

Salience and Taxation: Theory and Evidence

An Analysis of Chetty, Looney, & Kroft (AER, 2009)

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What is "Tax Salience"?

Definition

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Scenario: A \$10 item with 7.5% sales tax.

High Salience (Tax Included)

- Price shows: **\$10.75**
- You see the full cost upfront.
- **Your brain processes:** "This costs \$10.75."

Low Salience (Tax Added at Register)

- Price shows: **\$10.00**
- Final cost at checkout: \$10.75
- **Your brain processes:** "This costs \$10.00."

Introduction and Research Question

Standard Economic Assumption

A central assumption in public economics is that agents engage in **full optimization** with respect to tax policies, treating a tax exactly like a price change.

The Paper's Core Research Question

This paper empirically investigates whether this is true by analyzing the effect of tax "**salience**," defined as the visibility of the tax-inclusive price.

- **Hypothesis:** Consumers systematically underreact to taxes that are not salient (i.e., not included in posted prices).

Connection to Lectures

This research directly tests the concept of **Context-Dependent Preferences** from the "Psychology of Choice" lectures. The "context" here is how the price information is framed for the consumer, challenging the model of a rational agent with fixed preferences.

Empirical Framework

The Model and Key Parameter

The authors model consumer demand as a log-linear function of the posted price (p) and the ad valorem sales tax (τ^s):

$$\log x(p, \tau^s) = \alpha + \beta \log p + \theta_\tau \beta \log(1 + \tau^s)$$

The key parameter is θ_τ , which measures the degree to which consumers underreact to the tax, defined as the ratio of the tax elasticity to the price elasticity:

$$\theta_\tau = \frac{\epsilon_{x,1+\tau^s}}{\epsilon_{x,p}}$$

The neoclassical null hypothesis is $\theta_\tau = 1$. This framework simplifies a complex psychological concept into one testable factor

The Two Empirical Strategies

Strategy 1: Manipulate Tax Saliency

Concept: Make the non-salient sales tax as visible as the pretax price.

Method: Post new price tags showing the full tax-inclusive price, $q = (1 + \tau^s)p$. **Estimator:** The degree of underreaction, $(1 - \theta_\tau)$, is estimated by:

$$(1 - \theta_\tau) = -\frac{\Delta \log x}{\epsilon_{x,p} \log(1 + \tau^s)}$$

Strategy 2: Manipulate Tax Rate

Concept: Exploit independent variation in the tax rate (τ^s) and the pretax price (p). **Method:** Use observational data where tax rates and prices change independently. **Estimator:** The parameter θ_τ is identified directly by the ratio of the two estimated elasticities:

$$\theta_\tau = \frac{\epsilon_{x,1+\tau^s}}{\epsilon_{x,p}}$$

Data Table 1

TABLE 1— SURVEY EVIDENCE: SUMMARY STATISTICS

	Mean	Median	Standard deviation
<i>Panel A. Classroom survey</i>			
Original price tags:			
Correct tax-inclusive price w/in \$0.25	0.18	0.00	0.39
Experimental price tags:			
Correct tax-inclusive price w/in \$0.25	0.75	1.00	0.43
<i>t</i> -test for equality of means: $p < 0.001$			
<i>N</i> = 49			
<i>Panel B. Grocery store survey</i>			
Local sales tax rate	7.48	7.39	0.80
(Actual rate is 7.375 percent)			
Fraction correctly reporting tax status			
All items	0.82	1.00	0.38
Beer	0.90	1.00	0.30
Cigarettes	0.98	1.00	0.15
Cookies	0.65	1.00	0.48
Magazines	0.87	1.00	0.34
Milk	0.82	1.00	0.38
Potatoes	0.81	1.00	0.39
Soda	0.76	1.00	0.43
Toothpaste	0.80	1.00	0.40
<i>N</i> = 91			

Data Table 2

TABLE 2—GROCERY EXPERIMENT: SUMMARY STATISTICS

	Treatment store		Control stores		Total
	Treatment products (1)	Control products (2)	Treatment products (3)	Control products (4)	All stores and products (5)
<i>Panel A. Category-level statistics</i>					
Weekly quantity sold per category	25.08 (24.1)	26.63 (38.1)	27.84 (27.4)	30.64 (47.0)	29.01 (42.5)
Weekly revenue per category	\$97.85 (81.9)	\$136.05 (169.9)	\$107.04 (92.3)	\$154.66 (207.7)	\$143.10 (187.1)
Number of categories	13	95	13	95	108
<i>Panel B. Product-level statistics</i>					
Pre-tax product price	\$4.46 (1.8)	\$6.26 (4.3)	\$4.52 (1.7)	\$6.31 (4.2)	\$6.05 (4.1)
Pre-tax product price (weighted by quantity sold)	\$4.27 (1.7)	\$5.61 (3.9)	\$4.29 (1.6)	\$5.59 (3.8)	\$5.45 (3.7)
Weekly quantity sold per product (conditional > 0)	1.47 (0.9)	1.82 (1.6)	1.61 (1.1)	1.98 (1.9)	1.88 (1.7)

Data Table 3

TABLE 3—EFFECT OF POSTING TAX-INCLUSIVE PRICES: *DDD* ANALYSIS OF MEAN QUANTITY SOLD

Period	Control categories	Treated categories	Difference
<i>Panel A. Treatment store</i>			
Baseline (2005:1–2006:6)	26.48 (0.22) [5,510]	25.17 (0.37) [754]	−1.31 (0.43) [6,264]
Experiment (2006:8–2006:10)	27.32 (0.87) [285]	23.87 (1.02) [39]	−3.45 (0.64) [324]
Difference over time	0.84 (0.75) [5,795]	−1.30 (0.92) [793]	$DD_{TS} = -2.14$ (0.68) [6,588]
<i>Panel B. Control stores</i>			
Baseline (2005:1–2006:6)	30.57 (0.24) [11,020]	27.94 (0.30) [1,508]	−2.63 (0.32) [12,528]
Experiment (2006:8–2006:10)	30.76 (0.72) [570]	28.19 (1.06) [78]	−2.57 (1.09) [648]
Difference over time	0.19 (0.64) [11,590]	0.25 (0.92) [1,586]	$DD_{CS} = 0.06$ (0.95) [13,176]
<i>DDD Estimate</i>			−2.20 (0.59) [19,764]

Strategy 1: The Grocery Store Experiment

Design and Implementation

- **Setting:** A supermarket with a 7.375% sales tax added at the register.
- **Intervention:** For three weeks, posted new tags showing the full tax-inclusive price for ~ 750 products.
- **Methodology:** A difference-in-differences (DDD) design comparing treated products to control groups.

Results & Connection to Lectures

- Posting the tax-inclusive tags caused demand for the treated products to **fall by 7.6 percent**.
- This implies a salience parameter $\theta_\tau \approx 0.35$.
- Surveys confirmed this is due to **inattention**, not lack of information. This provides real-world evidence for the lecture notes' models of **limited attention** and the power of **framing effects**.

Connection to Prospect Theory (Topics 3 & 4)

Reference Dependence

- **From Lecture Notes:** Prospect Theory assume that people evaluate outcomes not in absolute terms, but as gains and losses relative to a **reference point**.
- **Paper Connection:** The posted shelf price acts as the consumer's powerful reference point. The sales tax, revealed later, is psychologically coded as a "loss" from that reference.

Loss Aversion

- **From Lecture Notes:** This principle states that losses are felt more intensely than equivalent gains ($v(x) < -v(-x)$).
- **Paper Connection:** This helps explain the market equilibrium. Retailers have a strong incentive *not* to make the tax salient because they intuitively understand that framing a cost as an explicit loss would trigger a stronger negative psychological reaction.

Strategy 2: The Alcohol Tax Study

Design and Implementation

- **Natural Experiment:** Exploits two types of state-level alcohol taxes:
 - ① A **salient excise tax** (included in the posted price).
 - ② A **non-salient sales tax** (added at the register).
- **Data:** State-level beer consumption and tax rates from 1970-2003.

Results Connection to Lectures

- The salient excise tax reduces consumption by an "**order of magnitude more**" than the non-salient sales tax.
- The sales tax elasticity is statistically indistinguishable from zero, implying $\theta_\tau \approx 0$.
- This long-run persistence demonstrates a stable psychological bias, consistent with the lecture notes' concept of a **Status Quo Bias**, where consumers anchor on the visible price.

Conclusion & Summary of Connections

Summary of Findings

The Chetty et al. paper provides robust evidence that tax salience matters profoundly, due to **inattention**, not lack of information. This has two major upshots:

- Statutory incidence affects economic incidence, violating tax neutrality.
- The paper provides a framework for welfare analysis with non-rational agents.

Synthesis of Connections to Lectures

The research empirically validates a web of interconnected psychological principles:

- It is a real-world example of **Context-Dependence** and **Framing Effects**.
- The results can be interpreted through the lens of Prospect Theory's **Reference Dependence** and **Loss Aversion**.

Thank you. Questions?