



Cash Transfers and Temptation Goods: An Analysis on the Impact of Cash Transfers on Poor Households' Consumption of Sugar-Sweetened Beverages in the Philippines

Sugar intake has been increasing globally and locally for individuals. Meanwhile, Philippine institutions continue to provide cash transfers (CTs) to poor households. This paper used propensity score matching and average treatment effects on the treated (ATET) evaluation method to compare the sugar-sweetened beverage (SSB) consumption of poor households with CTs to their consumption if they had not received CTs and determine the characteristics of households who were likely to receive CTs.

Policy Recommendations

Cash transfer programs are often conducted to alleviate the effects of poverty, but recipient households may spend it on unhealthy goods. The study found statistically insignificant changes in the households' consumption of SSBs except for soft drinks and observed that the income elasticity of demand is positive. Although the Philippine government has started implementing an ingredient-based tax on SSBs, studies emphasized that taxes should be accompanied by other interventions. Thus, we recommend the following actions based on our results:

Written by:

Janelle S. Tiu
Vince Eisen C. Yao
School of Economics, De La Salle University

1. **Require SSBs to include graphic warning labels in their packaging** – Graphic warning labels were the most effective in discouraging SSB consumption. We found that consumption of SSBs was bolstered by information asymmetry, but SSB consumption was easily foregone when households realized SSBs were unhealthy.
2. **Regulate advertising and marketing of SSBs** – Mothers usually decide on what the household consumes, but most mothers were found to think that they had no control over their child's beverage choices (Morel et al., 2019). Some SSBs are marketed by highlighting a nutritious ingredient, which increases the likelihood of SSB consumption, especially in youth (Kaur et al., 2017; Kraak et al., 2006). Even when mothers are knowledgeable, effective marketing of SSBs to the child would still yield consumption. Hence,

intervention should capture different forms of media, including but not limited to social media, as young people are more vulnerable to the marketing of SSBs in this platform (Brownbill et al., 2018).

3. **Restrict sugar content of SSBs** – Restrictions on the amount of sugar added in SSBs would force the SSB industry to reformulate their products (Pomeranz, 2012; Dransfield, 1995). A study found that sugar added to chocolate drinks can be significantly decreased without changing consumer taste perception nor hedonic perception (Oliveira et al., 2016). Thus, gradual reformulation would reduce sugar intake even if SSB consumption stays constant.

Introduction

Sugar intake has been increasing globally despite high-sugar diets being associated with morbid diseases (World Cancer Research Fund International, 2015). Among Southeast Asian countries, the Philippines suffers the greatest reduction in productive years due to obesity (Helble & Francisco, 2017). Often, cash transfer (CT) programs are conducted to alleviate the effects of poverty; however, due to freedom of choice, it is unclear how transfers affect beneficiaries' consumption of unhealthy commodities. Most studies focused on alcohol and tobacco consumption and neglected the impact of cash transfers on the consumption of sugar-sweetened beverages (SSBs).

Model Specification and Results

The study used the propensity score matching technique together with the average treatment effect on the treated (ATET) evaluation framework. The probit model was employed to estimate the probability of households receiving the treatment (cash transfers) conditional on the independent variables (the household characteristics and income). The predicted probabilities served as the propensity scores of the households. The treated households were matched with untreated households with similar propensity scores. The study applied four matching methods—nearest neighbor matching with one neighbor restricted by a caliper width of 0.2, nearest neighbor matching with five neighbors with caliper width of 0.2, kernel matching, and propensity score weighting by the odds. Then, the study used the ATET framework, as suggested by Cameron and Trivedi (2005) and Ratkovic (2014), to determine the effect (whether gain or loss) of cash transfers on the SSB consumption of the treated households. ATET is the comparison of the outcome of the treated households and the potential outcome if they had not received treatment which would be based on the outcome of the untreated households that were close matches of the treated households (Katchova, 2013).

Socio-economic variables that affect the likelihood of receiving cash transfers (Probit model results)

- The household head's age, educational attainment, and class of the worker significantly affect the likelihood of a poor household receiving cash transfers. A household with an older household head who is a high school undergraduate is more likely to receive CTs. Household heads who work for a private establishment, are self-employed without any employee, are employers in their own family-operated farm or business, or work without pay in their own family-operated farm or business decreases the likelihood of their households to be beneficiaries of a CT program.
- Households in Bicol, Eastern Visayas, Zamboanga Peninsula, Northern Mindanao, Davao, Caraga, CALABARZON, or MIMAROPA regions are more likely to receive CTs than those in NCR, but those who live in ARMM region are less likely to be treated than those in NCR. The number of children below 18 years of a household significantly increases the likelihood of receiving CTs. A household made up of an extended family is also more likely to receive CTs. The number of televisions and the number of refrigerators, on the other hand, decreases the likelihood.
- Households that lived under roofs made of light materials or mixed but predominantly strong materials were less likely to receive CTs than those living under roofs made of strong materials. Households that had their own tubed or piped deep well or relied on tubed or piped shallow wells as their main source of water were also more likely to receive CTs, but having a toilet facility that is unclassified increases the likelihood of a household to receive CTs.

The most appropriate matching method in the case of the Philippines

- The most appropriate method is propensity score weighting by the odds, and this entails assigning of weights for each treated and untreated observations based on their calculated propensity scores. It adjusts for selection biases as the weights adjust for the influence of the treatment (Olmos & Govindasamy, 2015). The matched sample from the said method had the lowest values for the standardized differences of the covariates and had the covariate variance ratios closest to one among the four methods based on the numerical diagnostics conducted.

Table 1

Summary of the Average Treatment Effects on the Treated (ATET) on Consumption of All Sugar-sweetened Beverages Using the Different Matching Methods

Category	Nearest neighbor with radius matching (one neighbor)	Nearest neighbor with radius matching (five neighbors)	Kernel matching	Propensity score weighting by the odds
Soft drink	** -55.1311	** -45.6340	** -50.3819	** -50.4278
Fruit and vegetable juice powder	0.7678	-5.1304	-3.6427	2.9039
Concentrates and ready-to-drink juice	6.2757	7.6625	8.4114	8.8599
Other non-alcoholic beverage (energy drink)	-0.5896	2.9146	1.9781	3.1999
Instant coffee	-49.6980	-59.1412	-39.8414	-25.5499
Powdered cocoa	-3.7257	3.9730	17.4168	-1.3866
Sugar-sweetened beverage	-102.1009	-95.3556	-66.0597	-62.4007

*p<0.10, **p<0.05, ***p<0.01

- Its overidentification test check for covariate balance confirmed that the covariates were balanced. This is consistent with Stuart’s (2010) study that had advised propensity score weighting by the odds as the most appropriate choice in estimating average treatment effects on the treated when there are more treated observations than untreated.

Average Treatment Effect on the Treated

- The effect of cash transfers was only significant on the consumption of soft drinks with a 45 to 55 peso decrease in consumption, whereas the effect on the rest of the sugar-sweetened beverage classifications, including the totality of the sugar-sweetened beverage consumption, were not statistically different from zero in the matching methods shown in Table 1. The similar coefficients and the consistent significance (insignificance) of these results show the robustness of the results through different matching methods.
- CTs negatively affect the consumption of soft drinks, but the results were insignificant for all other beverages.
- Cash transfers have no statistical effect on the overall consumption of sweetened beverages for poor households in the Philippines. Treated household expenditure on SSBs remained constant despite a

higher income. Instead, treated households either saved or spent other commodities that may have been more beneficial for the household. This result may also have been because the total consumption of SSBs only constituted 2.76% of a household’s average total expenditure. Nonetheless, CT programs seem to be effective in reducing the consumption of soft drinks in households, and this may be attributed to the health seminars that educate poor households about healthier food alternatives.

Conclusion and Recommendations

The effect of cash transfers was insignificant for all SSBs except for soft drinks. However, the income elasticities of consumption of all SSBs were positive. Though treated households had a lower income elasticity of demand for soft drinks than untreated households, treated households had greater income elasticity of demand for SSBs in general. This implies that the positive income effect is only overshadowed by the negative substitution effect, which may be attributed to the health seminars that some treated households attended. Although the Philippine government has started implementing an ingredient-based tax on SSBs, studies emphasized that taxes should be accompanied by other interventions such as improved labelling, subsidy programs, reformulation, and restrictions in marketing practices (Perova, 2010; Ranganathan & Lagarde, 2012; Cornelsen & Carriedo, 2015).

References

- Brownbill, A. L., Miller, C. L., & Braunack-Mayer, A. J. (2018). The marketing of sugar-sugar-sweetened beverages to young people on Facebook. *Australian and New Zealand Journal of Public Health, 42*(4), 354–360. <https://doi.org/10.1111/1753-6405.12801>
- Cameron, A. C., & Trivedi, P. K. (2005). *Microeconometrics: Methods and applications*. Cambridge University Press.
- Cornelsen, L., & Carriedo, A. (2015). Health-related taxes on foods and beverages. *Food Research Collaboration Policy Brief, 20*.
- Dransfield, J. S. (1995). Legislation controlling production, labelling and marketing of fruit juices and fruit beverages. In P.R. Ashurst (Ed.), *Production and packaging of non-carbonated fruit juices and fruit beverages* (pp. 360–385). Springer.
- Helble, M., & Francisco, K. (2017). *The imminent obesity crisis in Asia and the Pacific: First cost estimates*. Retrieved from <https://www.adb.org/sites/default/files/publication/320411/adbi-wp743.pdf>
- Katchova, A. (2013). *Propensity score matching*. Econometrics Academy. Retrieved from <https://sites.google.com/site/econometricsacademy/econometrics-models/propensity-score-matching>
- Kaur, A., Scarborough, P., & Rayner, M. (2017). A systematic review, and meta-analyses, of the impact of health-related claims on dietary choices. *International Journal of Behavioral Nutrition and Physical Activity, 14*(1), 1–17.
- Kraak, V. I., Gootman, J. A., & McGinnis, J. M. (Eds.). (2006). *Food marketing to children and youth: Threat or opportunity?* National Academies Press.
- Morel, K., Nichols, K., Nong, Y., Charles, N., Price, S., Taveras, E., Goldman, R., & Baidal, J. (2019). Parental and provider perceptions of sugar-sweetened beverage interventions in the first 1000 days: A qualitative study. *Academic Pediatrics, 19*(7), 748–755.
- Oliveira, D., Reis, F., Deliza, R., Rosenthal, A., Giménez, A., & Ares, G. (2016). Difference thresholds for added sugar in chocolate-flavoured milk: Recommendations for gradual sugar reduction. *Food Research International, 89*, 448–453. <https://doi.org/10.1016/j.foodres.2016.08.019>
- Olmos, A., & Govindasamy, P. (2015). A practical guide for using propensity score weighting in R. *Practical Assessment, Research, and Evaluation, 20*(20).
- Perova, E. (2010). *Three essays on intended and not intended impacts of conditional cash transfers* (Unpublished doctoral dissertation). UC Berkeley.
- Pomeranz, J. L. (2012). Advanced policy options to regulate sugar-sweetened beverages to support public health. *Journal of Public Health Policy, 33*(1), 75–88. <https://doi.org/10.1057/jphp.2011.46>
- Ranganathan, M., & Lagarde, M. (2012). Promoting healthy behaviours and improving health outcomes in low and middle income countries: A review of the impact of conditional cash transfer programmes. *Preventive Medicine, 55*, S95–S105.
- Ratkovic, M. (2014). *Propensity score matching and beyond*. Princeton University. <https://www.princeton.edu/~ratkovic/public/EpenDay1.pdf>
- Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. *Statistical Science, 25*(1), 1–21. <https://doi.org/10.1214/09-STS313>
- World Cancer Research Fund International. (2015). *Curbing global sugar consumption: Effective food policy actions to help promote healthy diets and tackle obesity*. Retrieved from <https://www.wcrf.org/wp-content/uploads/2021/01/Curbing-Global-Sugar-Consumption.pdf>

CONTACT INFORMATION

DLSU - Angelo King Institute for Economic and Business Studies (DLSU-AKI)

Room 223, St. La Salle Hall
2401 Taft Avenue
1004 Manila

Angelo King International Center
Corner of Arellano Avenue and Estrada Street
1004 Manila

+63-2-8524-4611 loc. 287,
+63-2-8524-5333, +63-2-85245347 (Fax)
<https://www.dlsu-aki.com>