Appendix

Calculation of the difference of coefficients

When outcome variable is log transformed, the regression coefficient was interpreted as the expected change in log of outcome respect to a one-unit change in predictor. Alternatively, a more natural way to do is to interpret the exponentiated regression coefficients, exp(β), since exponentiation is the inverse of logarithm function. In terms of percent change, we used (exp(β)-1)*100%, e.g., when the coefficient is 0.029, it corresponded to an increase of (exp(0.029)-1)*100%= 2.97%. The difference of coefficients was calculated by exp(0.029) – exp(-0.073) = 0.0997, corresponding to an decrease of 9.97%. The 95% confidence interval of the difference was obtained using Bootstrap simulations (see Efron B, Tibshirani RJ. An Introduction to the Bootstrap. 1993.).

[Appendix Figure 1]

Sensitivity Analysis I

The SARIMAX model used in this study is based on an auto regressive integrated moving average (ARIMA) model (see Box GE, Jenkins GM. Time series analysis: Forecasting and control. San Francisco: Holden-Day, Inc.; 1976.). ARIMA consists of three components—autoregression, integration, and moving average. An autoregression component indicates that a variable is correlated with its past values; an order of time lagged in this component is denoted *p*. An integration component indicates a degree of differencing, which is denoted *d*. A moving-average component indicates that a variable is correlated with past error terms; an order of moving average in this component is denoted *q*. These parameters of ARIMA denotes (*p, d, q*). ARIMA is used for non-seasonal data. For seasonal time-series, corresponding seasonal terms (P, D, Q) are added to ARIMA denotes (p, d, q) (P, D, Q)m, where m refers to a number of observations per one cycle of the time-series—typically, a year (see Hyndman RJ, Athanasopoulos G. Forecasting: principles and practice: OTexts; 2018.). To incorporate an explanatory (exogenous) variable into the model, an extension of a seasonal ARIMA—namely SARIMAX—was used.

SARIMAX requires a stationary time-series. Monthly per capita consumption data was first explored by decomposing into trend, seasonal variation, and remainder component. Increasing trend and seasonal variation of the data suggested non-stationary of the data. The stationary time-series was attained by differencing the monthly per capita consumption (first-order differencing), which was confirmed by the Augmented Dickey-Fuller and Kwiatkowski–Phillips–Schmidt–Shin tests. The differenced time-series was analyzed with the SARIMAX model as a dependent variable.

Table 1 Estimates from SARIMAX model.

Variable	Coefficient	95% CI
Moving average at lag 1	-0.8543*	-0.9758, -0.7329
Moving average at lag 2	-0.1030	-0.2268, 0.0208
Seasonal moving average at lag 1	0.4720*	0.3509, 0.5931
Seasonal moving average at lag 2	0.2932*	0.1628, 0.4236
Campaign effect	-0.0346*	-0.0677, -0.0015

Note: 95% CI = 95% confidence interval; * p-value < 0.05.

Sensitivity Analysis II

GAM model statistics and Wald Chi-square test for the effects of the campaign on alcohol consumption per capita using all data points from Jannary 1995 to September 2017

	Estimate	Standard Error	95% CI	Pr(>|t|)
(Intercept)	-0.832	0.014	(-0.859, -0.805)	<0.001
After Campaign	-0.064	0.052	(-0.166, 0.038)	0.219
Before Campaign	0.026	0.055	(-0.082, 0.134)	0.636

Smooth Terms	Effective degrees of freedom	F statistic	p-value
s(month over a year)	7.549	20.810	<0.001
s(time)	8.618	105.280	<0.001

*R-square of the model is 0.825

* The difference of coefficients for before and after campaign is significant. $\chi 2=7.306$ p-value =0.006

Sensitivity Analysis III

GAM model statistics for the effects of the campaign on alcohol consumption per capita, including time trend and its interaction with campaign variable

	Estimate	Standard Error	95% CI	Pr(>|t|)
(Intercept)	-0.408	0.054	(-0.514, -0.302)	<0.001
Time	-0.003	0	(-0.003, 0.003)	<0.001
After Campaign	0.02	0.082	(-0.141, 0.181)	0.811
Before Campaign	0.001	0.069	(-0.134, 0.136)	0.993
After Campaign * Time	0	0	(0, 0)	0.163
Before Campaign * Time	0.001	0.001	(-0.001, 0.003)	0.533

*R-square of the model is 0.85

Sensitivity Analysis IV

GAM model statistics for the effects of the campaign on alcohol consumption per capita, including 2008 and 2013 policy.

	Estimate	Standard Error	95% CI	Pr(>|t|)
(Intercept)	-0.384	0.054	(-0.490, -0.278)	<0.001
time	-0.003	0	(-0.003, -0.003)	<0.001
After Campaign	-0.069	0.049	(-0.165, 0.027)	0.16
Before Campaign	0.032	0.052	(-0.070, 0.134)	0.536
the 2008 Policy	0.002	0.035	(-0.067, 0.071)	0.956
the 2013 Policy	-0.043	0.034	(-0.110, 0.024)	0.211

*R-square of the model is 0.85