Simulating the Effect of the Nutrition Fact Label Revision: Added Sugar and the Demand for Ready-to-Eat Breakfast Cereals

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The Findings and Conclusions in This Preliminary Presentation Have Not Been Formally Disseminated by the U. S. Department of Agriculture and Should Not Be Construed to Represent Any Agency Determination or Policy.

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The analysis, findings, and conclusions expressed in this paper also should not be attributed to Information Resources, Inc. (IRI).

Another Disclaimer

Preliminary and incomplete – DO NOT CITE

1. Background

On May 20, 2016, the FDA announced a revision of the Nutrition Facts Label for packaged foods

Revisions will include changes to reflect the link between diet and chronic diseases (e.g. obesity, heart disease)

Initial compliance date: July 26, 2018 (one additional year for manufacturers with annual food sales < $10 million).

Revised compliance date: January 1, 2020 (2021 for “small” food manufacturers).

1. Background

Main changes in the Nutrition Facts Label (NFL)

1) Larger (bolder) type: serving size; larger type: calories
2) Updated serving size and daily values
3) NEW: ADDED SUGAR
4) Change in nutrients required (Micro)
5) Actual amounts declared (Micro)
6) New footnotes

1. Background

8th edition of the DGA (2015-2020) : “ Limit calories from **added sugars** and saturated fats and reduce sodium intake.”

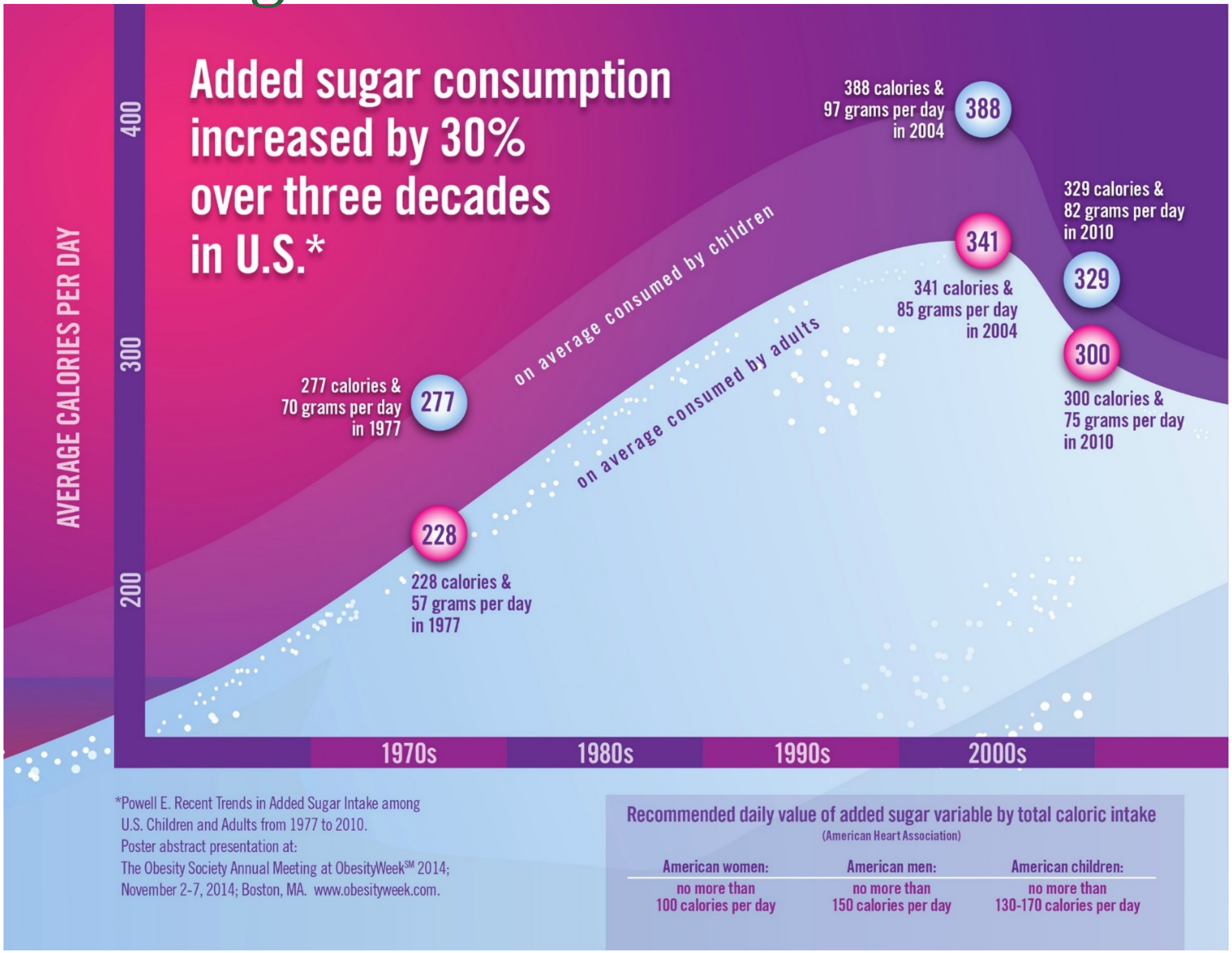
Recommended amounts not to be exceeded
< 10 % cal/day from added sugars → ~ 50 grams or 12.2 tsp
< 10% cal/ day from saturated fats → ~ 22 grams or 3/4 OZ
< 2,300 mg / day of sodium (1/12 OZ)

American Hearth Association Added Sugar limits:

- Men: 150 calories / 36 grams / 9 tsp ;
- Women: 100 calories / 25 grams / 6 tsp

Note: 12 fluid OZ Regular Coke ~ 39 grams of added sugar

1. Background



Source Mollie Turner, The Obesity Society: http://www.obesity.org/news/press-releases/us-adult

1. Background (5/7)

Source:https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm385663.htm

Nutrition Facts

Serving Size 2/3 cup (55g)
Servings Per Container About 8

Amount Per Serving

Calories 230	Calories from Fat 72
	% Daily Value*
Total Fat 8g	**12**%
Saturated Fat 1g	**5**%
Trans Fat 0g	
Cholesterol 0mg	**0**%
Sodium 160mg	**7**%
Total Carbohydrate 37g	**12**%
Dietary Fiber 4g	**16**%
Sugars 1g	
Protein 3g	
Vitamin A	10%
Vitamin C	8%
Calcium	20%
Iron	45%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily value may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

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Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

1. Background

The FDA definition of added sugars includes all sugars that are either added during the processing of foods, or are packaged as such:

- Sugars (free, mono- and disaccharides);
- Sugars from syrups and honey;
- Sugars from concentrated fruit or vegetable juices in excess of what would be expected from the same volume of 100 percent fruit or vegetable juice of the same type.

Excluded: fruit or vegetable juice concentrated from 100% fruit juice sold to consumers as well as some sugars found in fruit and vegetable juices, jellies, jams, preserves, and fruit spreads.

FDA currently reconsidering “added sugar” labels for honey and maple syrup.

Existing Literature on labeling (and use of NFL) is plentiful, but only limited research exists on NFL revision / added sugar label

- Laquatra et al (2015): providing information on "added sugar" content can mislead consumers; such misperception can influence purchase intent

- Kandhapur et al (2017): consumer understanding of different display of added sugar info on NFL → Providing high/medium/low text, %DV, or combination, leads to better understanding

- Grebitus and Davis (2017): consumers pay more attention to the modified NFL than the current one for healthier foods, whereas they pay less attention to the new NFP compared to the current, for less healthy items.

How will the "added sugar" information in the new NFL affect the demand for Ready-to-Eat Breakfast Cereals?

Use unique / novel dataset and method

- IRI (PoS) matched with "Linkages": data enhancement for IRI data developed by ERS - it allows us to import the added sugar data from USDA nutrition databases (more details later)
- Fosgerau, de Palma, and Monardo (2018) Cross-Nested Generalized Nested Entropy (CN-GNE) demand model

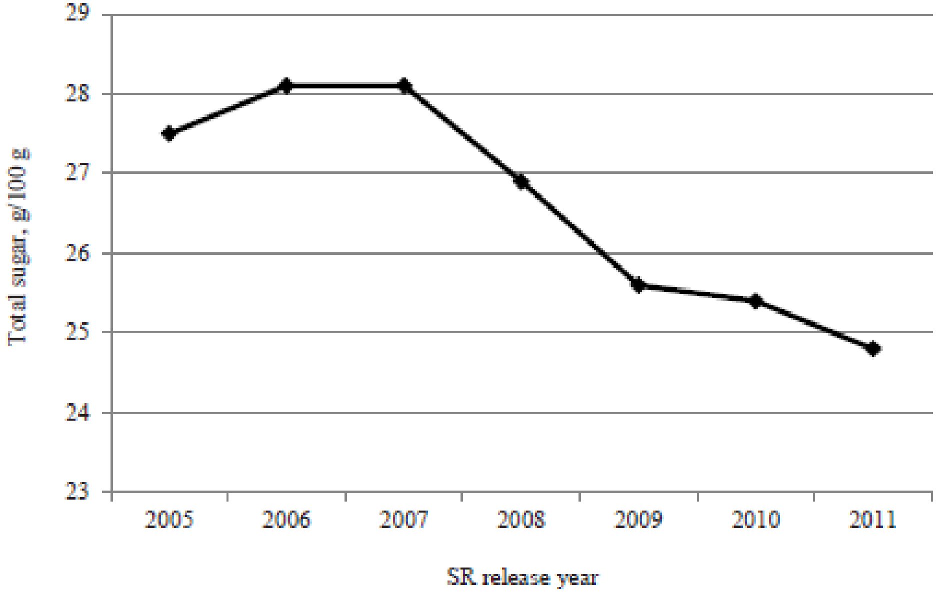
2. Research Question: why RTEBC? (2/4)

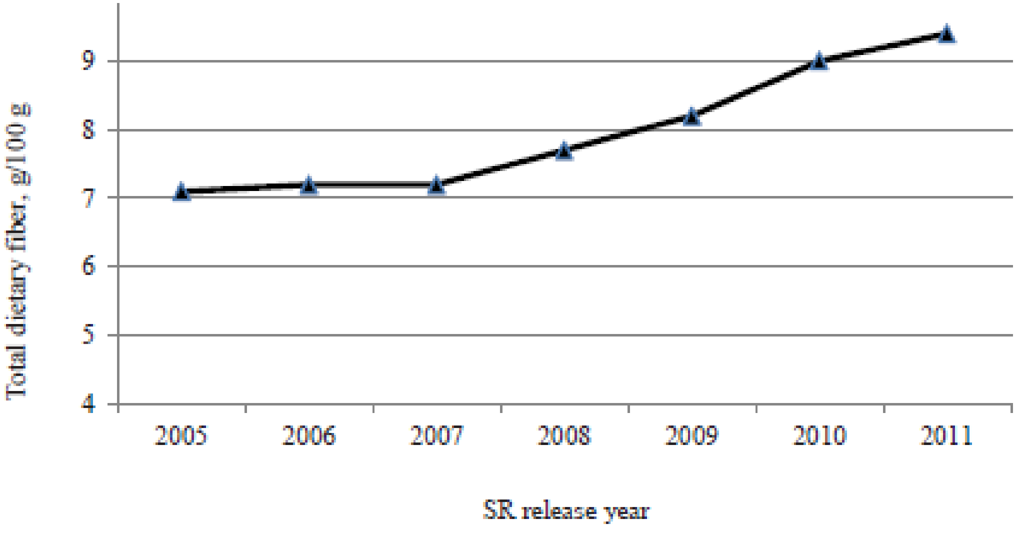
Cereals' nutritional quality has generally improved since 2001 (Thomas et al. 2013: Wang, Rojas, and Bauner, 2015)

Harris et al (2012) evaluated the Nutrition Profiling Index (NPI) of RTE cereals in the US (based on calories, fiber, sugar, sodium, etc.) from 2006 to 2012.

- Reformulations: ↓sugar and sodium; ↑ fiber
- Nutritional quality of cereal brands improved by 14% for children's cereals, 12 % for family cereals, and 5% for adult cereals

2. Research Question: why RTEBC? (3/4)





Source:

Thomas et al 2013.

2. Research Question: why RTEBC? (4/4)

Not all consumers make the “healthiest” RTE cereal choices:

- Consumers with lower income tend to have a stronger preference for sugary cereals (e.g. Nevo 2001; Chidmi and Lopez 2007)
- Binkley and Golub (2011): education and income are positively linked to more healthful RTE cereals choices (controlling for prices)

Information (not pricing intervention) may lead to healthier cereal purchases

- Rahkovsky et al (2013): using a Guiding Star Program™ (GSP) tag may affect the demand of more nutritious RTE cereals at the expense of less nutritious ones.
- Lin et al. (2017): a tax / subsidy scheme aimed to increase the consumption of high-nutrition RTE cereals may have limited effect on overall REBC demand and even have unintended consequences (i.e. increase overall breakfast caloric intake).

3. The Modelling Approach

1) Demand Side: CN-GNE;
Demand parameters

→

2) Supply Side; SR Nash Bertrand
Estimate PCM and Marginal costs

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3) Use estimates + Linkages data to simulate preference parameters for added sugar

4) Simulate changes in Demand (market shares) once added sugar content is known to consumers

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to simulate preference parameters
for added sugar

4) Simulate changes in Demand
(market shares) once added sugar
content is known to consumers

5) Use modified market shares
And marginal costs to predict new
Equilibrium price

6) Updated market shares, calculate
total amounts of sugar purchased
and post-price adj. changes in sugar

3. The Modelling Approach: Demand (1/6)

Fosgerau, de Palma, and Monardo (2018) Cross-Nested Generalized Nested Entropy (CN-GNE) demand model

- FdPM: framework that reconciles Additive Random Utility (ARUM) models with Representative Consumer Models (RCM) – extension of Anderson et al. (1988) and Verboven (1996)
- Any ARUM can be represented using a General Entropy Model (GEM)
- GEM class is strictly larger than ARUM; GEM allow for complementarity – not possible in demand models obtained from ARUM
- GEM easier empirical tractability than "traditional" discrete choice models – (e.g. Berry, 1994; BLP 1995; Nevo 2000; 2001; Dube et al, 2010)

3. The Modelling Approach: Demand

Consider the following indirect utility maximization problem (over J+1 goods; one good serving as the numeraire)

$$\max_{\mathbf{S}} \left\{ \alpha y + \sum_{j \in J} \delta_j S_j + \Theta(\mathbf{S}) \right\}$$

$$\delta_j = -\alpha p_j + \beta_0 + \sum_k \beta_k x_k + \xi_j; \qquad \Theta(\mathbf{S}) = -\sum_{j \in J} S_j \ln G(\mathbf{S})$$

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FdPM show that there exist a vector of non-zero GE demands

$$S_i(\delta) = \frac{H^{(i)}(e^{\delta})}{\sum_{j \in J} H^{(j)}(e^{\delta})}; \quad \text{where} \quad H^{(i)}(e^{\delta}) = G^{-1(i)}(e^{\delta})$$

<u>NOTE: we use different notation than FdPM to (ultimately) highlight similarities with ARUM Logit models!!!</u>

3. The Modelling Approach: Demand (3/6)

Assume there are J+1 cereal in each market (including outside option), differentiated along different attributes (indexed by l).

The Generator function associated with a general (unrestricted) nesting structure characterized by the taste for variety (or attributes c) is:

$$G^{(j)}(\mathbf{S}) = \begin{cases} S_0 & j = 0, \\ S_j^{\mu_0} \prod_{l \in L} S_{\sigma_l(j)}^{\mu_l} & j > 0, \end{cases}$$

$$\mu_0 + \sum_{l \in L} \mu_l = 1; \quad \mu_0 > 0; \mu_l \geq 0$$

S_j: Market share of product j; S_0: Share of the outside option

$S_{\sigma_l(j)}$: Share of products belonging to σ_l;

σ_l identifies the “nests” or “classes” of differentiated products

μ_l: taste parameter for variety along the L dimensions

3. The Modelling Approach: Demand (4/6)

Taking logs on both sides and rearranging one has

$$\ln\left(\frac{S_j}{S_0}\right) = -\alpha p_j + \beta_0 + \sum_k \beta_k x_k + \sum_{l=1}^{L} \mu_c \ln\left(\frac{S_j}{S_{\sigma_l(j)}}\right) + \xi_j$$

Which can be estimated using standard econometric techniques

Cross Nested-Generalized Nested Entropy (CN-GNE): similar to Bresnahan et al. (1997) product differentiation logit model

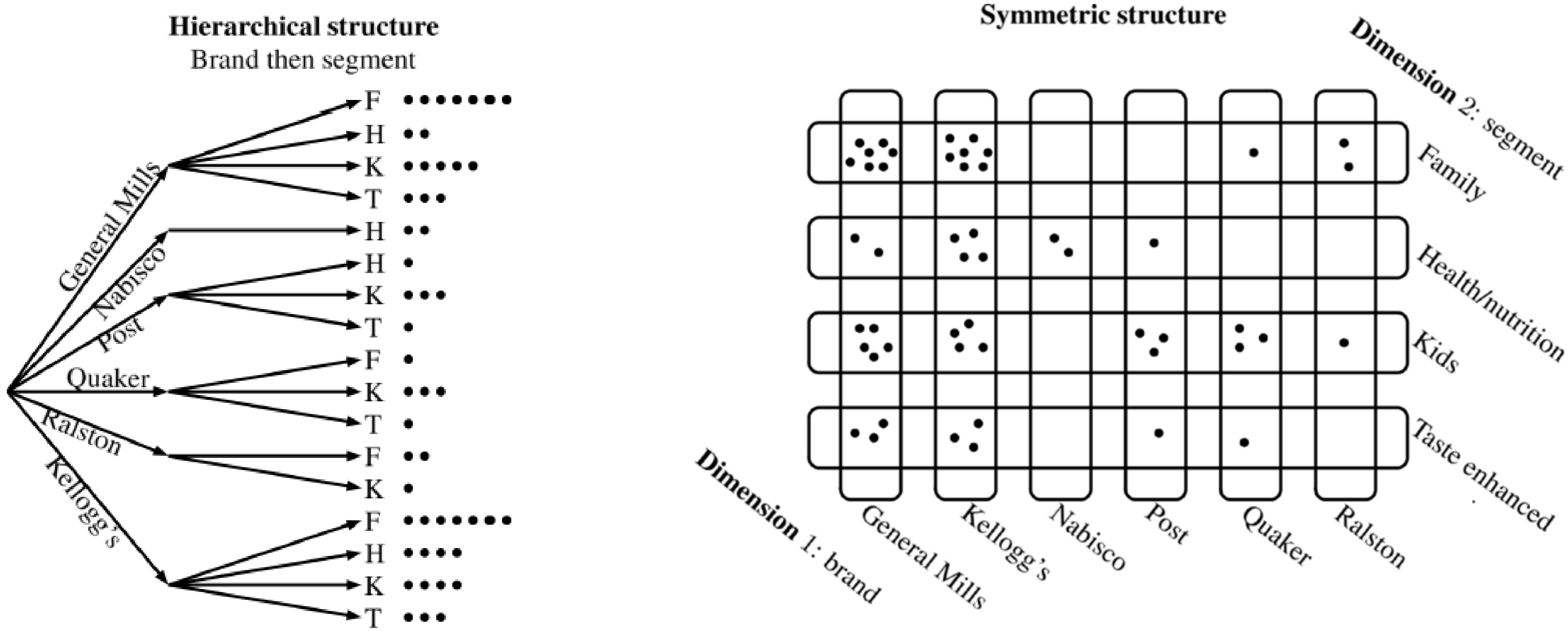
For some ranges of μ_l and δ FdPM show that the CN-GNE can lead to negative cross price parameters

→ the smaller the μ_l the "farther" (a la Pinkse and Slade 2004) the ` products attribute l will be (and more likely to be complements)

3. The Modelling Approach: Demand (5/6)

How does it differ from a Nested Logit?

FdPM (2018) application of CN-GNE to cereal demand in Chicago



F = Family; H = Health/Nutrition; K = Kids; T = Taste enhanced

3. The Modelling Approach: Demand (6/6)

Elasticities

$$\boldsymbol{\eta} = diag(\mathbf{p})\left(-\alpha\left[\mu_0\mathbf{I} + \sum_{l=1}^{L}\mu_l\Xi_l\mathbf{S}_{\sigma_l}\right]^{-1} diag(\mathbf{S})[\mathbf{I}-\mathbf{1S}']\right)diag(\mathbf{S})^{-1}$$

where $(\mathbf{S}_{\sigma_l})_{jj} = \frac{S_j}{S_{\sigma_l(j)}}$; $\quad (\Xi_l)_{ij} = \begin{cases} 1 & if \;\; i \in \sigma_l(j) \\ 0 & otherwise \end{cases}$

One can use actual or predicted shares;

Predicted shares solve the non-linear system of equation

$$(1-\sum_j S_j)S_j^{\mu_0}\prod_{l\in L}(\sum_{j\in\sigma_l} S_j)^{\mu_l} = e^{\delta_j}$$

3. The Modelling Approach: Supply

Each cereal producer solves $\max_{p_j} \pi_n = M \sum_{j \in J_n} S_j (p_j - c_j);$

Assume Nash-Bertrand (NB); the FOCs lead to:

$$p - c = -\Omega^{-1} S(p)$$

$$\Omega_{jk} = \Omega^*_{jk} \Delta_{jk}$$

$$\Omega^*_{jk} = \begin{cases} 1 & if \quad k, j \in Y_n \\ 0 & \quad otherwise \end{cases} \qquad \Delta_{jk} = \frac{\partial S_j}{\partial p_k}$$

Use demand estimates and prices to solve for the marginal cost

$$c = p - \Omega^{-1} S(p)$$

3. The Modelling Approach: Simulation (1/4)

Specification 1: preference for sugar same for consumers choosing NHFCS cereals

$$\ln\left(\frac{S_j}{S_0}\right) = -\alpha p_j + \beta_0 + \beta_{Sug} \boxed{Sug_j} + \beta_{NHF} \boxed{NHF_j} + \dots$$

Amount of sugars (g/ OZ) from NFL

Indicator variable for products with FOP "No HFCS" label

Specification 2: preference for sugar is different for those choosing NHFCS cereals

$$\ln\left(\frac{S_j}{S_0}\right) = \dots + \beta_{Sug} Sug_j + \beta_{NHF} NHF_j + \beta_{Sug,NHF} Sug_j * NHF_j \dots$$

Parameter capturing difference in preference for sugar
For consumers choosing HFCS free cereals

3. The Modelling Approach: Simulation (2/4)

Post NFL changes added sugar content revealed to consumer; for specification 1:

$$\lambda \overline{Sug} + (\gamma - \lambda)\overline{ASug} = \beta_{Sug}\overline{Sug} + \beta_{NHF}\overline{NHF}$$

- *ASug* “added sugar”;
- λ and γ taste parameters for Non Added Sugar and Added Sugar (consumers DO NOT see Non Added Sugar but can compare *Sug* vs *ASug*)

If no added sugar (*ASug* =0) *NHF*=1;

$$\lambda \overline{Sug} = \beta_{Sug}\overline{Sug} + \beta_{NHF} \quad \rightarrow \quad \lambda = \beta_{Sug} + \frac{\beta_{NHF}}{\overline{Sug}}$$

Substituting + Rearranging

$$\gamma = \frac{\beta_{NHF}}{\overline{ASug}}\left(\frac{\overline{ASug}}{\overline{Sug}} + \frac{\overline{NHF} - 1}{\overline{ASug}}\right) + \beta_{Sug}$$

Similar (slightly more complex) expressions for demand specification 2

3. The Modelling Approach: Simulation (3/4)

Use λ and γ to calculate simulated post NFP changes shares vector S'

1) Replace $\beta_{Sug}\overline{Sug}$ with $\lambda\overline{Sug}+(\gamma-\lambda)\overline{ASug}$ and obtain a new vector δ^{New}

2) Find S^{New} solving $(S_j^{New})^{\mu_0}(1-\sum_j S_j^{New})\prod_{l\in L}(\sum_{j\in\sigma_l} S_j^{New})^{\mu_c} = e^{\delta_j^{New}}$

3) Calculate post-NFL change variation in total amounts of sugar (and added sugar) purchased

$$\Delta Sug = M\sum_J (S_j^{New}-S_j)Sug_j; \qquad \Delta ASug = M\sum_J (S_j^{New}-S_j)ASug_j$$

3. The Modelling Approach: Simulation (4/4)

Use the simulated shares S^{New} and NB marginal cost to obtain the new equilibrium price and shares solving simultaneously (for each j)

$$p_j^{New} = c_j - inv(\Omega_j) S_j^{NewP}$$

$$(S_j^{NewP})^{\mu_0} (1 - \sum_j S_j^{NewP}) \prod_{l \in L} (\sum_{j \in \sigma_l} S_j^{NewP})^{\mu_c} = e^{\delta_j^{NewP}}$$

Where $\delta_j^{NewP} = -\alpha p_j^{New} + \lambda Sug_j + (\gamma - \lambda) ASug_j + \beta_0 + \ldots + \xi_j$

Update the changes in sugar purchased

$$\Delta Sug = M \sum_J (S_j^{NewP} - S_j) Sug_j \quad \Delta ASug = M \sum_J (S_j^{NewP} - S_j) ASug_j$$

4. Data and Estimation - Linkages (1/4)

FNDDS: Food and Nutrient Database for Dietary Studies

FNDDS provides nutrient values for foods and beverages reported in the dietary intake component of NHANES

Food Patterns Equivalents Database and Food Pattern Ingredient Database (FPED/FPID) converts products in the FNDDS to 37 USDA Food Patterns components. FPED includes

1)Food Patterns Equivalents Ingredient Database (FPID): 37 USDA Food Patterns components per 100 grams of unique ingredients in the FNDDS
2) listings of gram weights for one cup equivalents of fruits, vegetables, dairy, and legumes used in the FPED

Linkages uses Ensemble Codes (ECs) to indicate Standard Reference or FNDDS codes used to find the best possible match between a UPC and a product whose nutrition information is in the FPED/FPID datasets

4. Data and Estimation – Sample (2/4)

State-level weekly PoS sales data (2013); aggregate store-level data (no RMAs) - REBC sales in grocery stores only

- 1308 UPCs of RTEBC matched with Linkages.
- Information on “child”, “adult”, and “family” styles matched for 528 UPCs from Harris et al (2012); styles of other UPCs from probit predictions.
- “Product” aggregation based on the Ensemble Codes

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Total of 357 Product aggregates → 93 products maintained in the dataset → lower 20% of sales in volume ….

We use "Style of Cereals" and Brands as differentiation space.

	Brand						
Style	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Child	8		10		6	4	1
Adult	6	7	1	9	11	10	4
Family			1	1	5	9	

4. Data and Estimation: Ident. Strategy (4/4)

Price IVs

1) Price for grains - Monthly National Grain Index Price (NASS) in 2013 (Source USDA – NASS) * grain content (Linkages) OZ of edible weight
2) Diesel Price - Weekly U.S. No 2 Diesel Retail Prices by regions. $/gal (Source: U.S. Energy Information Administration)
3) Electricity Price - Average monthly electricity (commercial) prices by state. Cents / KWH. (Source: U.S. Energy Information Administration)

Conditional Shares IVs,

- Conditional shares based on number of products belonging to a “nest” for each manufacturer:
  - Assumption: local demand for a product does not affect directly the assortment of varieties in a segment.

Estimation – STATA; Simulation - Matlab

4. Data and Estimation: Attributes (3/4)

"Linkages" data allows us to calculate the overall content of sugar, fat, protein and fiber in each of our aggregate products.

- Fat, protein, sugar, and fiber content rounded to 0 if < 0.5 gr / serving, following rounding rules for declaring nutrients on the nutrition label or in labeling.
- Use Linkages information on Added Sugar (Teaspoon equivalents to grams) in simulation

Other variables from IRI;

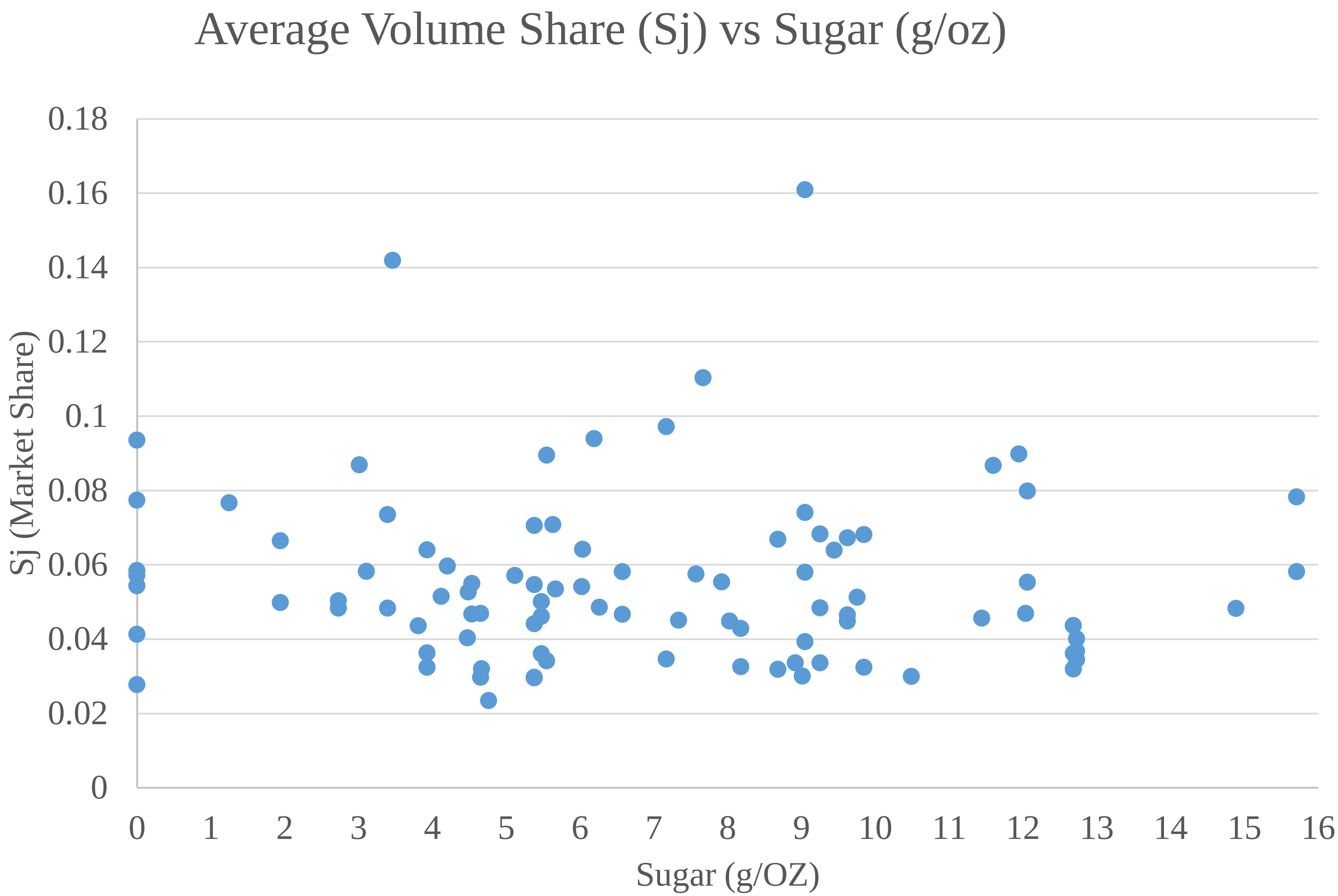
- "flavors", "types" ,"styles" and "manufacturer" indicators
- Week / State FEs controlled for
- Unbalanced Panel – account for ln(N) of products sold in equation (e.g. Ackerberg and Rysman (2005))

4. Data and Estimation: Some STATS (1/5)

	Mean	Sd	Min	Max
S	$5.36*10^{-04}$	$8.17*10^{-04}$	$8.89*10^{-09}$	0.063
So	0.955	0.038	0.809	1
P	24.193	7.492	3.194	58.049
Sh| Style	0.086	0.088	$7.59*10^{-07}$	1
Sh| Brand	0.188	0.213	$1.07*10^{-06}$	1
Sugar	7.271	3.707	0.054	15.933
Asugar	6.731	3.780	0	15.705
Ln(Nprod)	4.406	0.092	4.111	4.533
NHFCS	0.023	0.151	0	1
Maple	0.023	0.150	0	1
Honey	0.181	0.385	0	1
Calories	104.420	12.758	56.70	132.39
Fat	1.273	0.942	0.31	5.11
Sat Fat	0.291	0.321	0.06	1.79
Fiber	2.669	2.550	0.31	13.47
Protein	2.312	1.063	1.12	7.40
Wh Grain	0.421	0.287	0	1.001

FROM
LINKAGES

4. Data and Estimation: Some STATS (2/5)



Source: Estimated from 2013 IRI Infoscan and Linkages

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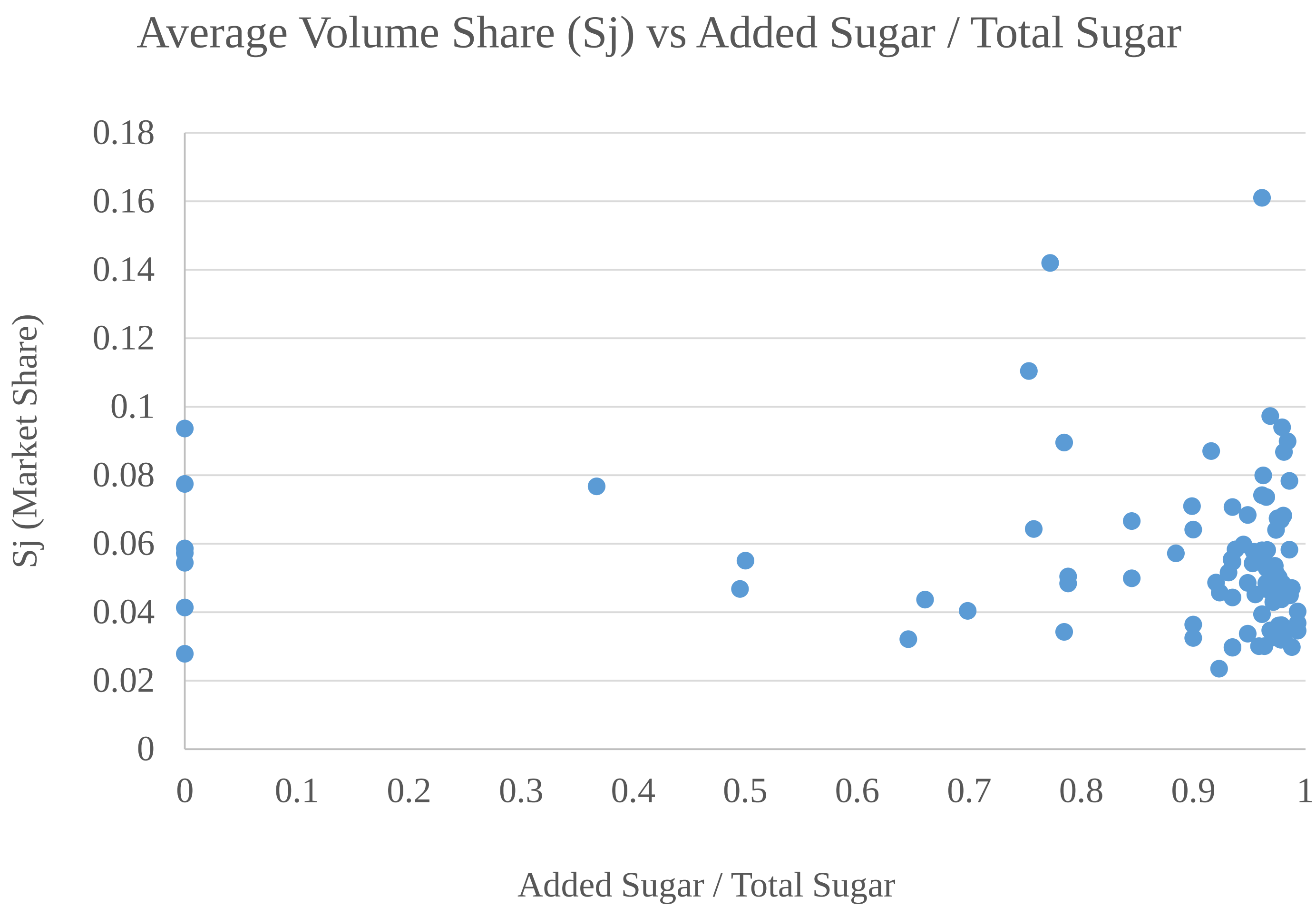

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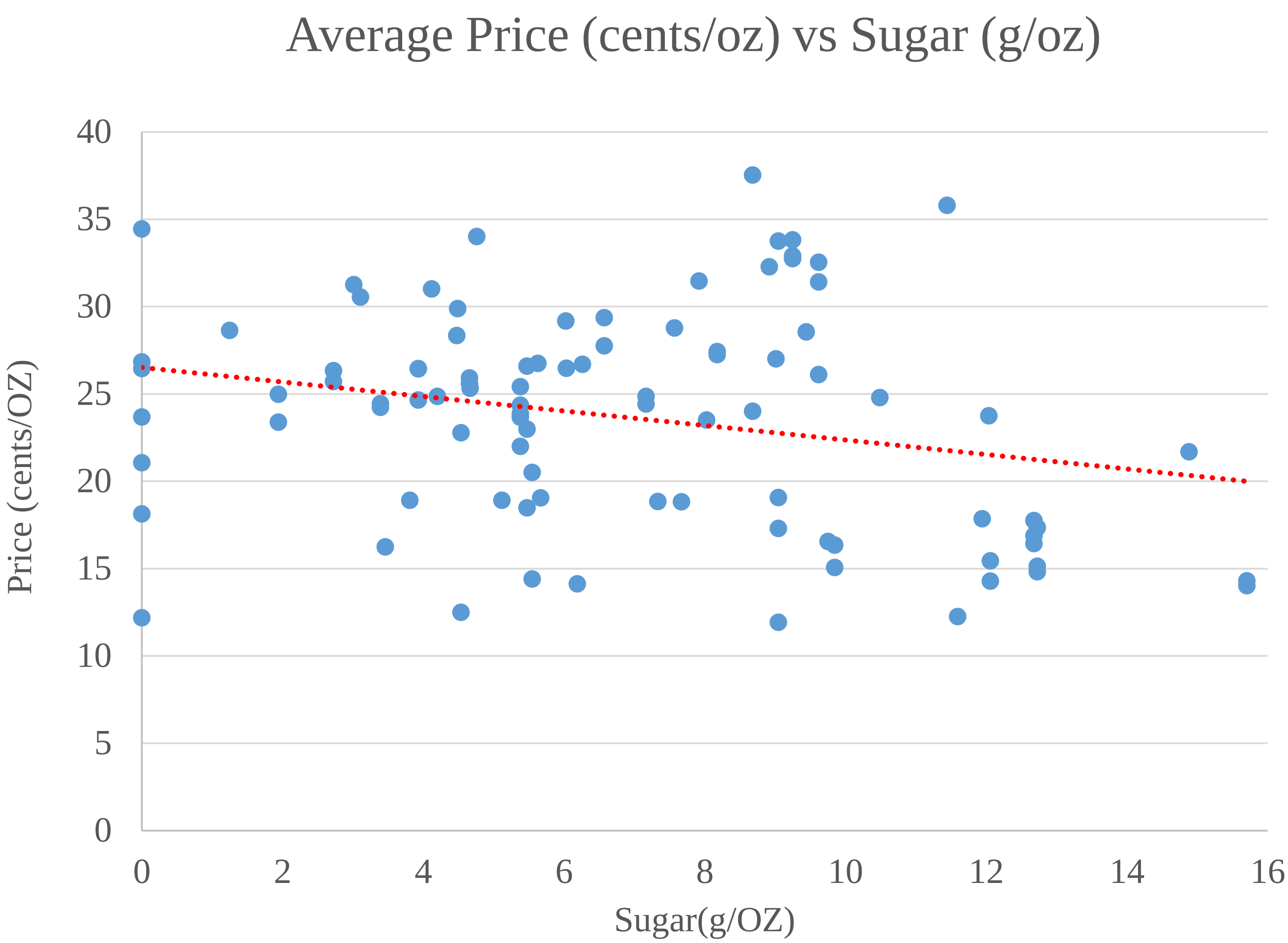

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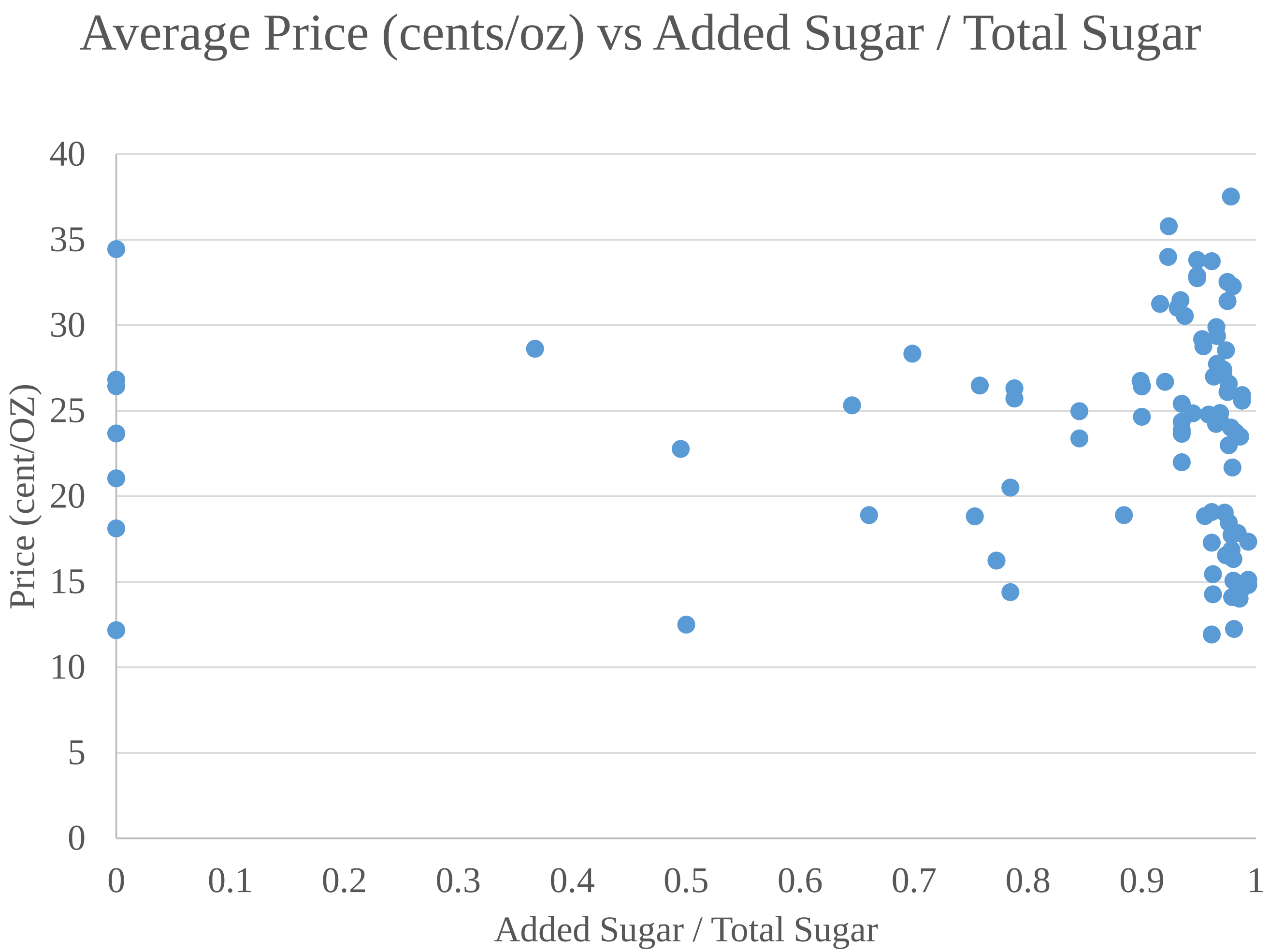
Bonanno, Ghazaryan, Carlson, and Cleary: Simulating the effect of NFL Changes: RTE Cereals Demand
University Of Minnesota, Department of Applied Economics, Minneapolis, MN, 9/19/2018

4. Data and Estimation: Some STATS (5/5)



Source: Estimated from 2013 IRI Infoscan and Linkages

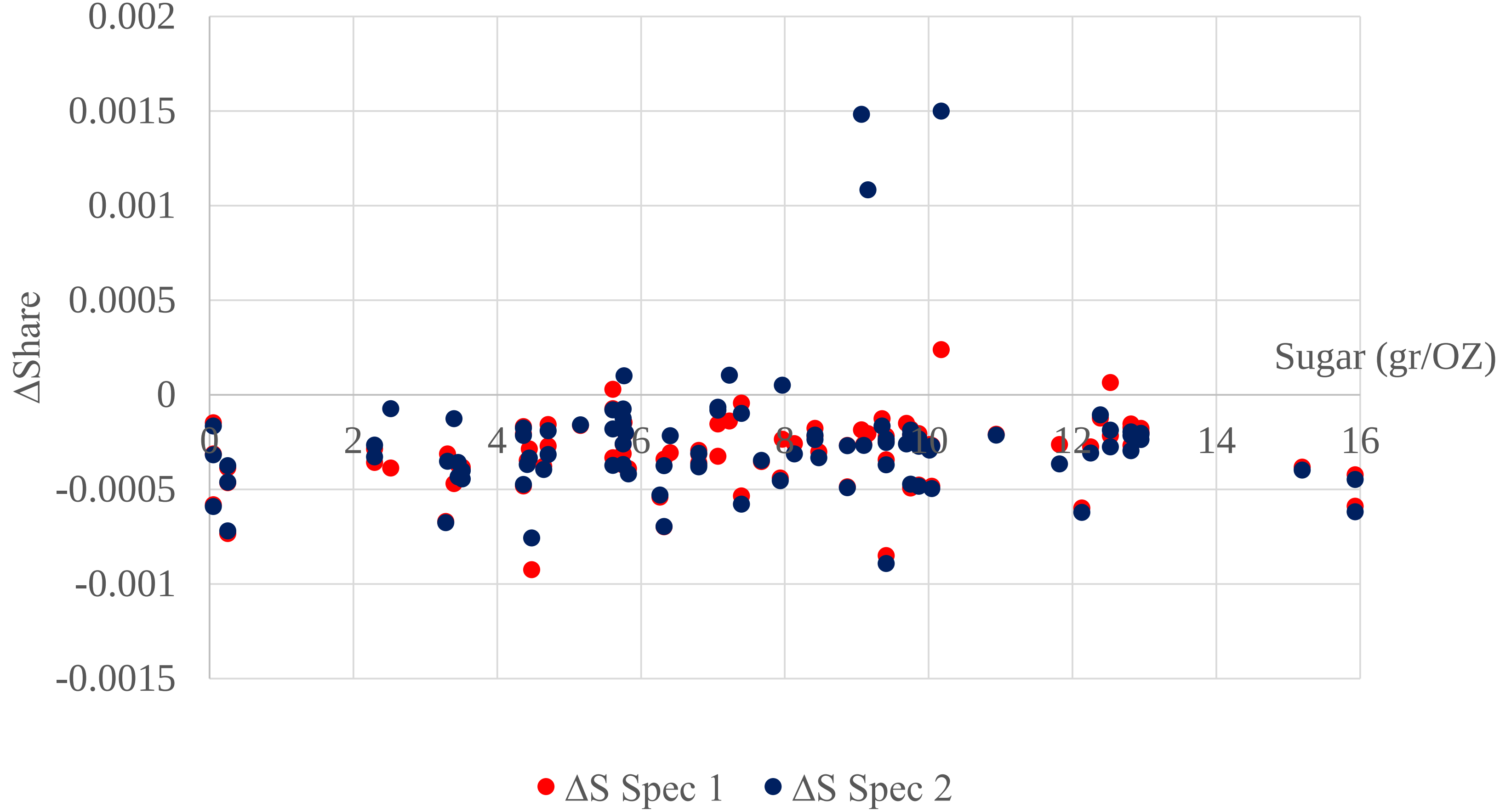
5. Results – Demand Estimates (1/8)

Variable	Specification 1	Specification 2
Price	-0.086***	-0.061***
	(0.008)	(0.006)
Cond Sh - Style	0.289***	0.292***
	(0.025)	(0.025)
Cond Sh. - Brand	0.044***	0.050***
	(0.013)	(0.012)
Sugar	-0.004**	-0.006***
	(0.002)	(0.002)
NHFCS	0.229***	2.425***
	(0.020)	(0.201)
Sugar*NHFCS		-0.378***
		(0.032)
MAPLE	-0.105***	-0.080***
	(0.017)	(0.015)
HONEY	0.154***	0.121***
	(0.011)	(0.009)
Simulated Coef.		
λ (NASug)	0.028	0.319
γ (Asug)	-0.005	-0.029

Metric		Spec. 1	Spec. 2
OPE			
Average		-3.049	-2.211
Min		-1.539	-1.117
Max		-4.827	-3.499
R2		0.804	0.812
P-val J		0.062	0.498
F Stat	Price	133.1	183.2
	CSh(Style)	200.3	193.5
	CSh (Brand)	961.9	956.1

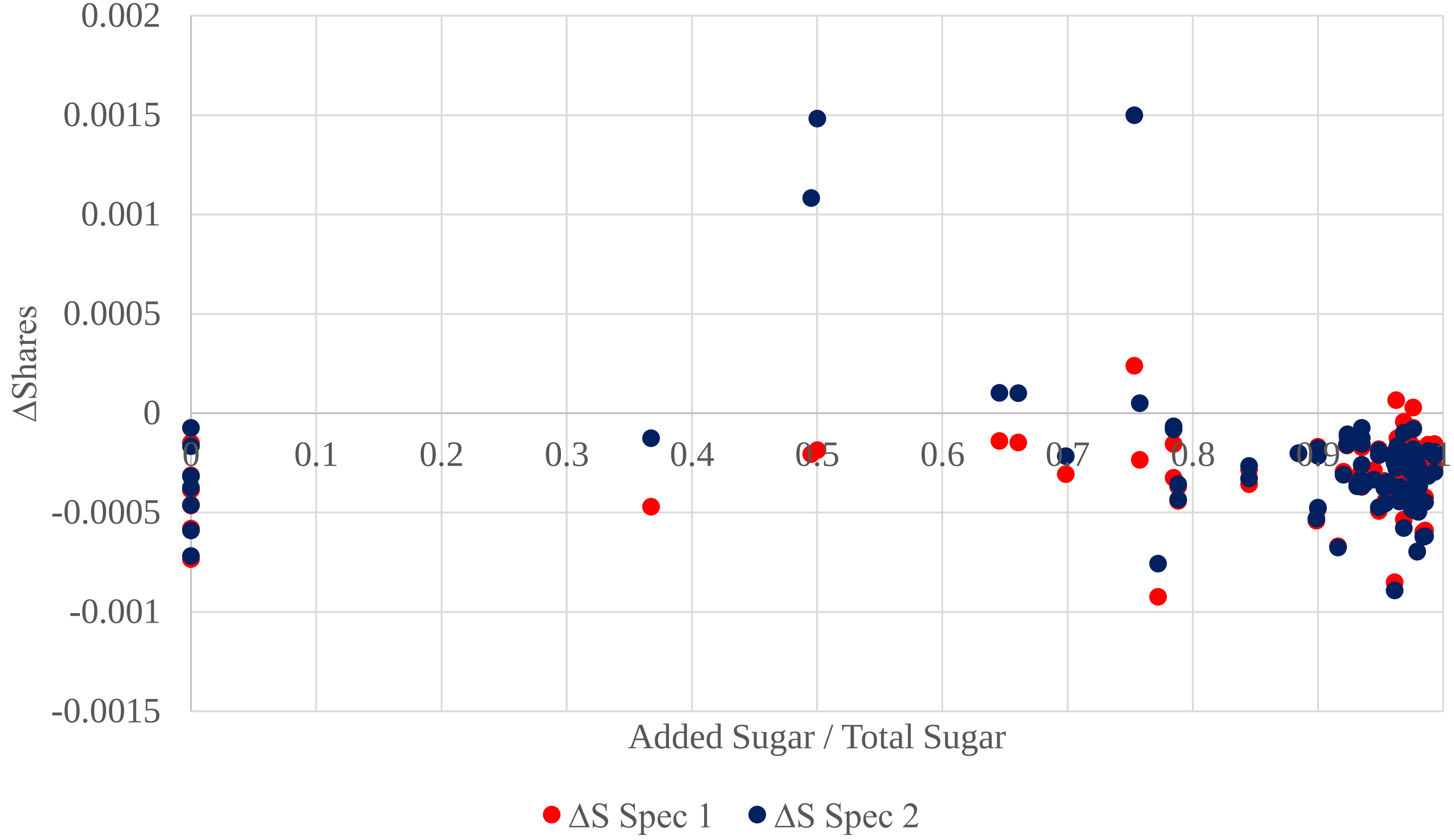
5. Results – Simulations (2/8)

Relationship between sugar content (X axis) and difference in share (Y axis).



5. Results – Simulations (3/8)

Relationship between added / total sugar ratio (X axis) and difference in share (Y axis).



5. Results – New Equilibrium (4/8)

Summary:

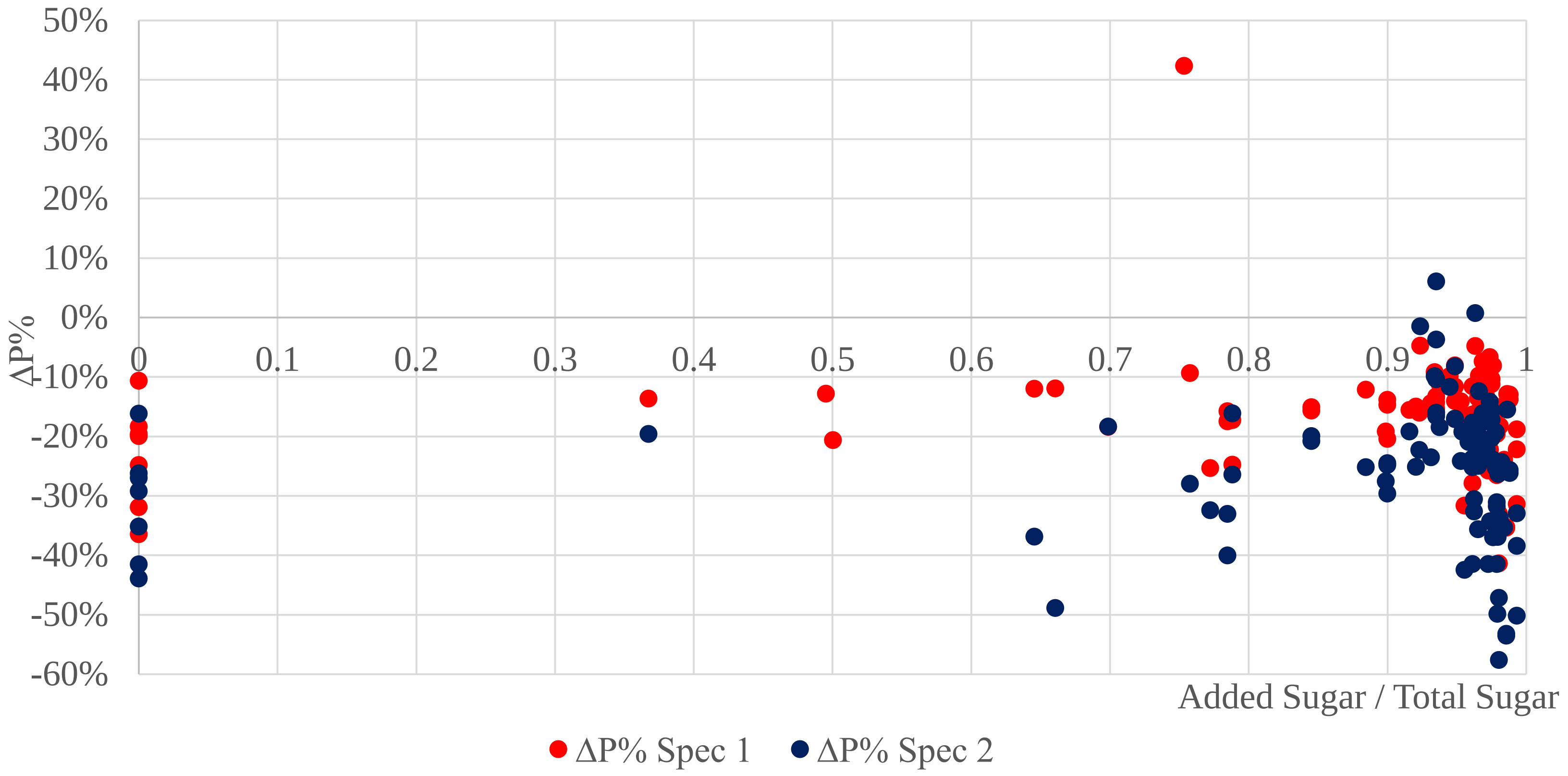
The majority of the products losing shares decrease their price and are able to gain higher shares.

NOTE:
The share of three of the leading products decline to go virtually to 0 → that corresponds to MUCH higher prices (>200% increase)!

- The remaining products' share overall increases from previous scenario, however not a clear pattern of the direction of change
- Overall amounts of sugar purchased increased compared to scenario without price changes

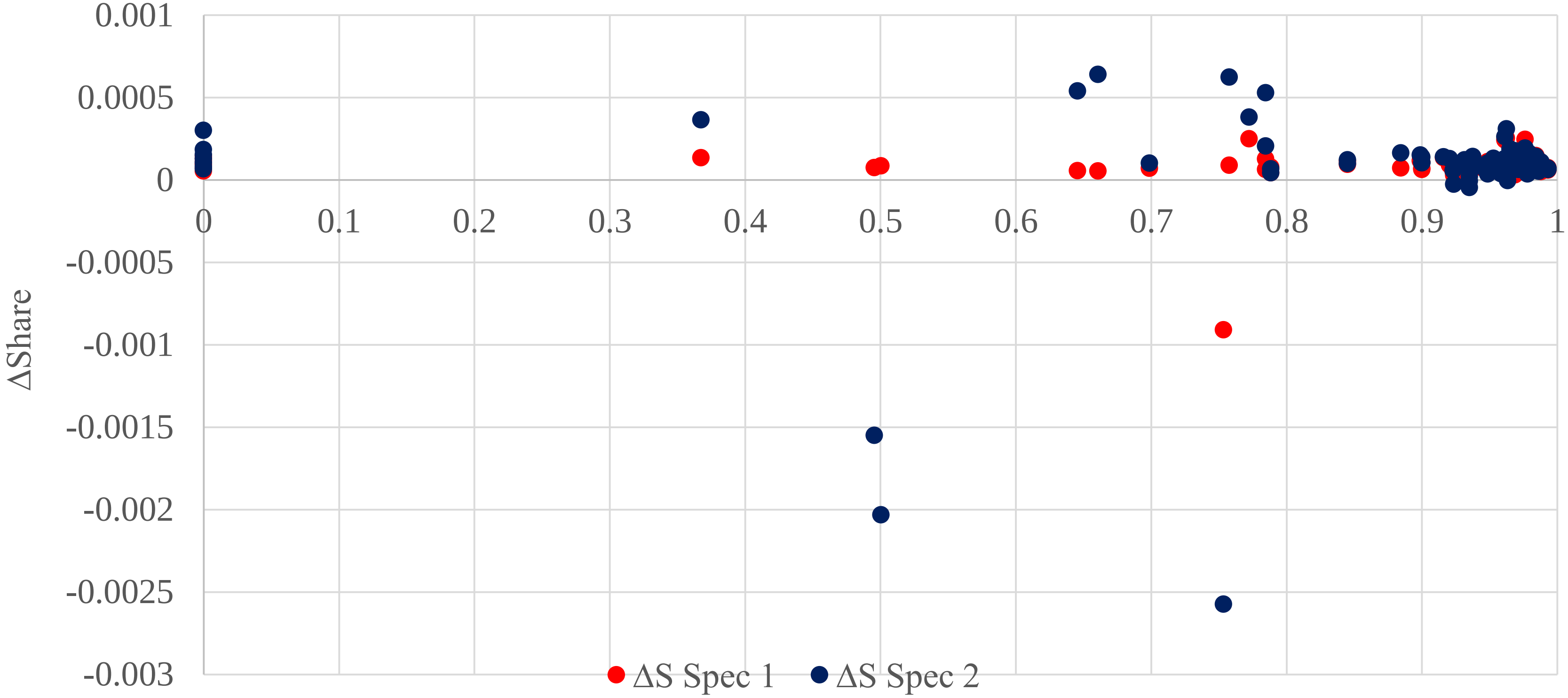
5. Results – New Equilibrium Prices (5/8)

Ratio of added sugar/ total sugar content (X axis), and simulated price changes (Y axis) after Nutrition Fact Label change



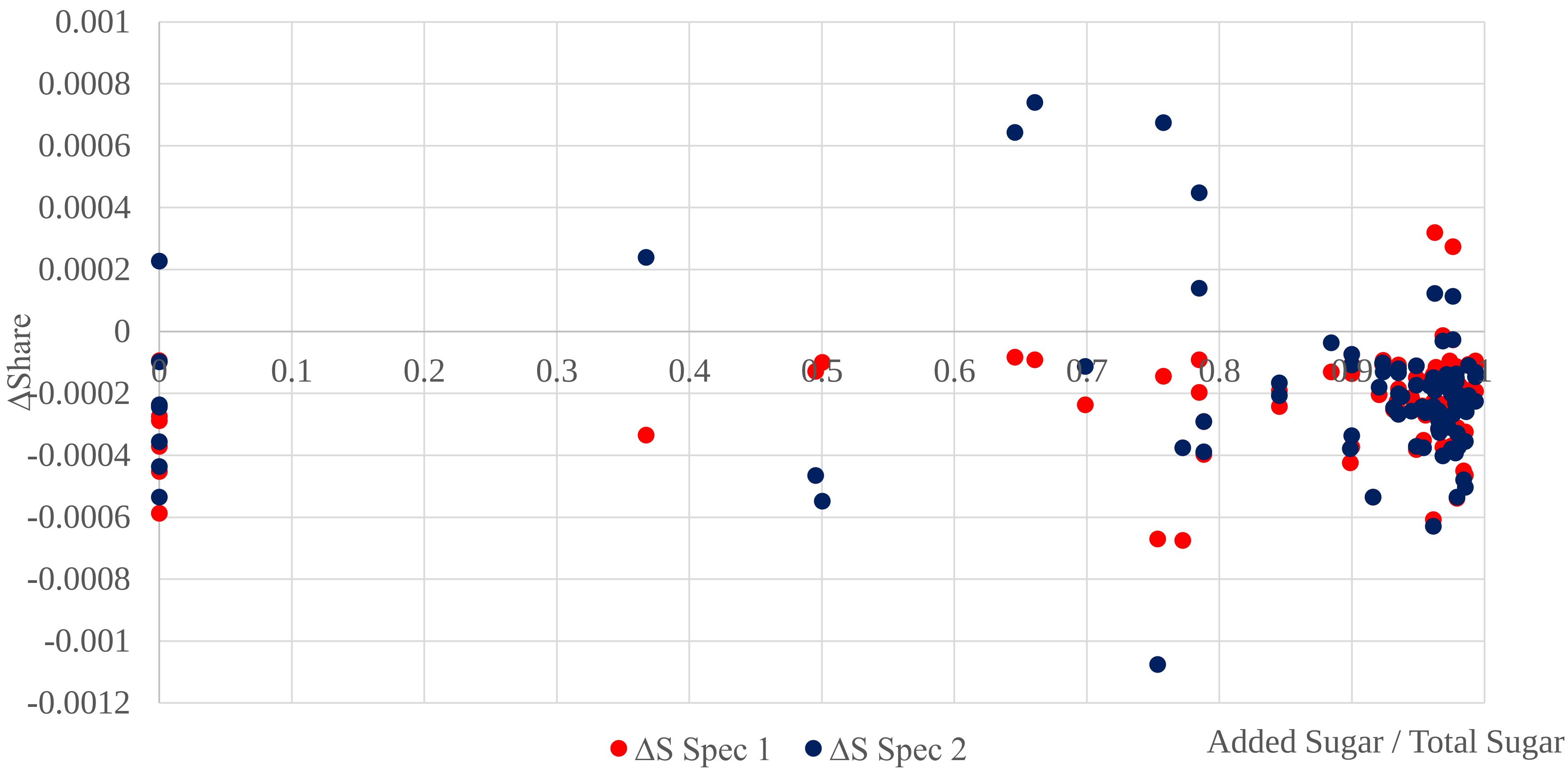
5. Results – New Equilibrium Shares (6/8)

Ratio of added sugar/ total sugar content (X axis), and simulated changes in shares (Y axis) at the new equilibrium – comparison PRE and POST price change (with new NFL information)



5. Results – New Equilibrium Shares (7/8)

Ratio of added sugar/ total sugar content (X axis), and simulated changes in shares (Y axis) at the new equilibrium



5. Results - Simulated Sugar Purchased (8/8)

		Data	Spec 1	%Change	Spec 2	%Change
No price	Added Sug	13,535.58	-7,203.04	-53.22%	-6,642.88	-49.08%
Adjustment	NAS	11,91.71	-5,45.76	-45.80%	247.61	20.78%
	Total Sugar	14,727.3	-7,748.81	-52.62%	-6,395.26	-43.42%

Values are in tons/year

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	Total Sugar	14,727.3	-7,748.81	-52.62%	-6,395.26	-43.42%

New Eq;	Added Sug	13,535.58	1,889.42	13.96%	1,273.02	9.40%
Comparison	NAS	11,91.71	86.94	7.29%	-526.25	-44.16%
With Snew	Total Sugar	14,727.3	1,976.36	13.42%	746.77	5.07%

Values are in tons/year

5. Results - Simulated Sugar Purchased (8/8)

		Data	Spec 1	%Change	Spec 2	%Change
No price	Added Sug	13,535.58	-7,203.04	-53.22%	-6,642.88	-49.08%
Adjustment	NAS	11,91.71	-5,45.76	-45.80%	247.61	20.78%
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Comparison	NAS	11,91.71	86.94	7.29%	-526.25	-44.16%
With SNew	Total Sugar	14,727.3	1,976.36	13.42%	746.77	5.07%
New Eq.	Added Sug	13,535.58	-5,313.62	-39.26%	-5,369.85	-39.67%
Overall Effect	NAS	11,91.71	-458.83	-38.50%	-278.64	-23.38%
	Total Sugar	14,727.3	-5,772.45	-39.20%	-5,648.5	-38.35%

Values are in tons/year

6. Conclusions (1/2)

With changes in Nutrition Facts Label, the FDA aims to facilitate the adoption of "healthy" diets for Americans

Preliminary results of simulated changes in purchases of RTE cereals due to NFL added sugar information, show a lot of potential for the NFL to help reducing the amounts of added sugar purchased…
… at least among "fringe products"

HOWEVER:
Model tends to **under-predict shares !** → Changes may actually be much smaller!!!!

6. Conclusions (2/2)

What is next ?
- QC share simulation

- No longer focusing on “fringe products”

- Ensure that the model’s predictive power is “reasonable”

- Model changes in formulation part of the supply side?

- Should we extend the “problem”?

Thank you!

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