Potential Market Responses to SSBs Taxation in Thailand

Evidences from Real Market Choice Experiments

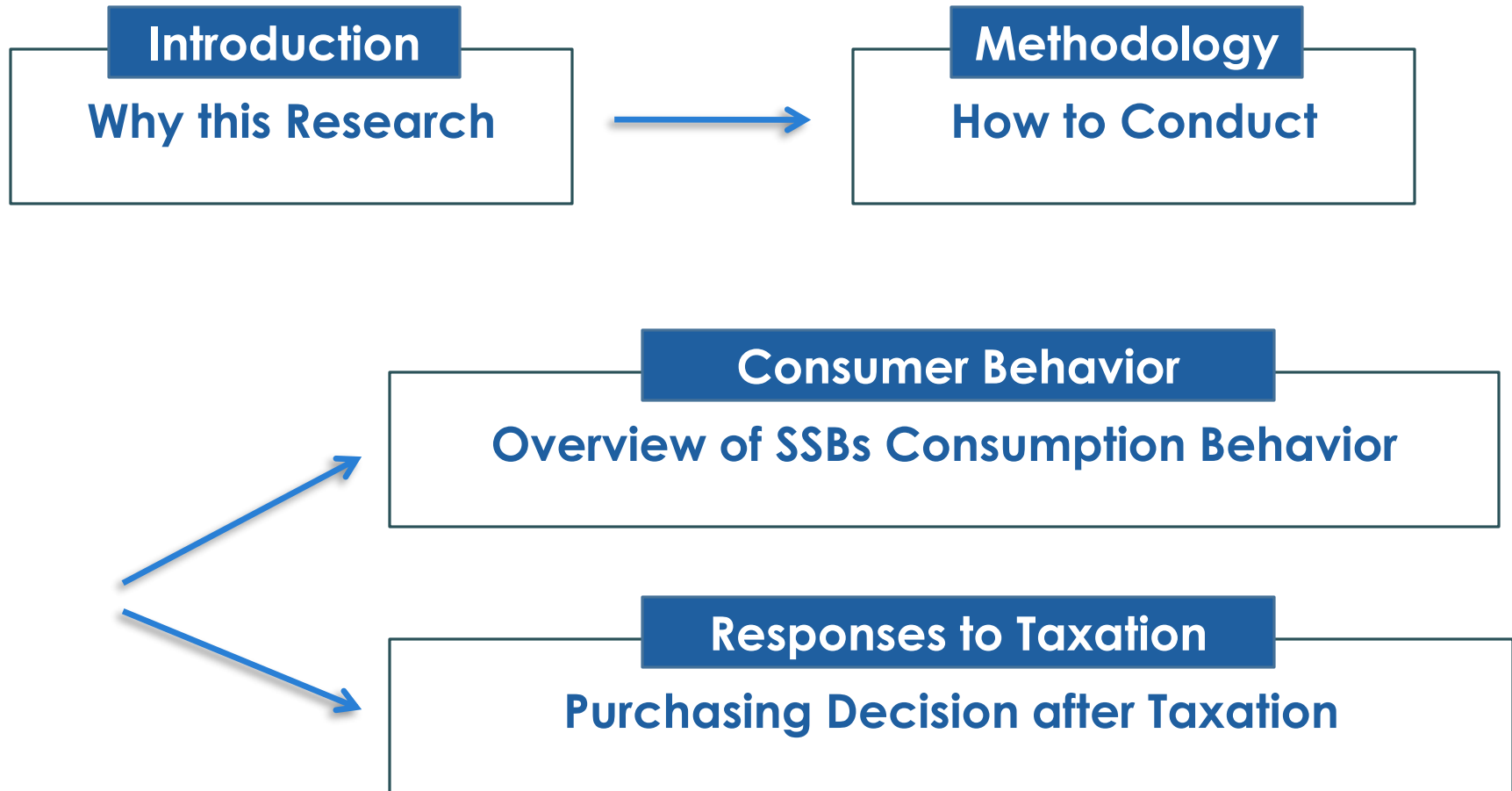**TANETPONG CHOUNGPRAYOON**

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Overview

Introduction
Why this Research

Methodology
How to Conduct

Consumer Behavior
Overview of SSBs Consumption Behavior

Responses to Taxation
Purchasing Decision after Taxation

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Starting Point

The National Reform Steering Assembly (NRSA)

↓ APPROVED

NRSA's committee on health and environmental reform's proposal of levying excise tax on Sugar-Sweetened Beverages (SSBs)

Main Ideas of the Proposal:
- SSBs containing sugar above 6 grams per 100 ml should be taxed.
- Tax rate should be increase retail price at least 20 percent.
- Progressive Rate depends on level of caloric sugar contained.

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Debates

Excise Tax Pass-Through Mechanism → Price ↑ → Consumption ↓
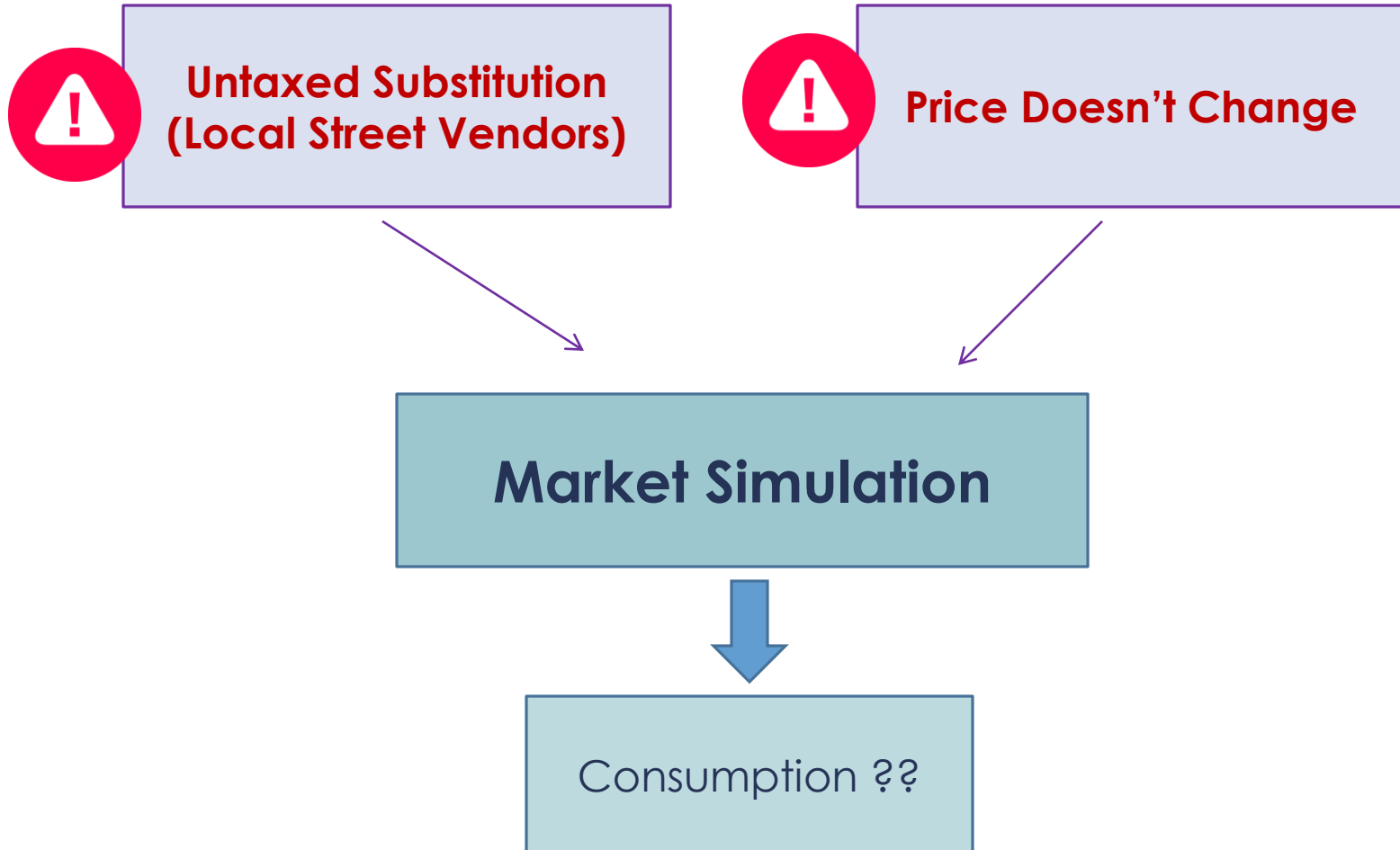
Untaxed Substitution (Local Street Vendors)

Price Doesn't Change

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Initiatives

Untaxed Substitution (Local Street Vendors)

Price Doesn't Change

Market Simulation

Consumption ??

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Methodology

Survey

(Jan 2017 – Feb 2017)

- **SSBs Perception**
- **Consumption Behavior**
- **Tax Policy Agreement**
- **Price Resistance**
- **Purchasing Behavior**

→ Paper

→ Online Survey (Survey Monkey)

Discrete Choice Experiment

(May 2017 – June 2017)

Purchasing Behavior and Influence of Relevant Attributes

conjoint.ly

Methodology

เรื่อง การสำรวจพฤติกรรมการดื่มและซื้อเครื่องดื่มของคนไทย

พฤติกรรมการดื่มเครื่องดื่มโดยทั่วไป

* 2. สินค้าเหล่านี้สามารถจัดประเภทเป็นสินค้าเครื่องดื่มได้ทั้งสิ้น ท่านทราบหรือไม่ (
ทราบ)

น้ำอัดลม	นมโคกล่อง/ขวด	นมเปรี้ยว	นมถั่
เครื่องดื่มธัญญาหาร	โยเกิร์ตพร้อมดื่ม	เครื่องดื่มชูกำลัง	เครื
น้ำผลไม้	น้ำพืชผัก	ชา/กาแฟพร้อมดื่ม*	ชา/ก
ชา/กาแฟผง(สำหรับชง)	บิวตี้ดริ้ง (Beauty Drink)	ฟังก์ชั่นนอลดริ้ง

*พร้อมดื่มคือเครื่องดื่มที่บรรจุกล่อง/กระป๋อง/ขวดปิดพร้อมดื่มแล้ว

◯ ทราบ

◯ ไม่ทราบ

14.1 ถ้าเครื่องดื่มที่ท่านชอบ**ขนาด 500 ml** (ขนาดขวดฝากลมพลาสติกมาตรฐานทั่วไป) **ราคาปัจจุบันอยู่ที่ 15**
ในอนาคตหากราคาขายเปลี่ยนไป ท่านจะซื้อเครื่องดื่มชนิดใด (ตอบเพียงข้อเดียว)

เครื่องดื่มพร้อมดื่มที่ท่านชอบ ขนาด: **500 ml** ราคา: **18 บาท**	เครื่องดื่มพร้อมดื่มที่ท่านชอบ ขนาด: **445 ml** ราคา: **15 บาท**	เครื่องดื่มพร้อมดื่มที่พอแทนกันได้ ขนาด: **500 ml** ราคา: **15 บาท**
1	2	3

	Street Vendor	Ready-to-Drink	Ready-to-Drink	Street Vendor
Product				
Price	20 บาท	18 บาท	15 บาท	30 บาท
Size	350 ml	550 ml	325 ml	590 ml
Sugar Level	Normal	Less Sugar	Normal	Normal
Taste Familiarity	Favorite drink/Usual Vendor	Favorite drink/Usual Vendor	Substi- tutes/New Street Vendor	Substi- tutes/New Street Vendor
Attribute				

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Potential Market Responses to SSBs Taxation in Thailand
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Statistical Inference

Descriptive Statistics

- SSBs Perception
- Consumption Behavior
- Purchasing Behavior

Multivariate Regression

- Tax Policy Agreement
- Price Resistance

$$Z_{i,i=1,2} = a_0 + \sum_{i=1}^{n} a_i A_i$$

Binary Logistic Regression

Purchasing Behavior and Influence of Relevant Attributes

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \sum_{i=1}^{n} \beta_i X_i$$

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Sample

Survey

	Total	N=507	100%
Survey Design	online	287	56.61%
	paper	220	43.39%
Age	15-20	75	14.79%
	21-25	293	57.79%
	26-30	65	12.82%
	Above 30	74	14.60%
Gender	Male	209	41.22%
	Female	298	58.78%
Income	below 10,000 baht	198	39.05%
	10,001-30,000	214	42.21%
	above 30,001	95	18.74%

Discrete Choice Experiment

	Total	N=320	100%
Age	15-20	14	4.38%
	21-25	144	45.00%
	26-30	106	33.13%
	Above 30	56	17.50%
Gender	Male	125	39.06%
	Female	195	60.94%
Income	below 10,000 baht	39	12.19%
	10,001-30,000	143	44.69%
	above 30,001	138	43.13%

Potential Market Responses to SSBs Taxation in Thailand
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Perception

Categories	Word listed
Feeling	Refreshing, Enjoyment, Tiresome, Excitement, Creative
Taste	Sweet, Sugar, Delicious, Spicy,Fizziness, Juicy
Health-Related	Stomachache, Obesity, Healthy, Energizing
Socialization	Playing Sports, Friends, Party, Conversation
Product Appearance	Hot, Cold, Bottle, Can, Glass, Black

Fizziness   Delicious

Refreshing
Party   Juicy   Sweet
Cold

Potential Market Responses to SSBs Taxation in Thailand
Evidences from Real Market Choice Experiments

Consumption Behavior

Favorite SSBs

- Carbonated Soft Drinks
- Fresh Milk and Flavored Milk
- Fruit Juice and Veggie
- Drinking yogurt

Frequency

55% : 2 – 4 times a week
22 %: At least 1 time per day

Price

67% : 15 – 25 Baht

Potential Market Responses to SSBs Taxation in Thailand
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Substitution Behavior

Carbonated Soft Drinks
1. Drinking Water
2. Juice and Veggie
3. Drinking Yogurt

Flavored Milk
1. Fresh Milk
2. Drinking Water
3. Soy Milk

Energy Drink
1. Drinking Water
2. Sport Drink
3. Carbonated Soft Drinks

Sport Drink
1. Drinking Water
2. Juice and Veggie
3. Carbonated Soft Drinks

Potential Market Responses to SSBs Taxation in Thailand
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Substitution Behavior

Fruit juice and Veggie

1. Drinking Water
2. Drinking Yogurt
3. Fresh Milk or flavored Milk

RTD Tea

1. Drinking Water
2. Street Vendors' Beverages
3. Juice and Veggie

RTD Coffee

1. Street Vendors' Beverages
2. Drinking Water
3. Drinking Yogurt
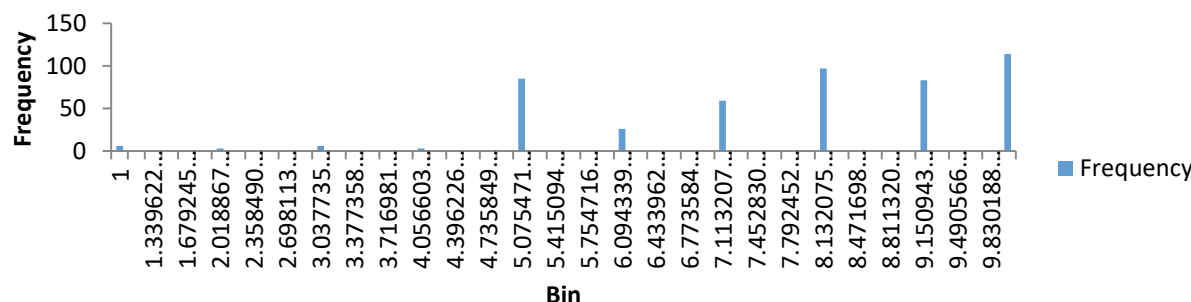
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Tax Policy Agreement

Please Rate Level of Agreement (1-10 Scale) according to this statement :
"SSBs taxation in Hungary effectively reduce the SSBs consumption"

Number of Observations	482
Mean	7.67
Median	8
Mode	10
Standard Deviation	2.05

Histogram

Potential Market Responses to SSBs Taxation in Thailand
Evidences from Real Market Choice Experiments

Price Resistance

Assuming current price of favorite SSBs 15 Baht,
How much you would pay in extra so that you would buy the same product

Number of Observations	475
Mean	8.62
Median	5
Mode	5
Standard Deviation	8.44

ANOVA Table (Dependent Variable = Log of Maximum Incremental Price)

Variables of Interest	Sum of Square	Df	F-Value	Pr$_{(>F)}$	Sig
Individual characteristic variables					
Gender	1.129	1	2.33	0.12	
Age	3.71	1	7.65	0.005	**
Income Level	5.322	10	1.1	0.36	
Consumption Behavior variables					
Weekly Consumption Frequency	0.039	1	0.08	0.78	
Average Price of Beverage	13.847	1	28.55	0.00	***
Residuals	186.201	384			

Potential Market Responses to SSBs Taxation in Thailand
Evidences from Real Market Choice Experiments

Price Resistance

Multivariate Regression Table
(Dependent Variable = Log of Maximum Incremental Price)

Variables of Interest	Coefficients	Standard Error	t-value	Pr(>|t|)	
Intercept	1.056	0.252	4.181	0.00	***
Gender-Female	0.114	0.075	1.526	0.13	
Age	0.017	0.006	2.766	0.005	**
Income level: 1,500-3,000 Baht	0.324	0.269	1.205	0.23	
Income level: 3,001-5,000 Baht	0.063	0.232	0.272	0.79	
Income level: 5,001-10,001 Baht	0.179	0.22	0.815	0.42	
Income level: 10,001-15,000 Baht	0.177	0.222	0.797	0.43	
Income level: 15,001-30,000 Baht	0.038	0.221	0.17	0.86	
Income level: 30,001-45,000 Baht	0.153	0.238	0.642	0.52	
Income level: 45,001-65,000 Baht	-0.219	0.284	-0.77	0.44	
Income level: 65,001-85,000 Baht	0.224	0.312	0.72	0.47	
Income level: 85,001-105,000 Baht	-0.275	0.458	-0.604	0.55	
Income level: Above 105,000 Baht	-0.666	0.54	-1.233	0.22	
Weekly Consumption Frequency	-0.005	0.018	-0.283	0.78	
Average Price of Beverage	0.023	0.004	5.344	0.00	***
F-Statistic $_{(14,384)}$	3.73				
R-Square	0.1197				
Number of Observations	399				

Potential Market Responses to SSBs Taxation in Thailand
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Market Simulation

Consumption Reasons

RTD Beverages

1. Tastiness
2. Convenience
3. Thirst-Quenching
4. Refreshing
5. Price

Local Street Vendors

1. Tastiness
2. Convenience
3. Price
4. Thirst-Quenching
5. Refreshing

Relevant Factors

Type of Drink + Price + Taste + Convenience

Market Simulation & Response

Respondents' Decision Under 1st Scenario (Only RTD, Cost Reduction Strategy)

Total Samples = 490 (100%)		
Stop Buying = 11 (2.24%)		
Drink: Favorite **Size:** 330 ml **Price:** 18 Baht	**Drink:** Favorite **Size:** 250 ml **Price:** 15 Baht	**Drink:** Favorite (with Slight Change of taste) **Size:** 330 ml **Price:** 15 Baht
N = 157 (32.04%)	N = 204 (41.63%)	N = 118 (24.08%)

Respondents' Decision Under 2nd Scenario (RTD&Street Vendors, Price Low)

Total Samples = 491 (100%)		
Stop Buying = 40 (8.15%)		
Drink: Favorite RTD **Size:** 185 ml **Price:** 16 Baht	**Drink:** Favorite Locally Produced Beverage **Size:** 185 ml **Price:** 15 Baht	**Drink:** Favorite Locally Produced Beverage **Size:** 350 ml **Price:** 20 Baht
N = 158 (32.18%)	N = 154 (31.36%)	N = 139 (28.31%)

Market Simulation & Response

Respondents' Decision Under 3rd Scenario (RTD & Street Vendors, Price Hike)

Total Samples = 490 (100%)		
Stop Buying = 64 (13.06%)		
Drink: Favorite RTD **Size:** 185 ml **Price:** 20 Baht	**Drink:** Familiar Locally Produced Beverage **Size:** 185 ml **Price:** 30 Baht	**Drink:** Unfamiliar Locally Produced Beverage **Size:** 350 ml **Price:** 20 Baht
N = 168 (34.29%)	N = 126 (25.71%)	N = 132 (26.94%)

Respondents' Decision Under 4th Scenario (Only RTD, Sugar Level Varied)

Total Samples = 478 (100%)			
Stop Buying = 33 (6.90%)			
Drink: Favorite **Sugar:** 12% **Price:** 18 Baht	**Drink:** Favorite **Sugar:** 11% **Price:** 17 Baht	**Drink:** Favorite **Sugar:** 10% **Price:** 16 Baht	**Drink:** Favorite **Sugar:** 8% **Price:** 15 Baht
N = 64 (13.39%)	N = 34 (7.11%)	N = 56 (11.72%)	N = 291 (60.88%)

Potential Market Responses to SSBs Taxation in Thailand
Evidences from Real Market Choice Experiments

Real Market Simulation

1st Scenario + 2nd Scenario + 3rd Scenario + 4th Scenario

Beverages Attributes	Attributes Level
Product Type	Ready-to-Drink
	Street Vendors Drinks
Price	15 Baht
	16 Baht
	17 Baht
	18 Baht
	20 Baht
	25 Baht
	30 Baht
Size	325
	350
	470
	500
	550
	590
Sugar Level	Low Sugar/ Low Calorie
	Normal Sweet Level
Taste or Familiarity	Favorite drink/Usual Vendor
	Substitutes/New Street Vendor
Proximity	3 Steps or Less than 10 meters ahead
	100 meters ahead

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Choice Experiments

Potential Market Responses to SSBs Taxation in Thailand
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Statistical Inferences from Choice Experiment

Analysis of Deviance of Purchasing Decision (1 = Buy, 0 = Not Buy)

Variables of Interest	Sum of Square	Df	Pr(>F)	
Product Type	68.80	1	0.000	***
Price	7.08	1	0.007	***
Size of Product (10 ml)	13.18	1	0.000	***
Sugar Level	45.07	1	0.000	***
Taste or Familiarity	52.14	1	0.000	***
Proximity	133.03	1	0.000	***
Product Type*Price	18.61	1	0.000	***
Product Type*Size	0.01	1	0.944	***
Product Type*Taste of Familiarity	5.18	1	0.023	**
Product Type*Proximity	0.10	1	0.317	

Potential Market Responses to SSBs Taxation in Thailand
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Statistical Inferences from Choice Experiment

Fixed Effect Logistic Regression of Purchasing Decision (1 = Buy, 0 = Not Buy)

Fixed Effects:				
Variables of Interest	Estimate	Std. Error	z-value	Pr(>|z|)
Intercept	2.009	0.759	2.645	0.008***
Local Street Drink (LSD) (0 = RTD, 1 =LSD)	- **1.994**	0.812	-2.454	0.014**
Price (Baht)	- 0.213	0.045	-4.721	0.000***
Size of Product (10 ml)	0.0123	0.005	2.257	0.024**
Regular Sugar Level (Less Sugar = 0, Regular Sugar = 1)	- 0.809	0.121	-6.714	0.000***
Unfamiliarity (Favorite Drink = 0 Substitutes = 1)	- 0.484	0.113	-4.263	0.000***
Long Distance (3 Steps = 0 100 Meters ahead = 1)	- **1.134**	0.118	-9.583	0.000***
LSD*Price	0.198	0.046	4.314	0.000***
LSD*Size	0.0005	0.007	0.071	0.944
LSD*Unfamiliarity	- 0.354	0.156	-2.276	0.023**
LSD*Long Distance	0.150	0.150	1.000	0.317

Conclusion

- Thai consumers frequently drink highly sugar-sweetened beverages due to its taste, its refreshing and easy-to-find characteristics

- Consumers believe that taxation might be able to curb consumption behavior and cause them to buy drinking water instead

- There is a possibility of consumption shift from taxed SSBs to untaxed SSBs, even though SSBs are preferable

- Accessibility to SSBs, caloric sugar concentration, and product familiarity are important factors influencing purchasing decision

Suggestion: Specific tax with rate varied by level of sugar concentration

+

Non-Tax Measures

Supporting healthier beverages and restrict high calorie beverages

Limitation

Samples

Samples are in high SSBs consumption areas

Number of Attributes

Limited due to experiment methodology and individual cognitive ability

online choice experiment

Not simulated the real world situation perfectly