What do Americans think about high fructose corn syrup?

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What do Americans think about high fructose corn syrup? Evidence from an experiment

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Introduction

High fructose corn syrup (HFCS) is a sweetener obtained when the corn starch is broken into glucose.

HFCS in the United States raised from 0 pounds per person in 1970 to 60 pounds per person in 2000 and accounted for half of the sugar consumption each year.

Literature finds positive relations between HFCS and non-communicable diseases, and finds adverse long-term effects of corn production on the environmental.

Objectives

- Evaluate consumer perceptions and consumption of HFCS
- Derive the willingness to pay (WTP) for mandatory HFCS labeling
- Assess consumer preferences for HFCS when randomly offered information on health and environment
- Find sociodemographic and behavioral characteristics associated with consumer preferences for HFCS labels.

Data and Methods

The data come from an online survey of United States households. in December 2021. The survey was organized into four sections:

1)socio-demographic characteristics,

2)households' consumption and perceptions of HFCS

3)contingent valuation (CV) questions for a HFCS mandatory labeling

4)stated choice experiments (CE) to assess preference for labels indicating the presence of HFCS.

The CV method address hypothetical questions about respondents' WTP for products with specific attributes, in the case of the study a mandatory HFCS label. The analysis of responses for hypothetical questions allows the estimation of the mean WTP of respondents for a mandatory label at different prices (Louviere et al., 2000).

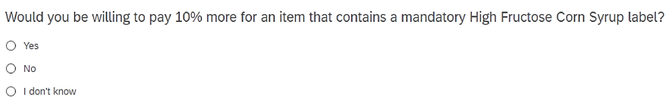

Figure 1. Example contingent valuation question

The conceptual framework for choice experiments is based on Lancaster's (1966) demand theory based on attributes of the products, and the random utility model (McFadden, 1974). Responses of the CE were analyzed using Mixed Logit regressions.

Figure 2. Examples of choice experiment scenarios

Results and Discussion

Table 1. Example contingent valuation question

Variable	Percentage
Age years	37.56
Education	
College graduated or more	80.73
Other	19.28
Sex of the respondent	
Male	52.11
Female	47.89
Marital status	
Married	64.50
Other	35.50
Race of the respondent	
White	74.84
Other	25.16
Hispanic or Latino Background	
Hispanic or Latino	26.37
Household characteristics	
Household size	3.23
Household with minors	63.92
Location of the household	
Urban	77.06
Rural	22.94
Household region	
Northeast	16.28
West	25.73
Midwest	22.86
South	33.72
Annual household income	
Less than US$25,000	20.06
US$25,000-US$49,000	30.03
US$50,000-US$74,999	22.62
US$75,000-US$149,999	22.68
US$150,000 or more	4.60

Table 2. Respondents' consumption and perceptions of HFCS

Variable	Percentage
Before information treatment	
When you go to get groceries, how likely are you to check for High Fructose Corn Syrup on the label?	
Very likely	22.80
Likely	38.63
Neutral	19.16
Not very likely	10.22
Very unlikely	8.62
I don't know	0.57
When you go to get groceries, how likely are you to avoid High Fructose Corn Syrup?	
Very likely	19.86
Likely	35.95
Neutral	24.58
Not very likely	11.37
Very unlikely	7.41
I don't know	0.83
Do you think High Fructose Corn Syrup:	
Has a negative impact on the environment	29.98
Has a positive impact in the environment	39.85
Does not have an impact on the environment	12.77
I don't know	17.41
Do you think High Fructose Corn Syrup:	
Has a negative effect on health	49.43
Has a positive effect on health	36.90
Does not have an impact on health	6.69
I don't know	6.98

Table 3. Estimation results of WTP for mandatory HFCS mandatory labeling

Variable	Model 1	Model 2
Constant	0.1468 ***	-0.0374
Age (Years)		-0.0007 *
College educated (1=Yes, 0=No)		0.0668 ***
Sex (1=Female, 0=Male)		-0.0063
Married (1=Yes, 0=No)		0.0674 ***
Race (White=1, Other=0)		0.0194 *
Hispanic or Latino (1=Yes, 0=No)		0.1263 ***
Household size		0.0024
Minors in household (1=Yes, 0=No)		0.0737 ***
Urban (1=Yes, 0=No)		0.0257 **
Midwest region		0.0013
South region		0.0075
West region		0.0216
Annual income (thousand USD)		-0.002 **
Sample size	1,566	1,563
Log likelihood	-1870.7932	-1608.6274

Notes. The parametric model used is a log-normal distribution with parameters μ and $\sigma, \mu = X_i'\beta$. ***indicates significance at 1%, ** indicates significance at 5%, and * indicates significance at 10%.

Table 4. Marginal effects of Mixed Logit Models

Attribute	WTP Calculation [a]	Mean WTP	95% Confidence Interval for the Mean [b]
Vanilla Yogurt			
Does not contain HFCS label[c]	$\beta_{DNHFCS}/\exp(\beta_{price})$	0.6933 ***	0.4725 ~ 0.9142
Free of HFCS label[c]	$\beta_{FHFCS}/\exp(\beta_{price})$	1.2599 ***	1.0295 ~ 1.4904
No HFCS label[c]	$\beta_{NoHFCS}/\exp(\beta_{price})$	0.5737 ***	0.3404 ~ 0.8071
Contains HFCS label[c]	$\beta_{CHFCS}/\exp(\beta_{price})$	-0.9927 ***	-1.4519 ~ -0.5335
Strawberry Yogurt			
Does not contain HFCS label[c]	$\beta_{DNHFCS}/\exp(\beta_{price})$	0.4559 ***	0.3396 ~ 0.5721
Free of HFCS label[c]	$\beta_{FHFCS}/\exp(\beta_{price})$	0.7378 ***	0.6455 ~ 0.8301
No HFCS label[c]	$\beta_{NoHFCS}/\exp(\beta_{price})$	0.1492 **	0.0137 ~ 0.2846
Contains HFCS label[c]	$\beta_{CHFCS}/\exp(\beta_{price})$	-0.6144 ***	-0.8715 ~ -0.3573
Granola Bars			
Does not contain HFCS label[c]	$\beta_{DNHFCS}/\exp(\beta_{price})$	0.5855 ***	0.4278 ~ 0.7433
Free of HFCS label[c]	$\beta_{FHFCS}/\exp(\beta_{price})$	0.8861 ***	0.7608 ~ 1.0115
No HFCS label[c]	$\beta_{NoHFCS}/\exp(\beta_{price})$	0.3045 ***	0.1523 ~ 0.4567
Contains HFCS label[c]	$\beta_{CHFCS}/\exp(\beta_{price})$	-0.6578 ***	-0.9625 ~ -0.3531
Honey Wheat Bread			
Does not contain HFCS label[c]	$\beta_{DNHFCS}/\exp(\beta_{price})$	0.5366 ***	0.4032 ~ 0.6699
Free of HFCS label[c]	$\beta_{FHFCS}/\exp(\beta_{price})$	0.8087 ***	0.7011 ~ 0.9162
No HFCS label[c]	$\beta_{NoHFCS}/\exp(\beta_{price})$	0.2633 ***	0.1251 ~ 0.4014
Contains HFCS label[c]	$\beta_{CHFCS}/\exp(\beta_{price})$	-0.8192 ***	-1.1427 ~ -0.4958

*****indicates significance at 1%, ** indicates significance at 5%, and * indicates significance at 10%. [a]Carson and Czajkowski (2019), when price attribute follow a lognormal distribution and constraining the standard deviation of price to 0 and other variables are follow a normal distribution.(Carson & Czajkowski, 2019) [b] 95% confidence intervals found using Fieller (1954) method. [c] No label indicating presence of HFCS as the base attribute.**

Summary and Conclusions

- Most respondents are likely/very likely to check and avoid products with HFCS.
- HFCS is perceived to have a negative impact on health while corn produced for HFCS is mostly perceived as positive for the environment.
- The contingent valuation revealed a strong preference and WTP for a mandatory HFCS labeling.
- Results for the choice experiment suggest that consumers are willing to pay premium values to avoid the presence of HFCS in the presented food products.

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