

## Appendix for: The Effect of Voluntary Health Star Rating Labels on Healthier Food Purchasing in New Zealand: Longitudinal Evidence using Representative Household Purchase Data

**Supplementary Table A: Summary Statistics for HSR labelled products (Per Product Per Household Per Year) at baseline**

Units Purchased (g or ml) Volume Share (%) Energy (kJ) Sodium (mg) Sugar (g) Protein (g) Fibre (g) Saturated Fat (g) <i>N</i>	Baseline Summary statistics at by HSR rating category per product for each household in a given year (in the year before labelling for labelled products)							
	0.5-1.5		2.0-3.5		4.0-5.0		Total	
	914.2	(15.6)	1247.3	(17.2)	2547.8	(45.6)	1833.1	(23.2)
	0.35	(0.01)	0.45	(0.01)	0.90	(0.01)	0.66	(0.01)
	16702.4	(304.5)	13765.9	(214.0)	15863.0	(207.8)	15132.2	(136.4)
	2933.6	(66.9)	5286.4	(104.2)	3163.1	(51.0)	3978.2	(48.9)
	232.7	(8.3)	105.3	(1.8)	134.6	(2.4)	134.9	(1.7)
	36.5	(0.8)	76.8	(1.5)	166.6	(2.3)	115.1	(1.3)
	2.1	(0.1)	16.9	(0.4)	61.8	(1.1)	36.7	(0.5)
	164.6	(4.3)	52.2	(1.4)	34.0	(0.8)	57.1	(0.9)
	10869		35553		43124		89546	

Note: Standard errors in parentheses. 100% is the total volume share for all products/household-year

**Supplementary Table B: Stratification by Food Group**

Food Group	HSR Association ( $\delta$ )	Standard Error
Biscuits	0.0168	(0.0143)
Bread	-0.0508	(0.0245)
Cakes, muffins and pastries	-0.0312	(0.0188)
Breakfast cereals	-0.00207	(0.0230)
Cereal bars	-0.0215	(0.0273)
Couscous	0.0679	(0.156)
Noodles	0.0221	(0.0507)
Pasta	0.00292	(0.0237)
Rice	-0.00189	(0.0534)
Unprocessed cereals	-0.0308	(0.0324)
Chocolate and sweets	0.0407	(0.0293)
Jelly	-0.0879	(0.114)
Ready meals	-0.0144	(0.0544)
Other frozen foods	-0.0643	(0.0697)
Cheese	0.0823	(0.0267)
Desserts	-0.0618	(0.0312)
Ice cream and edible ices	0.0865	(0.0587)
Milk	-0.0133	(0.0287)
Yoghurt and yoghurt drinks	0.0443	(0.0857)
Cooking oils	0.0641	(0.0578)
Edible oils	0.0461	(0.0520)
Cooking oil spray	-0.0481	(0.103)
Processed fish	-0.0354	(0.0236)
Fruit	0.0205	(0.0205)
Herbs and spices	0.0641	(0.0295)
Jam and marmalades	-0.00209	(0.0211)
Nuts and seeds	0.0257	(0.0260)
Vegetables	-0.0155	(0.0106)
Meat alternatives	-0.072	(0.0549)
Processed meat	0.0263	(0.0242)
Coffee and tea	0.0517	(0.0324)
Cordials	-0.0647	(0.0467)
Fruit and vegetable juices	-0.00099	(0.0567)
Waters	0.0355	(0.0693)
Mayonnaise and salad dressings	0.0453	(0.0440)
Crisps and snacks	0.052	(0.0267)
Sugar	0.203	(0.204)

## Appendix I: Econometric Method

### Econometric Design

Equation (1) presents our multilevel fixed effects regression model for estimating the causal association of displaying HSR labelling on product purchasing. This difference-in-differences style regression performs a before-after comparison of labelled products, in the presence of a comparison group not adopting labels, to capture up how purchasing changes with displaying the HSR label. The comparison group comprises all products that were not HSR labelled at any point during 2013-2019.

$$y_{hpt} = \delta hsr_{pt} + \gamma_t + \gamma_p + \gamma_h + \beta' X_{hpt} + \epsilon_{hpt} \quad (1)$$

Here,  $y_{hpt}$  is the household level outcome variable (natural log of quantity) for product  $p$  at time  $t$ .  $hsr_{pt}$  is the exposure (1 if displaying the HSR, 0 if not).  $\delta$  is then the coefficient of interest. Equation (1) also includes ‘fixed effects’ that capture observed or unobserved confounders at three levels:  $\gamma_t$  are time fixed effects, capturing time-varying secular confounders affecting purchasing for all products, such as economic growth or inflation;  $\gamma_p$  is a set of product dummies that capture product-level time-invariant confounders such as average manufacturer characteristics or average product nutrition; and  $\gamma_h$  is a set of household fixed effects that controls for time-invariant household-level factors such as the average dietary preferences across the study period (such as for organic foods), and adjust for changes in households sampled within the unbalanced HomeScan panel.  $X_{hpt}$  is the vector of time-varying household and product level covariates discussed above, further reducing confounding and enhancing precision. Finally,  $\epsilon_{hpt}$  is the random error of the regression.

To allow for the expected heterogeneity in the effect of HSR as a function of the score displayed, we conducted a modified regression detailed in equation (2):

$$y_{hpt} = \sum_{scorecat=0}^5 \delta_s hsr_{pt} \times scorecat_{pt} + \gamma_p + \gamma_t + \gamma_h + \beta' X_{hpt} + \epsilon_{hpt} \quad (2)$$

where  $scorecat_{pt}$  is a categorical variable, ranging from 0 for unlabelled goods, and 1 (Score of 0.5-1.0) to 5 (4.5 to 5.0) for products displaying HSR scores. The coefficient of interest,  $\delta_s$  is the change in purchasing of HSR products in each score category (say, 0.5-1.0), relative to never-labelled foods.

#### *Stratification within food groups*

We estimated equation (1) for each of the Nutritrack 14 sub-major food groups categories, e.g. Biscuits, Bread, etc. We now estimate the purchasing change for labelled products relative to unlabelled products within the same food group. To identify purchasing patterns across groups, **Error! Reference source not found.** plots the estimated change in purchasing against the average 2019 HSR rating of products within each group.

## Appendix II: Robustness checks

As a secondary outcome, the household level volume share of product purchases  $v_{hpt}$  was calculated by dividing the volume purchased in household  $h$  of product  $p$  at time  $t$ , by the overall volume of products purchased by the household in time  $t$ . We also ran analyses directly on the quantity purchased, rather than the logarithm.

Our methodology uses a difference-in-differences style estimator<sup>1</sup>. The causal validity of the results, therefore, relies on parallel trends in purchasing between unlabelled and labelled products in the counterfactual absence of labelling. To test the robustness of our estimates assumption, we conducted analyses allowing HSR labelled foods to be on a differential purchasing trend to never-labelled products, weakening the parallel-trends assumption<sup>2</sup>. We also use Coarsened Exact Matching (CEM)<sup>3</sup> to match the comparison group and HSR labelled products using major food group, nutrition, and price information. These analyses are presented in Supplementary Table C. We also ran regressions directly on the quantity purchased and volume share (not the logarithm), and these are presented in Supplementary Table D and Supplementary Table E, respectively.

The analyses controlling for differential purchasing trends between HSR labelled and unlabelled products, and matching for the price, food group, and nutrition information are presented in Supplementary Table C. No effect on the primary outcome is noted across specifications (differential trends, matching, both). Analyses with a differential pre-trend have a statistically significant change in the volume share of products with HSR 0.5-1.5, with a coefficient of -0.029% [-0.049 to -0.009]. This is around 8.5% lower than the baseline volume share of these products. Results with both matching and differential pre-trends see products rated 0.5-1.5 see a decline of 0.024% [-0.041 to -0.008], or approximately 7% of their baseline volume share. Similarly, products rated 2.0-3.5 see their volume share decline by 0.016% [-0.029 to -0.003], around 3.5% of the baseline volume share for such products.

All regressions in Supplementary Table D and Supplementary Table C ran on the quantity, without the logarithm, had no significant coefficient. However, the volume share of a labelled product increases by 0.009% [95% CI: 0.002 to 0.017]. Stratifying these results by the HSR rating observed on the packaging, the volume share increases by 0.022% [95% CI: 0.008 to 0.035] only for healthy products, rated 4.0-5.0 and no change is observed for other ratings. Given the pre-labelling volume share of HSR labelled products is 0.66% and the healthiest products are 0.9%, this is an approximate relative increase of 1.5% for all products and 2.4% for the healthiest products.

Last, Supplementary Table F repeats the main analyses where products are compared with respect to goods with similar pre-labelling healthiness across the three categories. Our results are qualitatively similar to our preferred estimates, with no significant result across purchasing - quantity, log(quantity), or volume share. The unhealthiest products may lose protein as the nutrient profile calculation does not award points for protein content till a certain threshold of baseline healthiness through negative nutrients is met.

**Supplementary Table C: Estimates with matching and differential pre-trends***Allow for differential pre-trends only*

	(1) Quantity (g or ml)	(2) ln(Quantity) (%)	(3) Volume Share (%)
<b>A. Overall Effect (Ref cat: Never-labelled products)</b>			
Any HSR rating	-7.650 [-20.743,5.443]	-0.007 [-0.022,0.007]	-0.001 [-0.010,0.008]
<b>B. Effect by HSR rating Category</b>			
0.5-1.5	-25.417 [-54.230,3.395]	-0.013 [-0.034,0.008]	-0.029** [-0.049,-0.009]
2.0-3.5	-4.147 [-19.354,11.061]	-0.005 [-0.026,0.016]	-0.013 [-0.026,0.000]
4.0-5.0	-6.828 [-23.044,9.388]	-0.008 [-0.024,0.009]	0.015* [0.003,0.027]
<i>N</i>	5392800	1836369	5392800

95% confidence intervals in brackets

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ *Coarsened Exact Matching only*

	(1) Quantity (g or ml)	(2) ln(Quantity) (%)	(3) Volume Share (%)
<b>A. Overall Effect (Ref cat: Never-labelled products)</b>			
Any HSR rating	-0.837 [-10.756,9.082]	-0.001 [-0.013,0.011]	0.008 [-0.001,0.016]
<b>B. Effect by HSR rating Category</b>			
0.5-1.5	-1.326 [-13.939,11.288]	-0.002 [-0.023,0.018]	-0.009 [-0.025,0.006]
2.0-3.5	0.945 [-8.873,10.764]	-0.003 [-0.020,0.015]	-0.006 [-0.015,0.003]
4.0-5.0	-2.194 [-18.842,14.455]	-0.000 [-0.015,0.014]	0.022** [0.007,0.038]
<i>N</i>	5392800	1836369	5392800

95% confidence intervals in brackets

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

*Coarsened Exact Matching and allow for differential pre-trends*

	(1) Quantity (g or ml)	(2) ln(Quantity) (%)	(3) Volume Share (%)
<b>A. Overall Effect (Ref cat: Never-labelled products)</b>			
Any HSR rating	-7.034 [-19.886,5.818]	-0.007 [-0.022,0.008]	-0.002 [-0.011,0.007]
<b>B. Effect by HSR rating Category</b>			
0.5-1.5	-13.401 [-29.412,2.609]	-0.009 [-0.031,0.013]	-0.024** [-0.041,-0.008]
2.0-3.5	-7.022 [-22.182,8.138]	-0.008 [-0.028,0.012]	-0.016* [-0.029,-0.003]
4.0-5.0	-5.734 [-22.299,10.831]	-0.006 [-0.023,0.011]	0.014* [0.002,0.027]
<i>N</i>	5392800	1836369	5392800

95% confidence intervals in brackets

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Supplementary Table D: Estimates with Quantity as Outcome**

	(1) Quantity (g or ml)
Any HSR rating	-1.13 [-10.70,8.45]
0.5-1.5	-12.52 [-37.86,12.82]
2.0-3.5	3.96 [-5.64,13.56]
4.0-5.0	-2.78 [-18.70,13.15]
<i>N</i>	7550867

95% confidence intervals in brackets

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ **Supplementary Table E: Estimates with Volume Share as Outcome**

	(1) % Volume Share
Any HSR rating	0.009* [0.002,0.017]
0.5-1.5	-0.011 [-0.027,0.006]
2.0-3.5	-0.001 [-0.009,0.006]
4.0-5.0	0.022** [0.008,0.035]
<i>N</i>	7550867

95% confidence intervals in brackets

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Supplementary Table F: Results using products with similar pre-labelling healthiness as controls**

	(1) Quantity (g or ml)	(2) ln(Quantity)	(3) Volume Share (%)	(4) ln(Sodium/1 00)	(5) ln(Energy/1 00)	(6) ln(Sugar/10 0)	(7) ln(Protein/1 00)	(8) ln(Fibre/100 )	(9) ln(Sat Fat/100)
0.5 - 1.5	-28.63 (24.67)	0.000740 (0.00948)	-0.00535 (0.00600)	-0.124*** (0.0355)	-0.00381 (0.0108)	-0.0520 (0.0476)	-0.0934* (0.0441)	0.0426 (0.0263)	0.0132 (0.0242)
<i>N</i>	2300171	798995	2300171	783723	789092	782775	750257	97138	694175
	(1) Quantity (g or ml)	(2) ln(Quantity)	(3) Volume Share (%)	(4) ln(Sodium/1 00)	(5) ln(Energy/1 00)	(6) ln(Sugar/10 0)	(7) ln(Protein/1 00)	(8) ln(Fibre/100 )	(9) ln(Sat Fat/100)
2.0 - 3.5	15.24 (13.61)	-0.000778 (0.00900)	0.00742 (0.00465)	-0.0635*** (0.0193)	-0.0103 (0.0109)	0.00301 (0.0235)	-0.00928 (0.0171)	0.0816** (0.0270)	-0.0968*** (0.0281)
<i>N</i>	2997122	1004369	2997122	972518	993575	946561	962358	304130	907541
	(1) Quantity (g or ml)	(2) ln(Quantity)	(3) Volume Share (%)	(4) ln(Sodium/1 00)	(5) ln(Energy/1 00)	(6) ln(Sugar/10 0)	(7) ln(Protein/1 00)	(8) ln(Fibre/100 )	(9) ln(Sat Fat/100)
4.0 - 5.0	-17.37 (22.84)	-0.00402 (0.00920)	0.00969 (0.00720)	-0.0999** (0.0348)	-0.0119 (0.0118)	-0.0226 (0.0334)	-0.0198 (0.0127)	0.0328* (0.0157)	0.0311 (0.0369)
<i>N</i>	2047396	692658	2047396	677913	686508	661147	677374	401429	604612

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



## Appendix III: Differences between matched and unmatched products

### Methodology

To further analyse differences in nutrition amongst products which merged between HomeScan and Nutritrack and products which did not, we calculated the mean HSR score amongst merging products within a given product category and imputed them onto HomeScan products without a corresponding match in Nutritrack. Fresh foods and Alcohol were excluded from all analyses.

### Differences in HSR score

Supplementary Supplementary Table 1 presents differences in mean HSR score categories between products without, and with a corresponding product in Nutritrack. Supplementary Supplementary Table 2 contains the results of a t-test of mean HSR between the matched and unmatched products. It is noted that there is a statistically significant difference between the two groups due to the large number of observations. However, the magnitude of the difference is small ( $\mu_{matched} - \mu_{unmatched} = 0.043$ )

Supplementary Table 1 Mean imputed HSR categories for products which did not have a match with Nutritrack products and products which matched in Nutritrack

HSR Category	No match	Matched	Total
<b>0.5-1.0</b>	206,899	944,786	1,151,685
(%)	12.75	13.01	12.96
<b>1.5-2.0</b>	465,901	1,599,458	2,065,359
(%)	28.7	22.02	23.24
<b>2.5-3.0</b>	215,783	1,344,926	1,560,709
(%)	13.29	18.52	17.56
<b>3.5-4.0</b>	433,968	2,243,101	2,677,069
(%)	26.73	30.88	30.13
<b>4.5-5.0</b>	300,740	1,130,869	1,431,609
(%)	18.53	15.57	16.11
<b>Total</b>	1,623,291	7,263,140	8,886,431
(%)	100	100	100

Supplementary Table 2 T-test of differences in mean imputed HSR between matched and unmatched products in HomeScan

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
No match	1623291	2.654033	0.001051	1.338787	2.651973	2.656092
Matched	7263140	2.697016	0.000474	1.2771	2.696087	2.697945
Total	8886431	2.689164	0.000432	1.288696	2.688317	2.690012
Difference		-0.04298	0.001119		-0.04518	-0.04079

## Matched and unmatched products by product category

Supplementary Table 3 presents summary statistics on Nutritrack matching and non-matching products in HomeScan by their product category.

Supplementary Table 3 T-test of differences in mean imputed HSR between matched and unmatched products in HomeScan

Product Category	No match	(%)	Match	(%)	Total	(%)
All Other Packaged Sn	2	100%	0	0%	2	100%
Arrowroot	89	51%	86	49%	175	100%
Artificial Sweeteners	1256	20%	5128	80%	6384	100%
Asian Simmer Sauce	3501	9%	36020	91%	39521	100%
Baking Cups	2376	100%	0	0%	2376	100%
Baking Fruit Mix	85	3%	3114	97%	3199	100%
Baking Glace Fruit	207	4%	4631	96%	4838	100%
Baking Juice	542	11%	4245	89%	4787	100%
Baking Powder	725	15%	4113	85%	4838	100%
Baking Soda	2714	56%	2115	44%	4829	100%
Bath Additives	4	100%	0	0%	4	100%
Biscuit Assortments	2514	70%	1063	30%	3577	100%
Bran	21	18%	99	83%	120	100%
Bread Snacks	736	27%	2035	73%	2771	100%
Breadcrumbs	667	6%	10523	94%	11190	100%
Bubble Gum	195	39%	306	61%	501	100%
Buns & Rolls	7377	18%	32588	82%	39965	100%
Butter	9166	8%	100673	92%	109839	100%
Butter & Margarine Bl	81	0%	17082	100%	17163	100%
Cake Decorations	2031	29%	5001	71%	7032	100%
Cakes	10879	31%	24157	69%	35036	100%
Canned Apricots	606	9%	6442	91%	7048	100%
Canned Asparagus	362	13%	2422	87%	2784	100%
Canned Baked Beans	2117	4%	52713	96%	54830	100%
Canned Beans	281	25%	861	75%	1142	100%
Canned Beetroot	966	4%	21844	96%	22810	100%

<b>Canned Corn</b>	324	1%	21972	99%	22296	100%
<b>Canned Corned Meats</b>	509	13%	3380	87%	3889	100%
<b>Canned Fish Fillets</b>	0	0%	2638	100%	2638	100%
<b>Canned Fruit Salad</b>	2034	11%	16377	89%	18411	100%
<b>Canned Herrings</b>	88	49%	92	51%	180	100%
<b>Canned Mackerel</b>	370	19%	1554	81%	1924	100%
<b>Canned Meals</b>	194	6%	2957	94%	3151	100%
<b>Canned Meats</b>	860	7%	11864	93%	12724	100%
<b>Canned Mushrooms</b>	387	10%	3441	90%	3828	100%
<b>Canned Other Fruit</b>	2036	10%	19161	90%	21197	100%
<b>Canned Other Vegetabl</b>	353	17%	1756	83%	2109	100%
<b>Canned Peaches</b>	8061	24%	25922	76%	33983	100%
<b>Canned Pears</b>	1101	17%	5447	83%	6548	100%
<b>Canned Peas</b>	139	5%	2933	95%	3072	100%
<b>Canned Pineapple</b>	8443	26%	23819	74%	32262	100%
<b>Canned Salad Beans</b>	4260	15%	24398	85%	28658	100%
<b>Canned Salmon</b>	2101	9%	21372	91%	23473	100%
<b>Canned Sardines</b>	977	10%	9247	90%	10224	100%
<b>Canned Seafood</b>	60	8%	720	92%	780	100%
<b>Canned Soup</b>	3639	9%	37138	91%	40777	100%
<b>Canned Spaghetti</b>	5666	16%	30719	84%	36385	100%
<b>Canned Tomatoes</b>	6584	9%	63209	91%	69793	100%
<b>Canned Tuna</b>	7263	10%	66170	90%	73433	100%
<b>Carbonated Flavoured</b>	2413	37%	4112	63%	6525	100%
<b>Carbonated Fruit Juic</b>	1128	20%	4522	80%	5650	100%
<b>Carbonated Mixers</b>	6861	23%	22620	77%	29481	100%
<b>Carbonated Pure Miner</b>	1678	37%	2891	63%	4569	100%
<b>Carbonated Soft Drink</b>	40476	17%	194592	83%	235068	100%
<b>Cereal Soup</b>	1114	16%	5682	84%	6796	100%
<b>Chewing Gum</b>	3343	14%	19809	86%	23152	100%
<b>Childrens Biscuits</b>	4482	9%	45974	91%	50456	100%
<b>Chilled Dairy Dessert</b>	253	23%	855	77%	1108	100%
<b>Chilled Pastry Dessert</b>	315	24%	999	76%	1314	100%
<b>Chocolate Assortments</b>	2738	19%	11740	81%	14478	100%
<b>Chocolate Self Lines</b>	6053	27%	16595	73%	22648	100%
<b>Chow Chow</b>	290	12%	2207	88%	2497	100%
<b>Christmas Cakes</b>	1288	95%	69	5%	1357	100%
<b>Christmas Confectione</b>	8026	96%	293	4%	8319	100%
<b>Christmas Fruit Mince</b>	369	44%	465	56%	834	100%
<b>Christmas Fruit Mince</b>	6298	79%	1714	21%	8012	100%
<b>Christmas Puddings</b>	1562	100%	2	0%	1564	100%
<b>Chutneys</b>	763	13%	5094	87%	5857	100%
<b>Citric Acid</b>	439	100%	0	0%	439	100%

<b>Coating &amp; Stuffing Mi</b>	294	7%	3925	93%	4219	100%
<b>Cocoa</b>	317	4%	7124	96%	7441	100%
<b>Coconut</b>	641	8%	7289	92%	7930	100%
<b>Coconut Milk &amp; Cream</b>	4242	19%	18031	81%	22273	100%
<b>Coffee Additives</b>	149	18%	660	82%	809	100%
<b>Coffee Essences</b>	334	54%	288	46%	622	100%
<b>Coffee Filters</b>	429	100%	0	0%	429	100%
<b>Coffee Substitutes</b>	173	26%	484	74%	657	100%
<b>Continental Meats</b>	4427	9%	44693	91%	49120	100%
<b>Convenience Cereals</b>	23465	99%	345	1%	23810	100%
<b>Convenience Food</b>	667	51%	648	49%	1315	100%
<b>Cookie Batters</b>	110	40%	168	60%	278	100%
<b>Cooking Chocolate</b>	2787	13%	18712	87%	21499	100%
<b>Cordials</b>	1964	9%	20671	91%	22635	100%
<b>Corn Chips</b>	5336	11%	44841	89%	50177	100%
<b>Cornflour</b>	276	4%	7225	96%	7501	100%
<b>Cottage Cheese</b>	634	5%	12934	95%	13568	100%
<b>Cracker Biscuits</b>	9984	6%	164924	94%	174908	100%
<b>Cream &amp; Jam Biscuits</b>	9013	20%	36543	80%	45556	100%
<b>Cream Cheese</b>	928	3%	26165	97%	27093	100%
<b>Cream Of Tartar</b>	454	100%	0	0%	454	100%
<b>Crumpets Muffins &amp; Pi</b>	2427	4%	54855	96%	57282	100%
<b>Curry Powder</b>	2639	70%	1128	30%	3767	100%
<b>Custard Powder</b>	24	1%	2508	99%	2532	100%
<b>Dairy Desserts</b>	123	13%	820	87%	943	100%
<b>Dairy Food</b>	1126	6%	16230	94%	17356	100%
<b>Dessert &amp; Ice Cream T</b>	938	9%	9211	91%	10149	100%
<b>Dip Mixes</b>	30	53%	27	47%	57	100%
<b>Dried Cake &amp; Biscuit</b>	1113	10%	10584	90%	11697	100%
<b>Dried Dessert Mixes</b>	162	18%	736	82%	898	100%
<b>Dried Fruit</b>	7466	11%	62576	89%	70042	100%
<b>Dried Vegetables</b>	567	16%	2935	84%	3502	100%
<b>Drink Mixers</b>	2	100%	0	0%	2	100%
<b>Drink Whiteners</b>	99	27%	264	73%	363	100%
<b>Drinking Chocolate</b>	2913	18%	13679	82%	16592	100%
<b>Dry Dog Food</b>	149	100%	0	0%	149	100%
<b>Dry Herbs &amp; Spices</b>	48972	91%	5095	9%	54067	100%
<b>Dry Pasta</b>	12775	17%	61767	83%	74542	100%
<b>Dry Salad Dressing Mi</b>	243	34%	473	66%	716	100%
<b>Easter Confectionery</b>	24863	94%	1520	6%	26383	100%
<b>Eggs</b>	59326	33%	119017	67%	178343	100%
<b>Enrobed Bars</b>	12200	17%	60725	83%	72925	100%
<b>Enrobed Biscuits</b>	12932	10%	121425	90%	134357	100%

<b>Essences &amp; Colourings</b>	10168	100%	17	0%	10185	100%
<b>Extruded Snacks</b>	4252	9%	41446	91%	45698	100%
<b>Flavoured Butter &amp; Ma</b>	28	3%	992	97%	1020	100%
<b>Flavoured Coffee</b>	3052	6%	49095	94%	52147	100%
<b>Flavourings &amp; Bouillo</b>	5107	10%	47967	90%	53074	100%
<b>Fresh Cream</b>	19552	27%	53423	73%	72975	100%
<b>Fresh Flavoured Milk</b>	2206	9%	22735	91%	24941	100%
<b>Fresh Meals</b>	7	29%	17	71%	24	100%
<b>Fresh Meat Pies</b>	11940	31%	26981	69%	38921	100%
<b>Fresh Meats</b>	126	14%	759	86%	885	100%
<b>Fresh Milk</b>	203318	41%	293053	59%	496371	100%
<b>Fresh Non Pasta Cooki</b>	108	77%	32	23%	140	100%
<b>Fresh Pasta</b>	1272	8%	15228	92%	16500	100%
<b>Fresh Pasta Cooking S</b>	1139	14%	7212	86%	8351	100%
<b>Fresh Pizza</b>	3406	22%	11954	78%	15360	100%
<b>Fresh Pizza Bases</b>	849	7%	10965	93%	11814	100%
<b>Fresh Soup</b>	1756	13%	12141	87%	13897	100%
<b>Fresh Vegetables</b>	10	100%	0	0%	10	100%
<b>Fresh Whole Chickens</b>	121	21%	458	79%	579	100%
<b>Frozen Dairy Desserts</b>	1776	22%	6200	78%	7976	100%
<b>Frozen Fish Fillets</b>	6085	20%	23629	80%	29714	100%
<b>Frozen Fish Fingers</b>	868	16%	4711	84%	5579	100%
<b>Frozen Fruit</b>	5078	23%	17172	77%	22250	100%
<b>Frozen Fruit Juices</b>	16	5%	334	95%	350	100%
<b>Frozen Meals</b>	6776	12%	49087	88%	55863	100%
<b>Frozen Meat</b>	2890	21%	10977	79%	13867	100%
<b>Frozen Meat Pies</b>	3612	31%	7985	69%	11597	100%
<b>Frozen Other Fish</b>	5377	32%	11333	68%	16710	100%
<b>Frozen Pastry Dessert</b>	2087	20%	8405	80%	10492	100%
<b>Frozen Pizza</b>	3264	19%	14326	81%	17590	100%
<b>Frozen Pizza Bases</b>	16	13%	107	87%	123	100%
<b>Frozen Potato Product</b>	14225	13%	92530	87%	106755	100%
<b>Frozen Poultry</b>	10503	20%	42391	80%	52894	100%
<b>Frozen Sausage Rolls</b>	1207	9%	12450	91%	13657	100%
<b>Frozen Vegetables</b>	16218	12%	122838	88%	139056	100%
<b>Frozen/Chilled Cakes</b>	190	19%	816	81%	1006	100%
<b>Fruit Drinks</b>	3587	9%	34866	91%	38453	100%
<b>Fruit Juice Chilled</b>	2344	9%	23134	91%	25478	100%
<b>Fruit Juice Shelf Sta</b>	4821	6%	74262	94%	79083	100%
<b>Fruit Sauce</b>	511	8%	6083	92%	6594	100%
<b>Gelatine</b>	953	88%	131	12%	1084	100%
<b>Gift Cards</b>	12	100%	0	0%	12	100%
<b>Golden Syrup</b>	27	1%	4990	99%	5017	100%

<b>Grains And Seeds</b>	378	13%	2430	87%	2808	100%
<b>Gravy Mixes</b>	1288	3%	47120	97%	48408	100%
<b>Green Tea</b>	10054	84%	1860	16%	11914	100%
<b>Herbal Tea</b>	16796	73%	6308	27%	23104	100%
<b>Home Yoghurt Making P</b>	1318	5%	24392	95%	25710	100%
<b>Honey</b>	3556	15%	20414	85%	23970	100%
<b>Hot Cereals</b>	4218	9%	42828	91%	47046	100%
<b>Ice</b>	903	100%	0	0%	903	100%
<b>Ice Cream - Family Pa</b>	10334	16%	56069	84%	66403	100%
<b>Ice Cream - Novelty/S</b>	2720	53%	2455	47%	5175	100%
<b>Ice Cream - Take Home</b>	14698	17%	73211	83%	87909	100%
<b>Ice Cream Cones &amp; Waf</b>	1468	16%	7554	84%	9022	100%
<b>Icings &amp; Marzipan</b>	601	20%	2395	80%	2996	100%
<b>Indian Bread</b>	1349	39%	2086	61%	3435	100%
<b>Instant Coffee</b>	79870	95%	3868	5%	83738	100%
<b>Instant Desserts</b>	636	12%	4557	88%	5193	100%
<b>Instant Soup</b>	4428	11%	37416	89%	41844	100%
<b>Jam</b>	3918	10%	36373	90%	40291	100%
<b>Jelly</b>	1206	6%	18109	94%	19315	100%
<b>Jelly Desserts</b>	21	100%	0	0%	21	100%
<b>Liquid Cooking Oils</b>	5180	8%	55789	92%	60969	100%
<b>Lunchbox Snacks</b>	5785	14%	35829	86%	41614	100%
<b>Margarine</b>	6586	6%	110509	94%	117095	100%
<b>Marinades</b>	663	19%	2813	81%	3476	100%
<b>Marmalade</b>	631	6%	10328	94%	10959	100%
<b>Mayonnaise</b>	3441	10%	32143	90%	35584	100%
<b>Meal Solutions</b>	17025	12%	128170	88%	145195	100%
<b>Meat &amp; Fish Pastes</b>	155	10%	1334	90%	1489	100%
<b>Meat Extracts &amp; Stock</b>	2342	7%	30119	93%	32461	100%
<b>Meat Snacks</b>	1240	29%	3101	71%	4341	100%
<b>Mexican Carriers</b>	434	3%	14816	97%	15250	100%
<b>Mexican Meal Ingredie</b>	564	6%	8465	94%	9029	100%
<b>Mexican Meal Kits</b>	447	6%	6910	94%	7357	100%
<b>Milk Powder</b>	697	10%	6448	90%	7145	100%
<b>Milk Shake Flavouring</b>	646	15%	3732	85%	4378	100%
<b>Mint Sauce</b>	401	9%	4016	91%	4417	100%
<b>Mixes &amp; Batters</b>	794	13%	5507	87%	6301	100%
<b>Molasses</b>	38	10%	344	90%	382	100%
<b>Moulded Chocolate</b>	29635	18%	137436	82%	167071	100%
<b>Muesli Bars Cereal Ba</b>	16383	11%	131328	89%	147711	100%
<b>Mustard</b>	1638	13%	10764	87%	12402	100%
<b>Natural Cheese</b>	14455	9%	146429	91%	160884	100%
<b>New Items</b>	17	100%	0	0%	17	100%

<b>Non Carbonated Minera</b>	11714	37%	20194	63%	31908	100%
<b>Non Rtd New Age Bever</b>	63	23%	210	77%	273	100%
<b>Non White Bread</b>	51279	17%	254001	83%	305280	100%
<b>Other Cereal Snacks</b>	9310	16%	50655	84%	59965	100%
<b>Other Health Bars</b>	1480	13%	10195	87%	11675	100%
<b>Other Non Dairy Milk</b>	1056	6%	16273	94%	17329	100%
<b>Other Salad Dressings</b>	899	9%	9241	91%	10140	100%
<b>Other Simmer Sauce</b>	1035	6%	15226	94%	16261	100%
<b>Other Whole Pickles</b>	1589	10%	14249	90%	15838	100%
<b>Other Wrapped Health</b>	145	11%	1137	89%	1282	100%
<b>Packaged Nuts</b>	10014	14%	61409	86%	71423	100%
<b>Packet Soup</b>	635	3%	23312	97%	23947	100%
<b>Pasta Simmer Sauce</b>	3578	7%	45599	93%	49177	100%
<b>Pastry</b>	3120	14%	19110	86%	22230	100%
<b>Pate</b>	910	8%	10359	92%	11269	100%
<b>Peanut Butter</b>	4913	11%	37935	89%	42848	100%
<b>Pepper</b>	8193	88%	1124	12%	9317	100%
<b>Piccalilli</b>	595	26%	1660	74%	2255	100%
<b>Pickled Gherkins</b>	872	11%	7062	89%	7934	100%
<b>Pickled Onions</b>	312	10%	2674	90%	2986	100%
<b>Pickles</b>	413	15%	2288	85%	2701	100%
<b>Plain Sweet Biscuits</b>	15558	11%	120200	89%	135758	100%
<b>Potato Chips</b>	20410	9%	205754	91%	226164	100%
<b>Pourable Dressings</b>	1686	9%	16940	91%	18626	100%
<b>Prepacked Bacon</b>	15653	18%	70010	82%	85663	100%
<b>Prepacked Ham</b>	2865	7%	36223	93%	39088	100%
<b>Prepacked Luncheon</b>	652	9%	6564	91%	7216	100%
<b>Prepacked Other Cold</b>	2177	9%	21763	91%	23940	100%
<b>Prepacked Sausages/Sa</b>	7456	16%	39032	84%	46488	100%
<b>Prepared Dips</b>	3919	7%	54354	93%	58273	100%
<b>Presweetened Powdered</b>	7293	21%	27589	79%	34882	100%
<b>Processed Cheese</b>	2387	5%	41054	95%	43441	100%
<b>Processed Cream Produ</b>	1476	9%	15129	91%	16605	100%
<b>Processed Liquid Milk</b>	3261	10%	30805	90%	34066	100%
<b>Quiche</b>	771	14%	4549	86%	5320	100%
<b>Ready Made Custard</b>	496	5%	10097	95%	10593	100%
<b>Ready To Eat Cereals</b>	15692	7%	215719	93%	231411	100%
<b>Ready To Eat Shelf De</b>	225	43%	304	57%	529	100%
<b>Ready To Serve Shelf</b>	1271	8%	14057	92%	15328	100%
<b>Relishes</b>	1135	15%	6270	85%	7405	100%
<b>Rice</b>	4737	7%	63470	93%	68207	100%
<b>Rice Crackers</b>	6735	9%	70382	91%	77117	100%
<b>Rice Wafers/Cakes</b>	5680	29%	13660	71%	19340	100%



<b>Roasted &amp; Ground Coff</b>	37460	88%	5296	12%	42756	100%
<b>Rtd Coffee</b>	151	72%	59	28%	210	100%
<b>Rtd Energy Beverages</b>	5256	15%	29989	85%	35245	100%
<b>Rtd Meal Replacement</b>	456	12%	3297	88%	3753	100%
<b>Rtd Other Beverages</b>	1696	18%	7694	82%	9390	100%
<b>Rtd Tea</b>	1272	18%	5781	82%	7053	100%
<b>Salt</b>	7613	53%	6709	47%	14322	100%
<b>Sauce Mixes</b>	536	6%	9013	94%	9549	100%
<b>Sausage Rolls &amp; Savou</b>	486	43%	653	57%	1139	100%
<b>Savoury Spreads</b>	134	19%	565	81%	699	100%
<b>Self Raising Flour</b>	420	5%	7887	95%	8307	100%
<b>Shelf Stable Dips</b>	271	7%	3753	93%	4024	100%
<b>Soda Syrups</b>	931	35%	1750	65%	2681	100%
<b>Solid Oils &amp; Fats</b>	1889	58%	1366	42%	3255	100%
<b>Soup Mix &amp; Pulses</b>	698	16%	3736	84%	4434	100%
<b>Sour Cream</b>	2094	5%	39898	95%	41992	100%
<b>Soy Sauce</b>	1524	16%	8018	84%	9542	100%
<b>Soya Milk</b>	1004	5%	17323	95%	18327	100%
<b>Speciality Flour</b>	717	26%	2013	74%	2730	100%
<b>Specialty Bread</b>	8365	15%	47039	85%	55404	100%
<b>Specialty Cheese</b>	5730	6%	97863	94%	103593	100%
<b>Specialty Sauce</b>	3466	16%	18274	84%	21740	100%
<b>Sports Drinks</b>	1372	8%	14792	92%	16164	100%
<b>Stabilized Novelties</b>	491	21%	1902	79%	2393	100%
<b>Standard Flour</b>	1290	3%	39325	97%	40615	100%
<b>Sugar</b>	6520	7%	92233	93%	98753	100%
<b>Sugar Conf Bulk Bags</b>	743	80%	188	20%	931	100%
<b>Sugar Conf Card/Tub P</b>	5149	31%	11314	69%	16463	100%
<b>Sugar Conf Family Bag</b>	17932	17%	89349	83%	107281	100%
<b>Sugar Conf Fun Packs</b>	21	6%	357	94%	378	100%
<b>Sugar Conf Handy Bags</b>	2043	34%	3949	66%	5992	100%
<b>Sugar Conf Jumbo Bags</b>	2014	21%	7651	79%	9665	100%
<b>Sugar Conf Mini Bags</b>	1110	54%	938	46%	2048	100%
<b>Sugar Conf Stick/Roll</b>	10616	33%	21421	67%	32037	100%
<b>Sweet Spreads</b>	1489	11%	11921	89%	13410	100%
<b>Tapioca Sago &amp; Semoli</b>	146	26%	417	74%	563	100%
<b>Tartaric Acid</b>	106	100%	0	0%	106	100%
<b>Tea</b>	60298	94%	3702	6%	64000	100%
<b>Tomato Paste</b>	1773	10%	16695	90%	18468	100%
<b>Tomato Puree</b>	935	11%	7303	89%	8238	100%
<b>Tomato Sauce</b>	4918	9%	51716	91%	56634	100%
<b>Tonic Food Drinks</b>	16788	83%	3338	17%	20126	100%
<b>Treacle</b>	0	0%	181	100%	181	100%

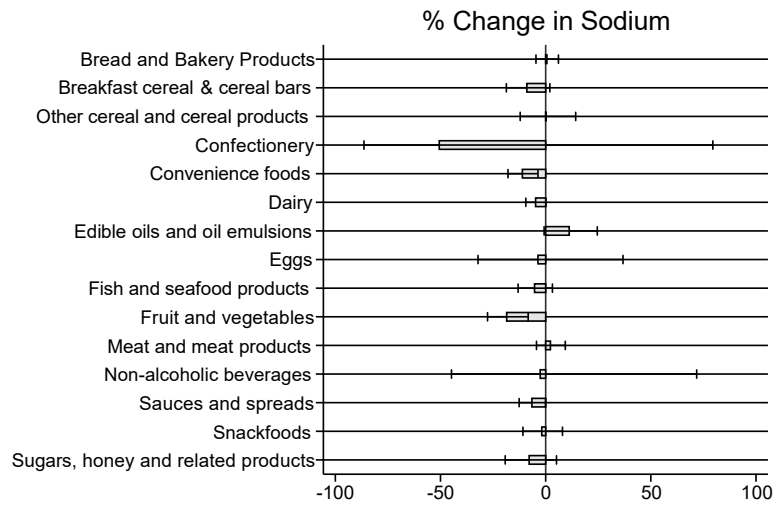


<b>Tucker Box</b>	22	100%	0	0%	22	100%
<b>Uht Flavoured Milk</b>	2045	13%	13396	87%	15441	100%
<b>Unprocessed &amp; Baking</b>	3185	9%	30722	91%	33907	100%
<b>Unprocessed Snack Foo</b>	4129	22%	14437	78%	18566	100%
<b>Vacuum Packed Fish</b>	1304	10%	11648	90%	12952	100%
<b>Vacuum Packed Other S</b>	3	100%	0	0%	3	100%
<b>Vacuum Packed Shellfi</b>	106	28%	278	72%	384	100%
<b>Vegetable &amp; Yeast Ext</b>	834	4%	19730	96%	20564	100%
<b>Vegetable Juice</b>	800	11%	6419	89%	7219	100%
<b>Vegetarian Foods</b>	1708	19%	7430	81%	9138	100%
<b>Vinegar</b>	17309	89%	2040	11%	19349	100%
<b>Wet Herbs &amp; Spices</b>	1712	11%	13527	89%	15239	100%
<b>White Bread</b>	34050	26%	98405	74%	132455	100%
<b>Worcestershire Sauce</b>	514	10%	4618	90%	5132	100%
<b>Yeast</b>	5043	100%	0	0%	5043	100%
<b>Yoghurt</b>	31155	14%	187223	86%	218378	100%
<b>Total</b>	1637877	18%	7268452	82%	8906329	100%

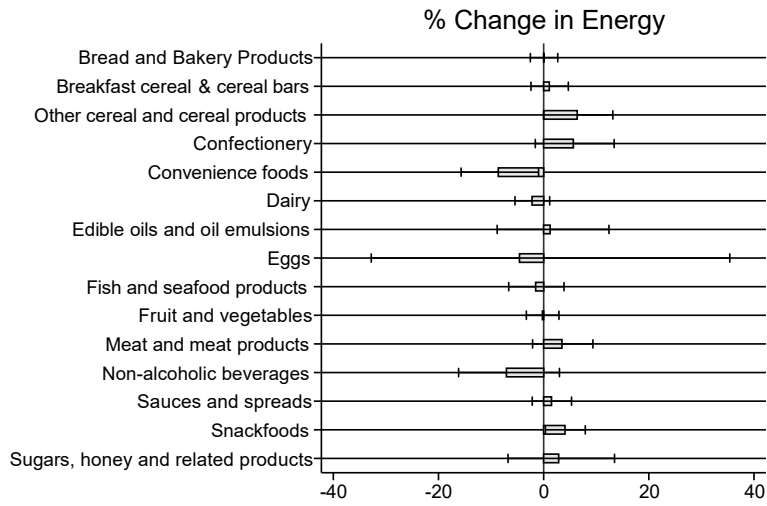
## Appendix IV: Change in nutrient purchasing across food groups

### Results

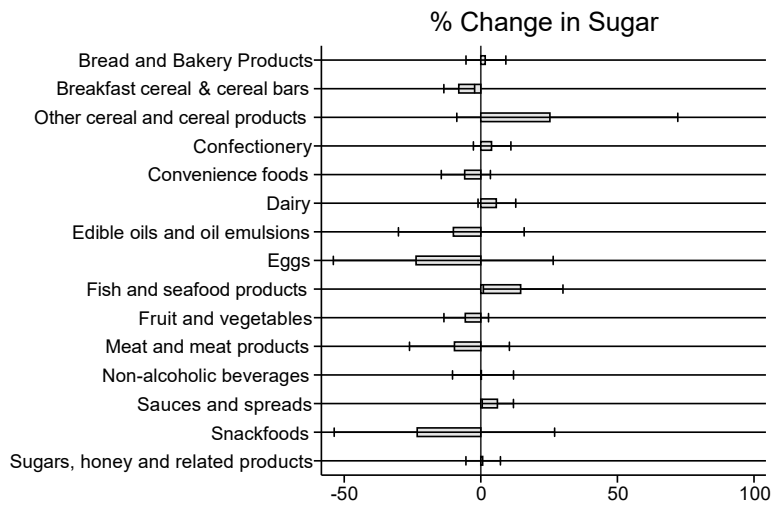
Supplementary Figures 1-6 present change in Sodium, Energy, Sugar, Saturated Fat, Fibre, and Protein across 15 food groups. Care should be taken in the interpretation of results in outlier food groups.



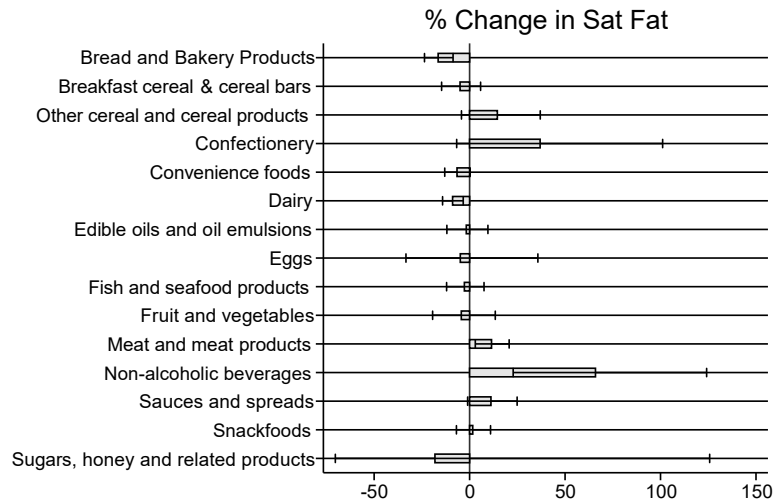
Supplementary Figure 1 Percent change in Sodium purchasing by food group



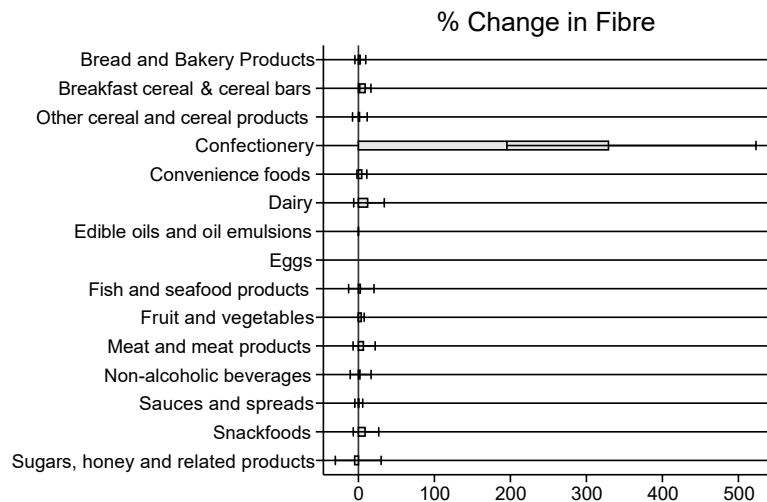
Supplementary Figure 2 Percent change in Energy purchasing by food group



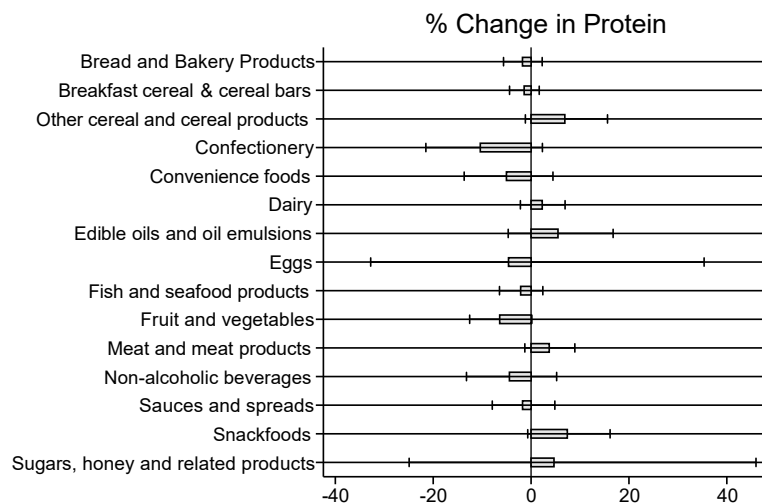
Supplementary Figure 3 Percent change in Sugar purchasing by food group



Supplementary Figure 4 Percent change in Saturated Fat purchasing by food group



Supplementary Figure 5 Percent change in Fibre purchasing by food group



Supplementary Figure 6 Percent change in Protein purchasing by food group

## References

- 1 Wing C, Simon K, Bello-Gomez RA. Designing Difference in Difference Studies: Best Practices for Public Health Policy Research. *Annu Rev Public Health* 2018; **39**: 453–69.
- 2 Friedman J. The often (unspoken) assumptions behind the difference-in-difference estimator in practice. *Impact Eval*. 2013. <https://blogs.worldbank.org/impactevaluations/often-unspoken-assumptions-behind-difference-difference-estimator-practice> (accessed Sept 26, 2017).
- 3 Blackwell M, Iacus S, King G, Porro G. Cem: Coarsened Exact Matching in Stata. *Stata J Promot Commun Stat Stata* 2009; **9**: 524–46.