0.021 | -0.122 | 0.017 | -0.026 |
| | [-0.187,0.186] | [0.158,0.411] | [-0.246,0.051] | [-0.130,0.088] | [-0.223,-0.020] | [-0.130,0.164] | [-0.144,0.092] |
| | 0.997 | <0.0001 | 0.200 | 0.708 | 0.019 | 0.824 | 0.665 |
| Sum. | 0.028 | 0.017 | -0.210 | -0.091 | 0.040 | 0.019 | -0.073 |
| | [-0.005,0.062] | [-0.040,0.074] | [-0.353,-0.068] | [-0.143,-0.038] | [0.005,0.075] | [-0.030,0.068] | [-0.124,-0.023] |
| | 0.098 | 0.556 | 0.004 | 0.001 | 0.025 | 0.443 | 0.004 |
| Aut. | -0.007 | -0.028 | -0.129 | -0.018 | 0.004 | 0.008 | 0.011 |
| | [-0.022,0.008] | [-0.056,0.001] | [-0.177,-0.081] | [-0.036,0.001] | [-0.021,0.029] | [-0.013,0.028] | [-0.020,0.042] |
| | 0.372 | 0.056 | <0.0001 | 0.065 | 0.732 | 0.462 | 0.491 |
| Wint. | 0.001 | -0.001 | -0.022 | 0.011 | -0.039 | 0.032 | 0.040 |
| | [-0.007,0.008] | [-0.012,0.011] | [-0.048,0.005] | [-0.003,0.025] | [-0.063,-0.015] | [0.014,0.049] | [0.020,0.060] |
| | 0.869 | 0.926 | 0.115 | 0.126 | 0.001 | <0.0001 | <0.0001 |
| Constant | -1.939 | -3.826 | -3.016 | -2.573 | -2.798 | -3.263 | -3.333 |
| | [-2.065,-1.814] | [-3.974,-3.678] | [-3.419,-2.613] | [-2.698,-2.449] | [-2.900,-2.697] | [-3.493,-3.034] | [-3.498,-3.168] |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| bic | -237.6 | -200.8 | 260.2 | -318.2 | -228.7 | -189.3 | -113.0 |
| p-value | 0.256 | 0.550 | 0.001 | 0.473 | 0.368 | 0.039 | 0.434 |

Notes: Dependent variable is the log-transformed series of volume of number of beverages sold per customer in each of the drink categories; robust standard errors;

[§] Wooldridge test for autocorrelation in lag 1

Table S7. Monthly data (Jamie's Italian restaurants in South)

| South; n=337 restaurant weeks | Levied SSBs on menu | Fruit juice (main menu) | Fruit juice (children's menu) | Diet cola | Water | Levied SSBs off menu | Mixers |
|------------------------------------------|--------------------------------|------------------------------------|------------------------------------------|------------------|-----------------|---------------------------------|-----------------|
| Time | 0.004 | -0.006 | -0.009 | <0.0001 | -0.004 | 0.002 | -0.006 |
| 95% CI | [0.001,0.008] | [-0.011,-<0.0001] | [-0.014,-0.004] | [-0.005,0.004] | [-0.012,0.004] | [-0.003,0.006] | [-0.010,-0.001] |
| P-value | 0.023 | 0.033 | 0.001 | 0.817 | 0.311 | 0.532 | 0.023 |
| Levy_1Sept | -0.138 | 0.207 | -0.114 | -0.081 | -0.01 | -0.03 | 0.066 |
| | [-0.195,-0.082] | [0.096,0.318] | [-0.204,-0.024] | [-0.147,-0.014] | [-0.089,0.069] | [-0.109,0.049] | [-0.015,0.146] |
| | <0.0001 | <0.0001 | 0.013 | 0.017 | 0.805 | 0.457 | 0.110 |
| Sum. | 0.069 | 0.009 | -0.087 | -0.019 | 0.050 | 0.069 | -0.080 |
| | [0.040,0.097] | [-0.042,0.059] | [-0.146,-0.027] | [-0.050,0.011] | [0.009,0.091] | [0.030,0.109] | [-0.141,-0.019] |
| | <0.0001 | 0.736 | 0.004 | 0.215 | 0.018 | 0.001 | 0.010 |
| Aut. | -0.005 | -0.012 | -0.108 | -0.005 | -0.004 | -0.003 | 0.003 |
| | [-0.019,0.009] | [-0.030,0.007] | [-0.134,-0.083] | [-0.018,0.008] | [-0.028,0.021] | [-0.021,0.015] | [-0.021,0.027] |
| | 0.501 | 0.225 | <0.0001 | 0.482 | 0.763 | 0.762 | 0.791 |
| Wint. | -0.004 | 0.013 | -0.016 | 0.011 | -0.029 | 0.021 | 0.034 |
| | [-0.014,0.006] | [0.001,0.025] | [-0.038,0.006] | [-0.002,0.023] | [-0.041,-0.018] | [0.006,0.035] | [0.009,0.058] |
| | 0.407 | 0.028 | 0.148 | 0.099 | <0.0001 | 0.005 | 0.007 |
| Constant | -1.754 | -3.553 | -2.997 | -2.675 | -2.635 | -3.710 | -3.819 |
| | [-1.872,-1.637] | [-3.834,-3.273] | [-3.182,-2.811] | [-2.819,-2.530] | [-2.814,-2.456] | [-3.826,-3.594] | [-4.009,-3.629] |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| BIC | -540.4 | -280.4 | 113.6 | -512.3 | -345.9 | -299.3 | -31.2 |
| p-value | 0.015 | 0.007 | 0.128 | 0.501 | 0.011 | 0.813 | 0.037 |

Notes: Dependent variable is the log-transformed series of volume of number of beverages sold per customer in each of the drink categories; robust standard errors;

[§] Wooldridge test for autocorrelation in lag 1.

Figure S1. Fitted vs actual values – weekly data

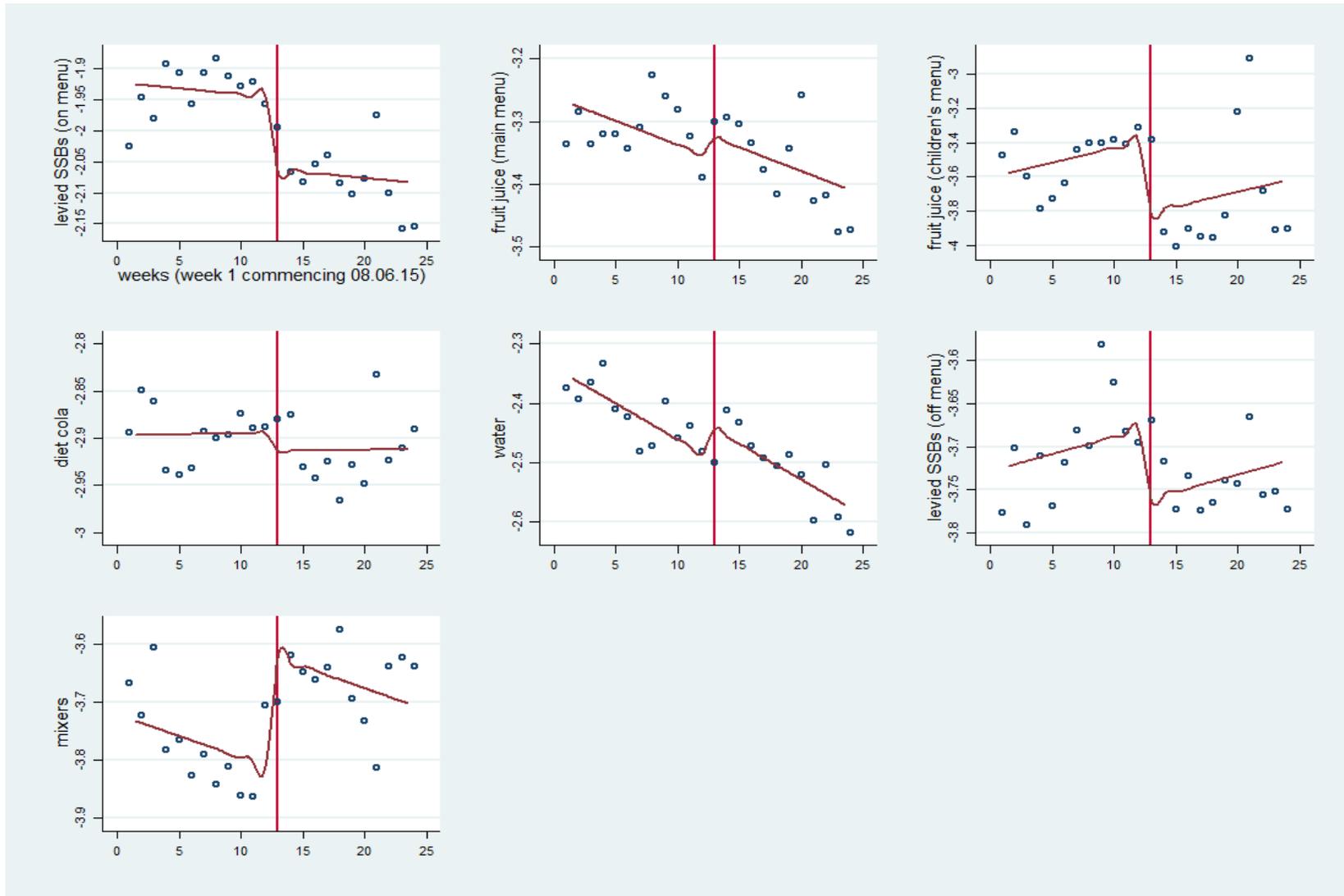


Figure S2. Fitted vs actual values - levied SSBs (on the menu); four-weekly data by restaurant

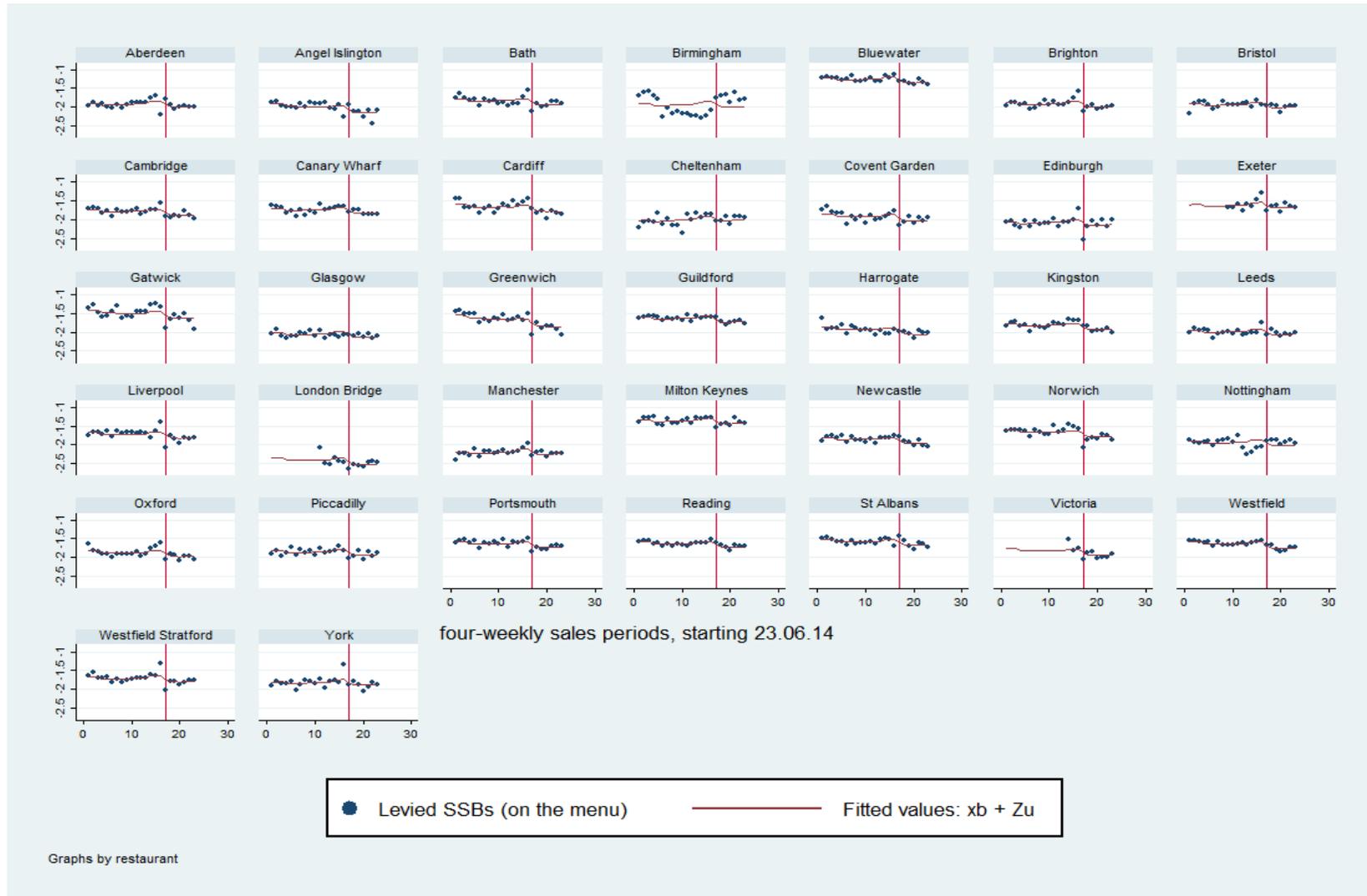


Figure S3. Fitted vs actual values – fruit juice (main menu); four-weekly data by restaurant

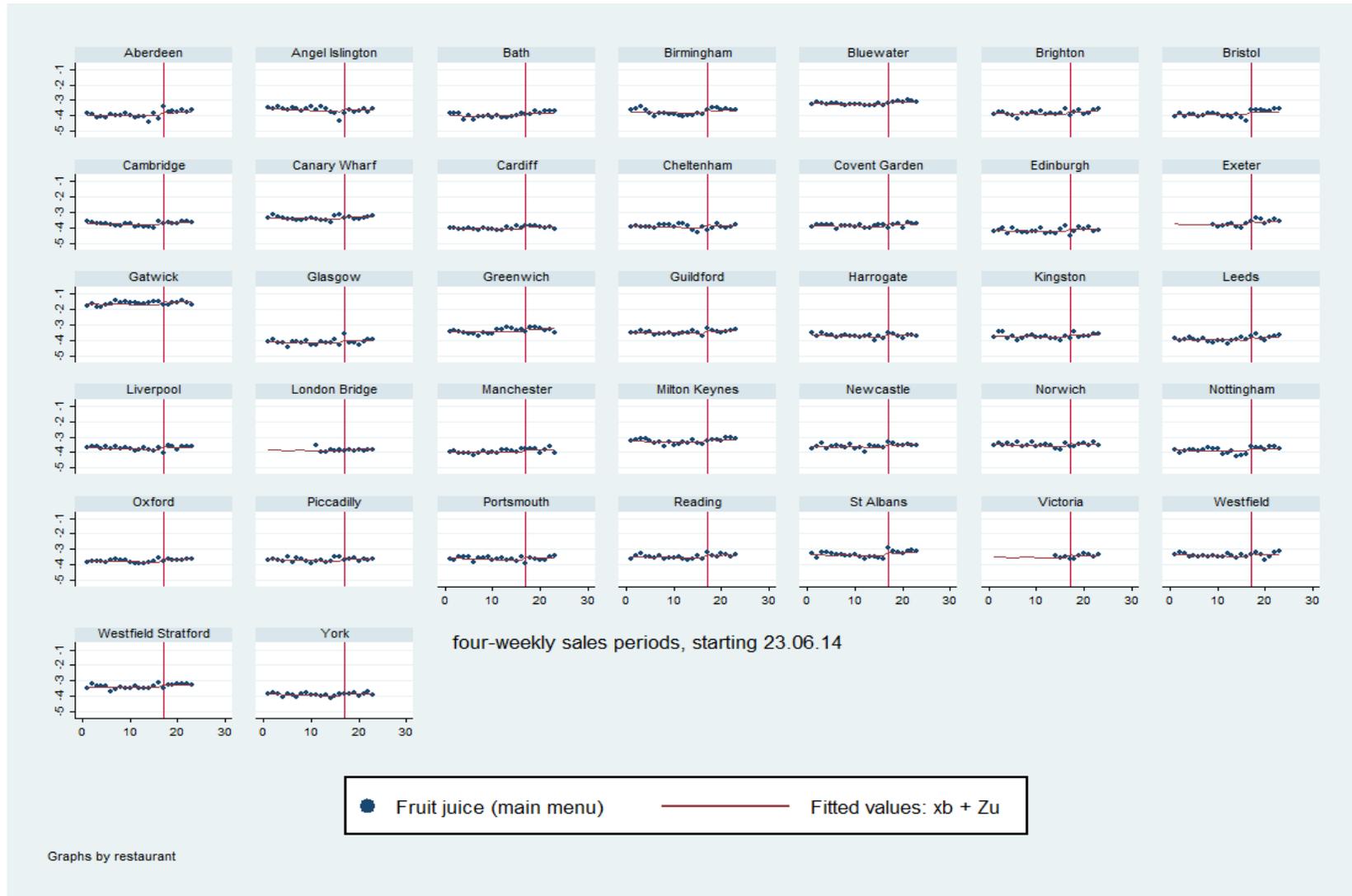


Figure S4. Fitted vs actual values – fruit juice (children’s menu); four-weekly data by restaurant

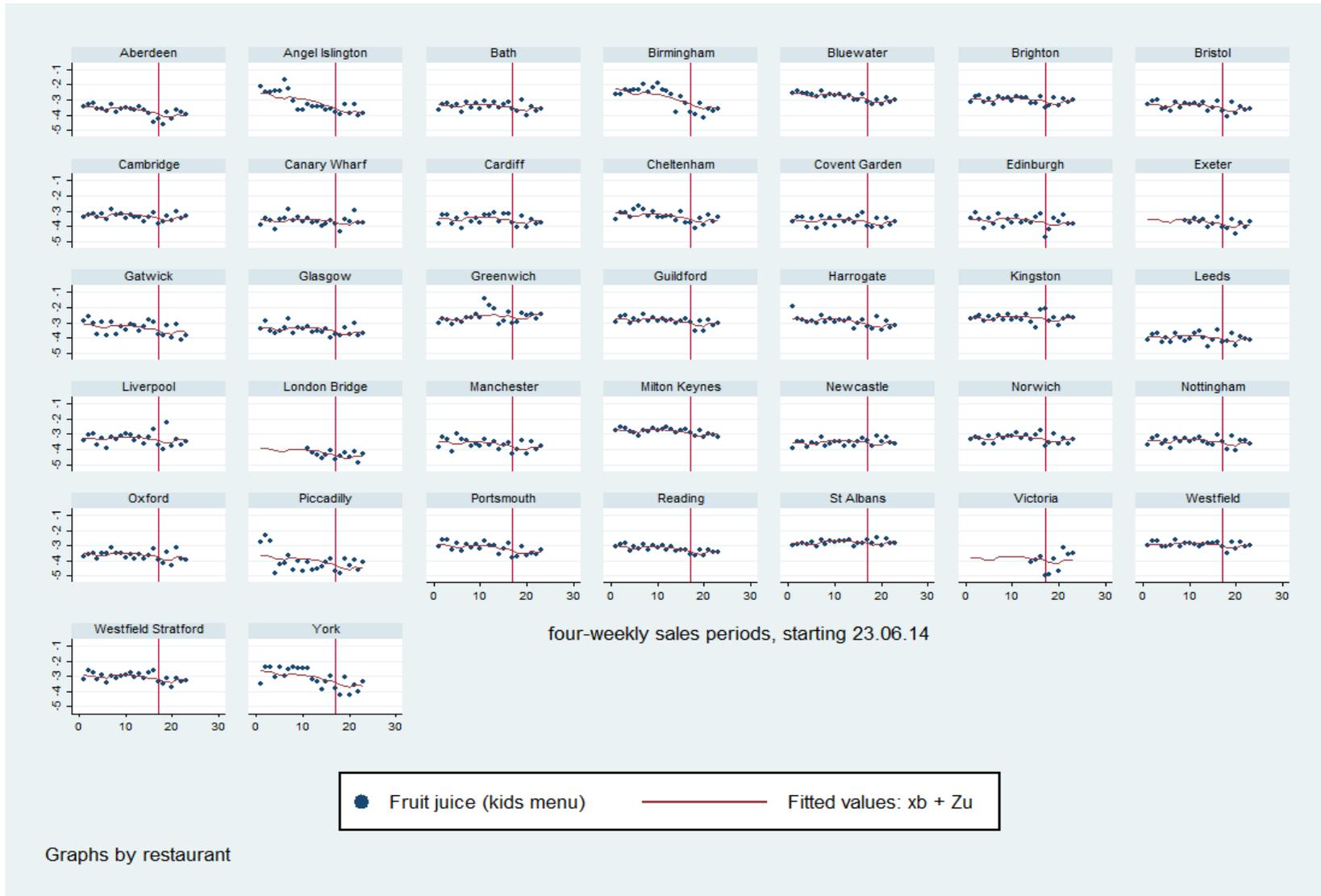


Figure S5. Fitted vs actual values – diet cola; four-weekly data by restaurant

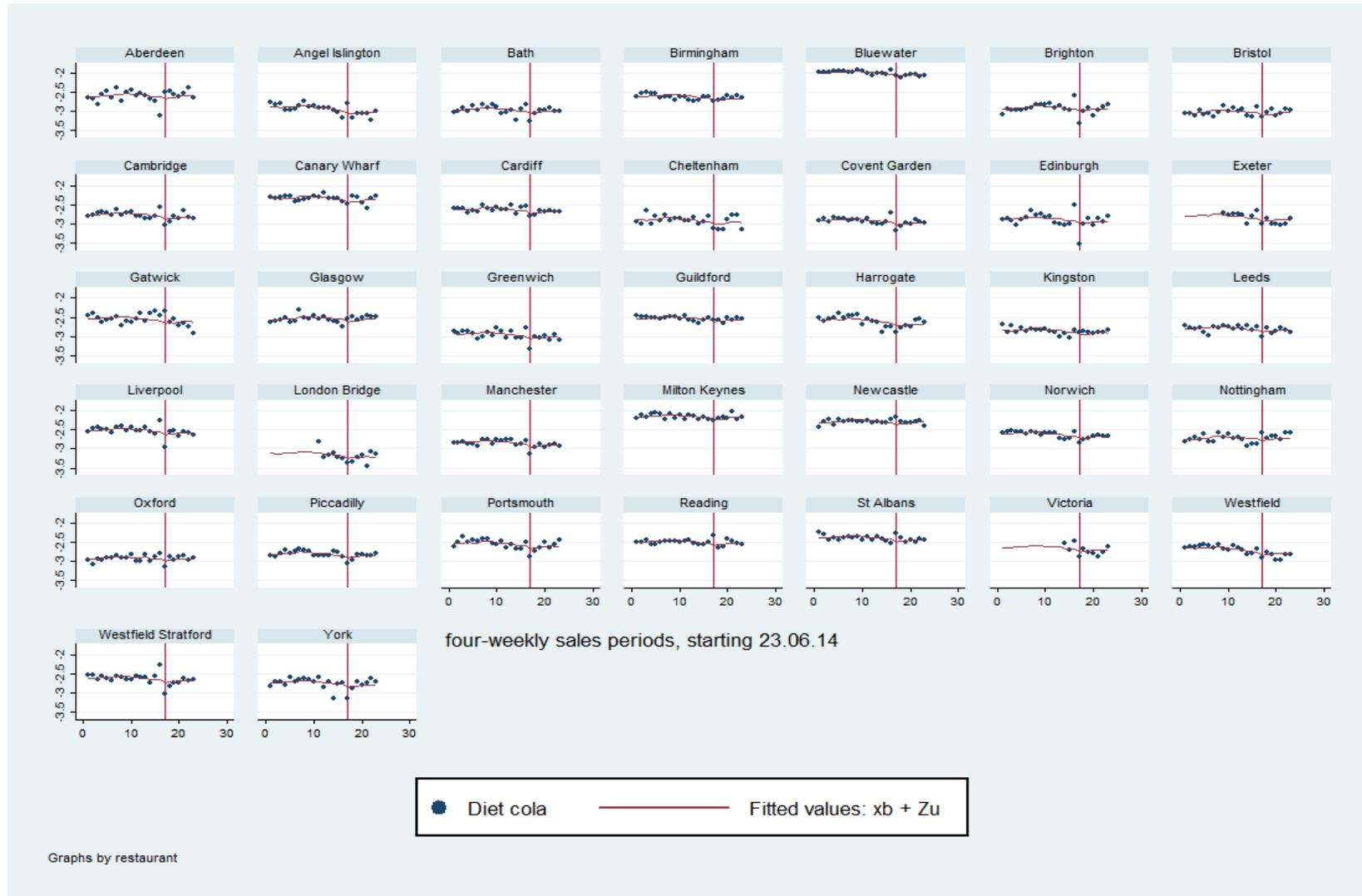


Figure S6. Fitted vs actual values – water; four-weekly data by restaurant

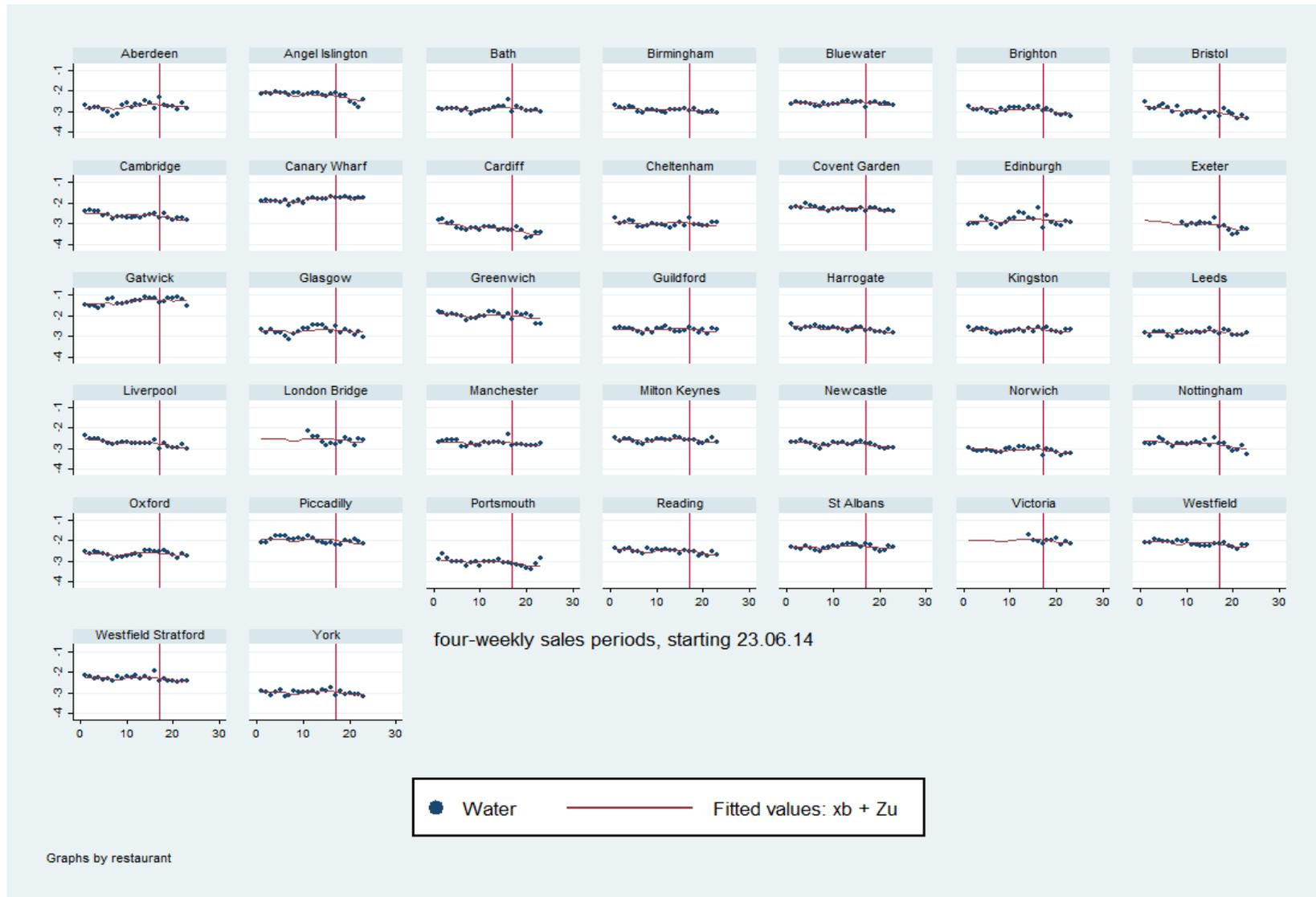


Figure S7. Fitted vs actual values – levied SSBs (off menu); four-weekly data by restaurant

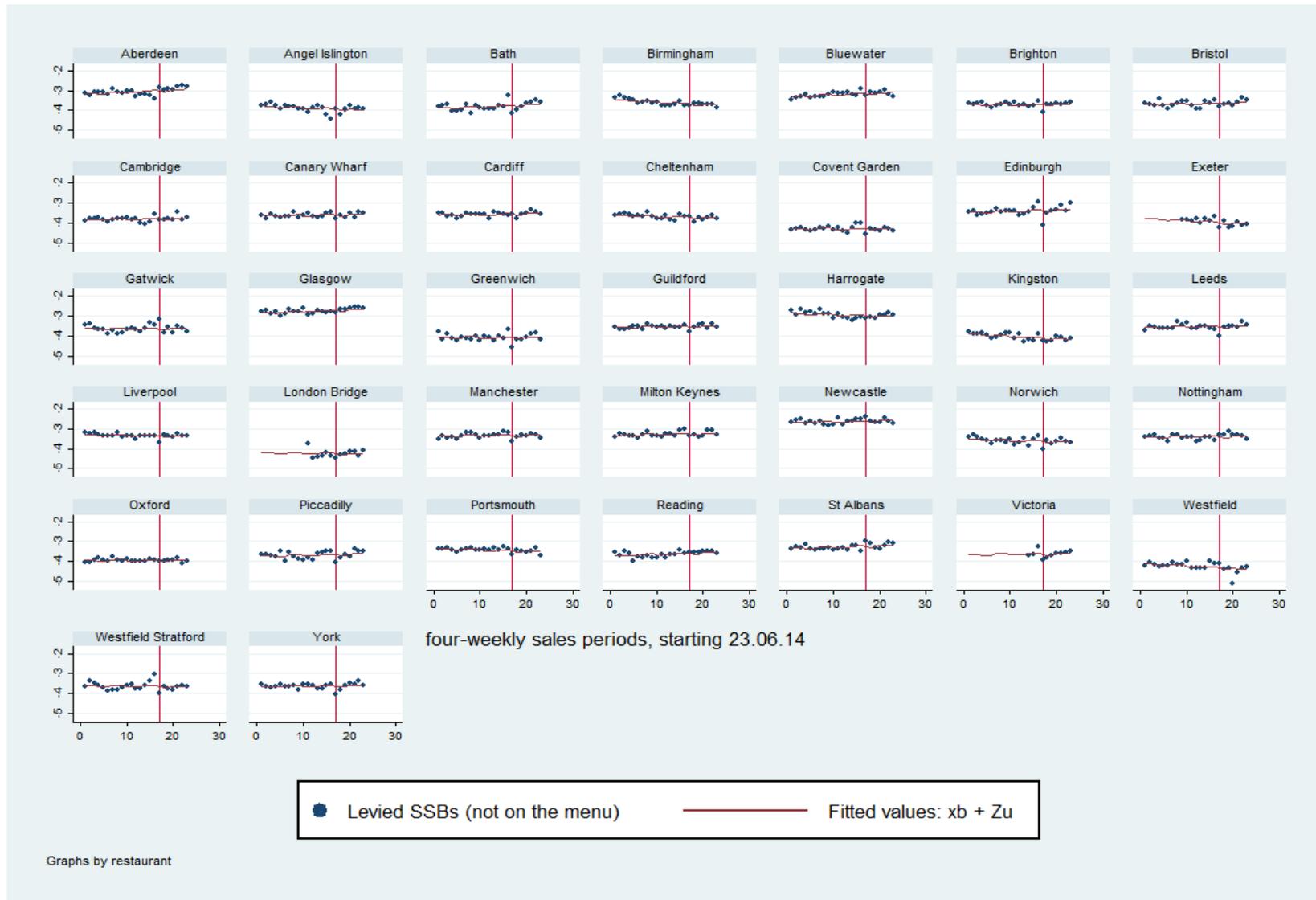
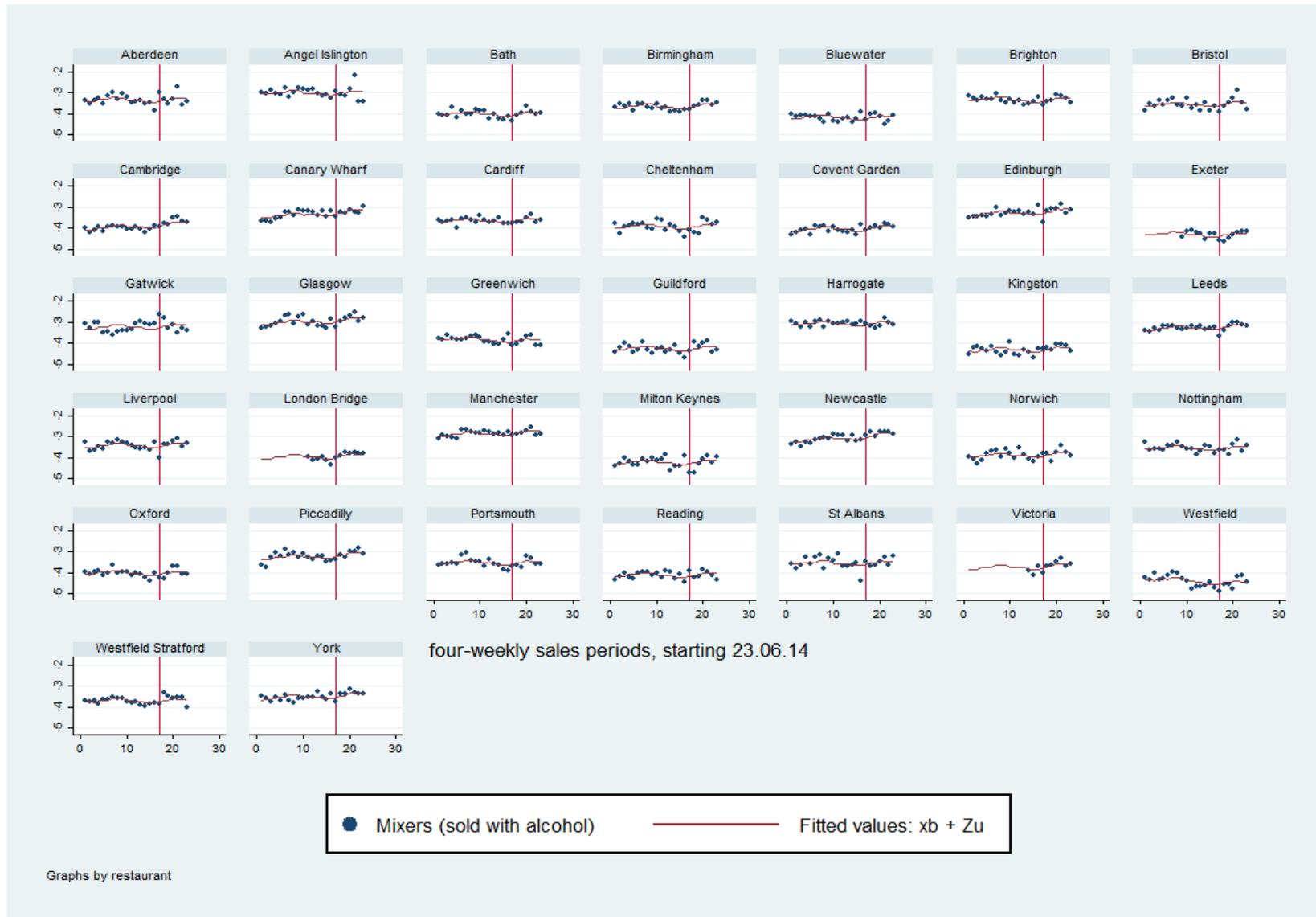


Figure S8. Fitted vs actual values – mixers; four-weekly data by restaurant



5. Robustness to timing of the levy

Robustness checks were undertaken with regard to the timing of intervention. First, we tested whether any effects on the volume of sales of levied SSBs (on-menu) were detected prior to the levy's introduction (from 17th of August), due to media coverage preceding the implementation of the levy. Secondly, we tested whether the effect from the levy could have been affected from coinciding with the beginning of the school year and thus more children visiting the restaurants. As we did not have exact figures on the number of children visiting the restaurants, more children visiting during certain period could have artificially increased the number of beverages sold by cover. This affects more weekly data as when modelling the four-weekly data we are able to control for seasonality as well as time effects. We test this by allowing the levy variable to equal to 1 (i.e. levy to take effect) from either 7th or 14th of September. Results showed that when using weekly data (table S8), the only model with statistically significant coefficient of the levy variable was one where the impact was allowed to start from the second week of September with a very similar effect size of -12.4% (Beta -0.124; 95% CI -18.7 to -6.1; P=0.001) reduction in sales. In 4-weekly data, the impact of the levy on the sales of SSBs (on the menu) reduced to -6.4% and -6.8% when the levy was assumed to take effect from mid-August or mid-September (Beta -0.064; 95% CI, -11.8 to -1; P=0.017, and Beta -0.068; 95% CI -11.6 to -2; P=0.005, respectively).

Table S8. Weekly data, robustness check for timing of the impact

| | Levied SSBs on menu | Fruit juice (main menu) | Fruit juice (children's menu) | Diet cola | Water | Levied SSBs off menu | Mixers |
|------------|--------------------------------|------------------------------------|------------------------------------------|------------------|-----------------|---------------------------------|-----------------|
| Time | -0.007 | -0.006 | -0.003 | -0.001 | -0.012 | 0.001 | -0.002 |
| 95% CI | [-0.015,0.001] | [-0.013,0.001] | [-0.037,0.031] | [-0.004,0.002] | [-0.016,-0.007] | [-0.006,0.008] | [-0.014,0.010] |
| P-value | 0.101 | 0.102 | 0.850 | 0.512 | <<0.00011 | 0.720 | 0.761 |
| Levy_17Aug | -0.039 | 0.003 | -0.107 | 0.001 | 0.046 | -0.04 | 0.107 |
| | [-0.140,0.061] | [-0.085,0.091] | [-0.534,0.320] | [-0.038,0.040] | [-0.019,0.111] | [-0.146,0.065] | [-0.058,0.271] |
| | 0.425 | 0.945 | 0.608 | 0.967 | 0.154 | 0.436 | 0.191 |
| Constant | -1.896 | -3.27 | -3.502 | -2.891 | -2.347 | -3.712 | -3.758 |
| | [-1.964,-1.829] | [-3.317,-3.224] | [-3.719,-3.285] | [-2.921,-2.861] | [-2.379,-2.314] | [-3.763,-3.662] | [-3.846,-3.669] |
| | <<0.00011 | <<0.00011 | <<0.00011 | <<0.00011 | <<0.00011 | <<0.00011 | <<0.00011 |
| Time | -0.004 | -0.005 | 0.005 | -0.001 | -0.011 | 0.003 | -0.008 |
| | [-0.012,0.004] | [-0.012,0.002] | [-0.031,0.040] | [-0.004,0.003] | [-0.016,-0.006] | [-0.004,0.010] | [-0.017,0.001] |
| | 0.343 | 0.128 | 0.784 | 0.760 | <0.0001 | 0.399 | 0.086 |
| Levy_24Aug | -0.087 | -0.002 | -0.231 | -0.008 | 0.038 | -0.066 | 0.203 |
| | [-0.179,0.006] | [-0.090,0.086] | [-0.681,0.219] | [-0.049,0.033] | [-0.031,0.108] | [-0.167,0.034] | [0.100,0.305] |
| | 0.064 | 0.962 | 0.298 | 0.686 | 0.264 | 0.186 | 0.001 |
| Constant | -1.91 | -3.271 | -3.537 | -2.893 | -2.346 | -3.721 | -3.729 |
| | [-1.977,-1.842] | [-3.322,-3.221] | [-3.779,-3.295] | [-2.925,-2.861] | [-2.381,-2.310] | [-3.773,-3.668] | [-3.805,-3.654] |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Time | -0.001 | -0.006 | 0.026 | 0.001 | -0.013 | 0.006 | -0.007 |
| | [-0.008,0.005] | [-0.012,0.001] | [0.001,0.050] | [-0.002,0.005] | [-0.017,-0.009] | [0.001,0.011] | [-0.016,0.003] |
| | 0.644 | 0.075 | 0.039 | 0.506 | <0.0001 | 0.026 | 0.151 |
| Levy_7Sep | -0.124 | 0.006 | -0.57 | -0.035 | 0.073 | -0.117 | 0.182 |
| | [-0.187,-0.061] | [-0.079,0.090] | [-0.775,-0.365] | [-0.077,0.007] | [0.026,0.120] | [-0.186,-0.048] | [0.060,0.303] |
| | 0.001 | 0.893 | 0 | 0.097 | 0.004 | 0.002 | 0.005 |
| Constant | -1.929 | -3.269 | -3.664 | -2.903 | -2.332 | -3.742 | -3.719 |
| | [-1.989,-1.869] | [-3.321,-3.218] | [-3.886,-3.443] | [-2.939,-2.866] | [-2.367,-2.296] | [-3.789,-3.696] | [-3.790,-3.648] |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Time | -0.004 | -0.004 | 0.012 | 0.002 | -0.01 | 0.006 | -0.002 |
| | [-0.011,0.004] | [-0.009,0.002] | [-0.019,0.043] | [-0.001,0.005] | [-0.016,-0.005] | [0.001,0.011] | [-0.013,0.008] |
| | 0.306 | 0.202 | 0.439 | 0.163 | 0 | 0.022 | 0.643 |
| Levy_14Sep | -0.089 | -0.03 | -0.353 | -0.053 | 0.028 | -0.116 | 0.117 |
| | [-0.179,0.001] | [-0.110,0.050] | [-0.797,0.092] | [-0.083,-0.023] | [-0.043,0.099] | [-0.181,-0.051] | [-0.032,0.266] |
| | 0.052 | 0.449 | 0.114 | 0.001 | 0.423 | 0.001 | 0.118 |
| Constant | -1.92 | -3.281 | -3.604 | -2.91 | -2.345 | -3.745 | -3.737 |
| | [-1.986,-1.854] | [-3.329,-3.233] | [-3.825,-3.383] | [-2.947,-2.872] | [-2.383,-2.307] | [-3.789,-3.701] | [-3.818,-3.656] |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |

Notes: Dependent variable is the log-transformed series of sales per cover for each of the drink categories; robust standard errors.

Table S9. Four-weekly data, robustness check for timing of the impact (impact starts from 17th of August)

| n=783 restaurant weeks | Levied SSBs on menu | Fruit juice (main menu) | Fruit juice (children's menu) | Diet cola | Water | Levied SSBs off menu | Mixer |
|-------------------------------|----------------------------|--------------------------------|--------------------------------------|------------------|-----------------|-----------------------------|-----------------|
| Time | -0.001 | -0.007 | -0.019 | -0.007 | -0.004 | -0.002 | -0.001 |
| 95% CI | [-0.005,0.002] | [-0.010,-0.003] | [-0.028,-0.010] | [-0.009,-0.004] | [-0.009,0.001] | [-0.006,0.002] | [-0.005,0.003] |
| P-value | 0.501 | <0.0001 | <0.0001 | <0.0001 | 0.079 | 0.386 | 0.522 |
| Levy_17aug | -0.064 | 0.189 | -0.060 | 0.011 | -0.006 | 0.017 | 0.052 |
| | [-0.118,-0.010] | [0.140,0.238] | [-0.142,0.023] | [-0.015,0.037] | [-0.043,0.030] | [-0.020,0.054] | [0.003,0.101] |
| | 0.020 | <0.0001 | 0.158 | 0.393 | 0.736 | 0.364 | 0.037 |
| Sum. | 0.071 | 0.016 | -0.070 | -0.057 | 0.009 | 0.056 | -0.060 |
| | [0.052,0.090] | [-0.021,0.052] | [-0.155,0.015] | [-0.081,-0.034] | [-0.024,0.041] | [0.024,0.088] | [-0.097,-0.024] |
| | <0.0001 | 0.406 | 0.104 | <0.0001 | 0.597 | 0.001 | 0.001 |
| Aut. | -0.001 | -0.006 | -0.026 | -0.019 | -0.028 | 0.009 | 0.038 |
| | [-0.010,0.007] | [-0.022,0.009] | [-0.063,0.012] | [-0.030,-0.008] | [-0.042,-0.014] | [-0.002,0.020] | [0.021,0.055] |
| | 0.768 | 0.441 | 0.177 | <0.0001 | <0.0001 | 0.097 | <0.0001 |
| Wint. | 0.006 | 0.017 | 0.030 | 0.005 | -0.034 | 0.026 | 0.029 |
| | [0.001,0.010] | [0.009,0.026] | [0.009,0.050] | [-0.001,0.011] | [-0.045,-0.024] | [0.018,0.033] | [0.014,0.044] |
| | 0.015 | <0.0001 | 0.005 | 0.135 | <0.0001 | <0.0001 | <0.0001 |
| Constant | -1.812 | -3.634 | -3.084 | -2.589 | -2.510 | -3.615 | -3.670 |
| | [-1.888,-1.736] | [-3.766,-3.501] | [-3.266,-2.902] | [-2.668,-2.510] | [-2.636,-2.385] | [-3.737,-3.494] | [-3.794,-3.547] |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| BIC | -1214.4 | -812.2 | 595.5 | -1472.8 | -889.9 | -788.2 | -293.1 |

Notes: Dependent variable is the log-transformed series of sales per cover for each of the drink categories; robust standard errors.

Table 7. Four-weekly data, robustness check for timing of the impact (impact starts from 14th of Sept.)

| n=783 | Levied SSBs on menu | Fruit juice (main menu) | Fruit juice (children's menu) | Diet cola | Water | Levied SSBs off menu | Mixers |
|--------------|--------------------------------|------------------------------------|------------------------------------------|------------------|-----------------|---------------------------------|-----------------|
| Time | -0.002 | -0.005 | -0.014 | -0.006 | -0.004 | -0.002 | -0.001 |
| 95% CI | [-0.005,0.002] | [-0.008,-0.002] | [-0.023,-0.006] | [-0.008,-0.004] | [-0.009,0.001] | [-0.006,0.002] | [-0.005,0.002] |
| P-value | 0.335 | 0.001 | 0.001 | <0.0001 | 0.100 | 0.338 | 0.472 |
| Levy_14Sept | -0.068 | 0.188 | -0.158 | -0.003 | -0.018 | 0.023 | 0.062 |
| | [-0.116,-0.020] | [0.142,0.234] | [-0.234,-0.083] | [-0.031,0.025] | [-0.058,0.022] | [-0.020,0.067] | [0.016,0.109] |
| | 0.005 | <0.0001 | <0.0001 | 0.851 | 0.378 | 0.291 | 0.009 |
| Sum. | 0.062 | 0.044 | -0.060 | -0.053 | 0.010 | 0.057 | -0.055 |
| | [0.043,0.080] | [0.009,0.079] | [-0.142,0.021] | [-0.075,-0.031] | [-0.021,0.042] | [0.026,0.088] | [-0.090,-0.019] |
| | <0.0001 | 0.013 | 0.146 | <0.0001 | 0.532 | <0.0001 | 0.002 |
| Aut. | <0.0001 | -0.007 | -0.006 | -0.016 | -0.026 | 0.008 | 0.035 |
| | [-0.008,0.007] | [-0.023,0.009] | [-0.040,0.028] | [-0.027,-0.005] | [-0.040,-0.011] | [-0.003,0.019] | [0.020,0.051] |
| | 0.952 | 0.399 | 0.746 | 0.004 | 0.001 | 0.155 | <0.0001 |
| Wint. | 0.007 | 0.015 | 0.038 | 0.006 | -0.033 | 0.025 | 0.028 |
| | [0.002,0.011] | [0.007,0.024] | [0.019,0.058] | [-0.001,0.012] | [-0.044,-0.023] | [0.017,0.033] | [0.013,0.043] |
| | 0.004 | 0.001 | <0.0001 | 0.075 | <0.0001 | <0.0001 | <0.0001 |
| Constant | -1.809 | -3.649 | -3.135 | -2.598 | -2.516 | -3.613 | -3.669 |
| | [-1.884,-1.734] | [-3.786,-3.513] | [-3.310,-2.960] | [-2.677,-2.519] | [-2.642,-2.390] | [-3.736,-3.490] | [-3.791,-3.546] |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| BIC | -1218.8 | -820.5 | 584.7 | -1472.0 | -890.9 | -789.1 | -295.4 |

Notes: Dependent variable is the log-transformed series of sales per cover for each of the drink categories; robust standard errors.