Betting on the House

Subjective Expectations and Market Choices

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Introduction

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- However, little direct evidence that:
  - Expectations *cause* real market decisions.
  - Magnitude of that effect.
- Our contribution: provide direct causal evidence from a large-scale, high-stakes field experiment.

Thought Experiment

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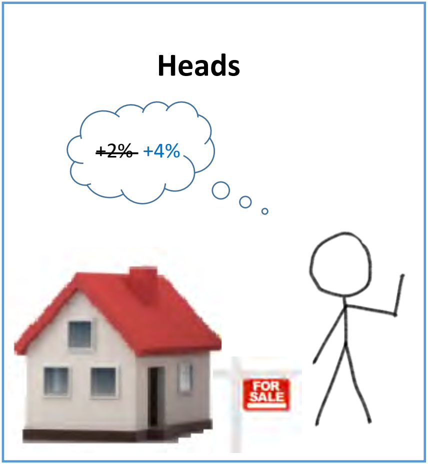

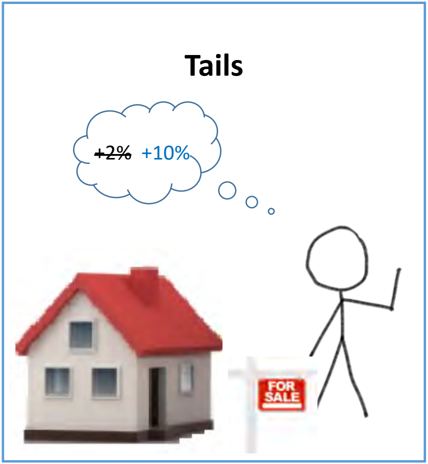

Our Contribution

- Conducted a field experiment that gets close to this ideal experiment.
  - Full design pre-registered in AEA RCT Registry (#0003663).
- In a nutshell:
  1. Contact 57,910 individuals who recently listed a property.
  2. Randomize non-deceptive information to create exogenous shocks to their home price expectations.
  3. Measure if shocks to expectations affect the subsequent sales probability.

Preview of Findings

- Expectations have a significant effect on decision to sell the home.
  - Favorite estimate (TOT): $\uparrow$ 1 pp expectation causes 2.63 pp $\downarrow$ in probability of selling the home.

Preview of Findings

- Expectations have a significant effect on decision to sell the home.
  - Favorite estimate (TOT): $\uparrow$ 1 pp expectation causes 2.63 pp $\downarrow$ in probability of selling the home.
- The results are robust to a number of checks.
  - E.g. binned scatterplots, event-study analysis, falsification tests.

Related Literature

- Home price expectations in macroeconomics, finance and real estate (Shiller, 2005; Glaeser & Nathanson, 2015; **Bailey et al., 2018**; Gennaioli & Shleifer, 2018; **Armona et al., 2019**; Kaplan et al., 2019).

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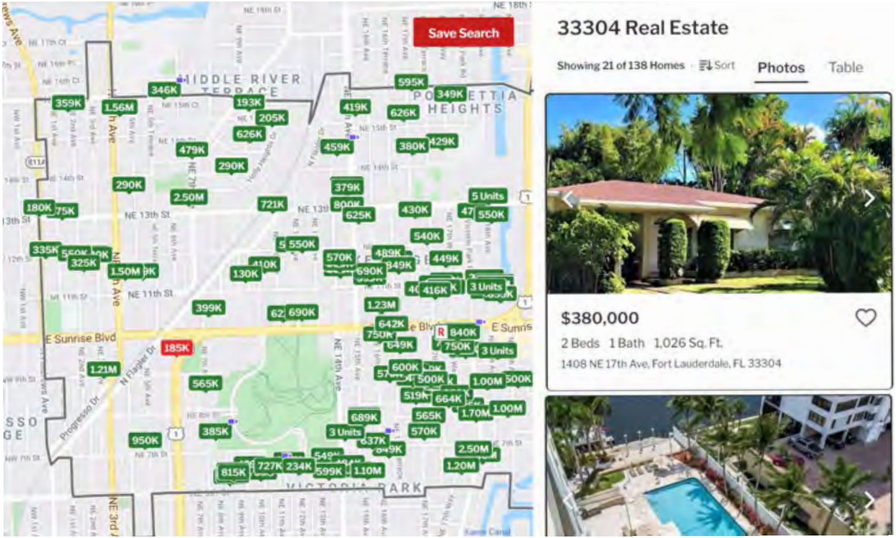
- Broader literature on macroeconomic expectations and information-provision experiments (e.g., Coibion et al., 2015, 2018, 2020; Armantier et al., 2016; Cavallo et al., 2017; Fuster et al., 2018).

Research Design

4-Step Recipe

1. Identify a sample of properties on the market.

Step 1: Identify Recent Listings



Step 1: Identify Recent Listings

4-Step Recipe

1. Identify a sample of properties on the market.
2. Identify the name and address of the owner.

Step 2: Identify Their Owners

Public Facts for 1408 Northeast 17th Ave

Home Facts

Beds	—	Lot Size	6,750 Sq. Ft.
Baths	—	Style	Single Family Residential
Finished Sq. Ft.	1,026	Year Built	1951
Unfinished Sq. Ft.	—	Year Renovated	1968
Total Sq. Ft.	1,026	County	Broward County
Stories	1	APN	494234019540

Home facts updated by county records on Apr 4, 2020.

Step 2: Identify Their Owners

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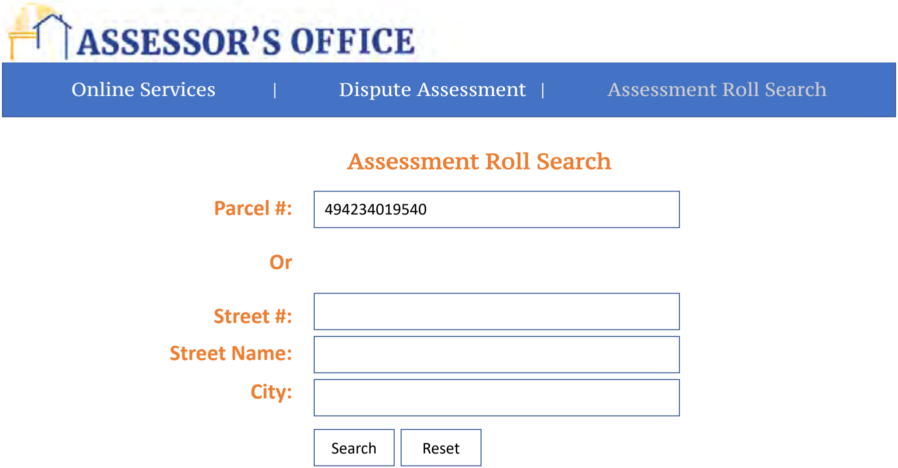

Step 2: Identify Their Owners

ASSESSOR'S OFFICE

Online Services | Dispute Assessment | Assessment Roll Search

Assessment Roll Search

Parcel #	494234019540
Address	1408 NE 17th Ave, Fort Lauderdale, FL 33304
Owner/s	Axel Foley
Mailing Address	1408 NE 17th Ave, Fort Lauderdale, FL 33304
School District	
Status	Active
Zoning Code	RE4
Total size	1,026
Assessed Value	$350,000

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1. Identify a sample of properties on the market.
2. Identify the name and address of the owner.
3. Mail information on home prices to the owner.

Step 3: Mail Information to Owners

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UCLA

Los Angeles, May 31st 2019

Dear Axel Foley,

We are researchers at UCLA and we are reaching out to you as part of a research study about decision making of homeowners.

According to our records, you may be considering selling a property. We know these decisions can be difficult, so we want to share some information that we hope can be helpful:

4-Step Recipe

1. Identify a sample of properties on the market.
2. Identify the name and address of the owner.
3. Mail information on home prices to the owner.
4. Track whether the house was sold and when.

Step 4: Track Sales Outcome

Property History for 1408 Northeast 17th Ave

Today

Dec 29, 2019 Date	Sold (Public Records) Public Records	$382,000 Price
Nov 29, 2019 Date	Listed (Active) Beaches MLS #F10203412	$380,000 Price

See all property history

Step 4: Track Sales Outcome

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See all property history

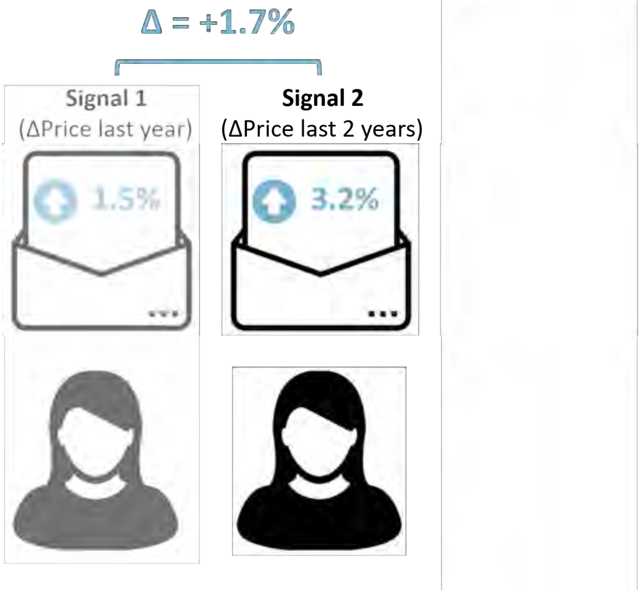
Information Experiment

- Goal: use randomization to induce exogenous "information shocks."
- Two sources of exogenous variation:
  1. Source-randomization.
  2. Disclosure-randomization.

Source-Randomization +

Signal 1
(ΔPrice last year)

Source-Randomization +



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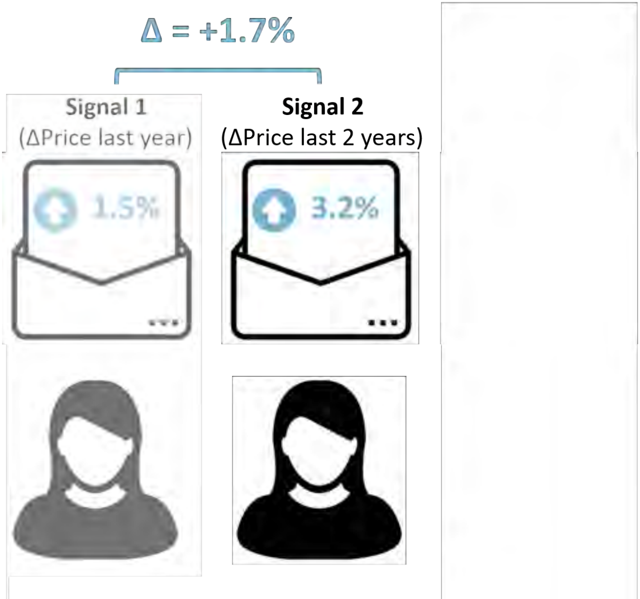

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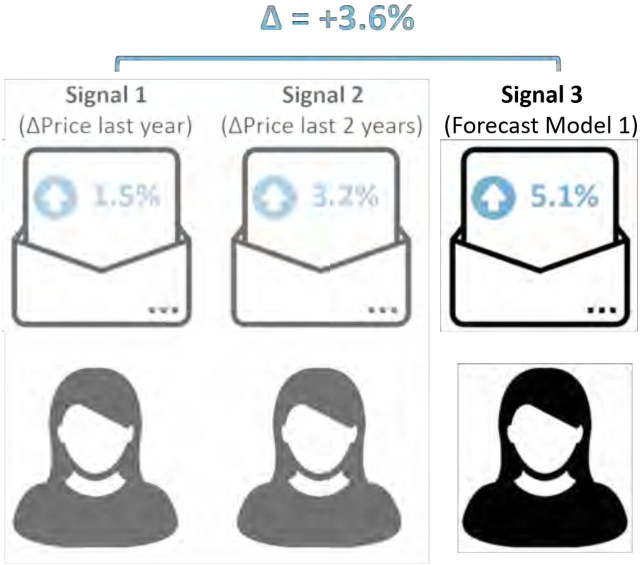


Econometric Model

$$Y_i^{post} = \nu_0 + \nu_1 \cdot \underbrace{\left(E_m^{j_i^*} - E_m^1\right)}_{\textbf{Information Shock}} + \varepsilon_i \tag{1}$$

- Y_i^{post}: post-treatment outcome.
- E_m^1: baseline source.
- $E_m^{j_i^*}$: source *actually* shown to subject i.
- See paper for disclosure-randomization.

Sample Letter

UCLA

Los Angeles, May 31st 2019

Dear Ricky Fort,

We are researchers at UCLA and we are reaching out to you as part of a research study about decision making of homeowners.

According to our records, you may be considering selling a property. We know these decisions can be difficult, so we want to share some information that we hope can be helpful:

<<INFORMATION>>

If you would like to help us with our study, we kindly ask you fill out the following 2-minute survey:

Visit **www.surveyhousing.com** and enter validation code

Participation is voluntary and responses are 100% confidential. The results of this study can provide valuable insights to homeowners across the country. Your participation in the survey is greatly appreciated.

Your household was randomly chosen to receive this letter. *We will not send you any more letters in the future.*

If you have any questions about the study, you can find contact information on our website: www.anderson.ucla.edu/housingstudy.

Thank you for your attention!

Ricardo Perez-Truglia	*Nicolas Bottan*
Assistant Professor of Economics	Post-Doctoral Associate
University of California, Los Angeles	Cornell University

<<INFORMATION DETAILS>>

Ricky Fort
123 Sunscreen Dr
Miami, FL 33155

Sample Table: Past-1

Median Price

2-bedroom home in ZIP Code 33308

May 2018:	$339,000	
		+1.2%
May 2019:	$343,000	

Notes: for more details, see the notes in the back of this page.

Sample Table: Past-2

Median Price

2-bedroom home in ZIP Code 33308

May 2017:	$320,000		
		⬆ +5.9%	Annual average: +3.6%
May 2018:	$339,000		
		⬆ +1.2%	
May 2019:	$343,000		

Notes: for more details, see the notes in the back of this page.

Sample Table: Forecast-1

Median Price

2-bedroom home in ZIP Code 33308

May 2019: $343,000

+2.6%

May 2020: $352,000
(forecast)

Notes: for more details, see the notes in the back of this page. The forecasts originate from our own statistical models and as such are subject to error.

Sample Table: Forecast-2

Median Price		
2-bedroom home in ZIP Code 33308		
May 2019:	$343,000	
		↑ +4.1%
May 2020: ***(forecast)***	$357,000	

Notes: for more details, see the notes in the back of this page. The forecasts originate from our own statistical models and as such are subject to error.

Sample Table: Forecast-3

Median Price

2-bedroom home in ZIP Code 33308

May 2019:	$343,000		
			+3.5%
May 2020: *(forecast)*	$355,000		

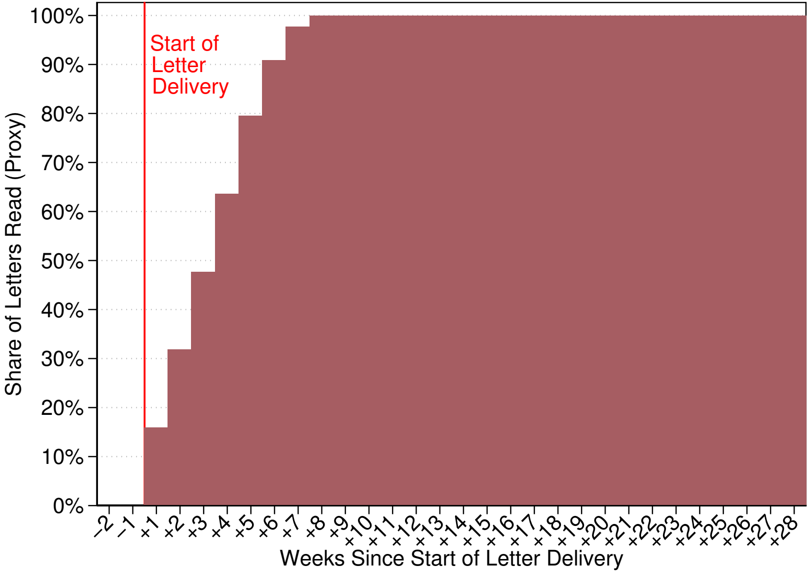
Notes: for more details, see the notes in the back of this page. The forecasts originate from our own statistical models and as such are subject to error.

Implementation Details

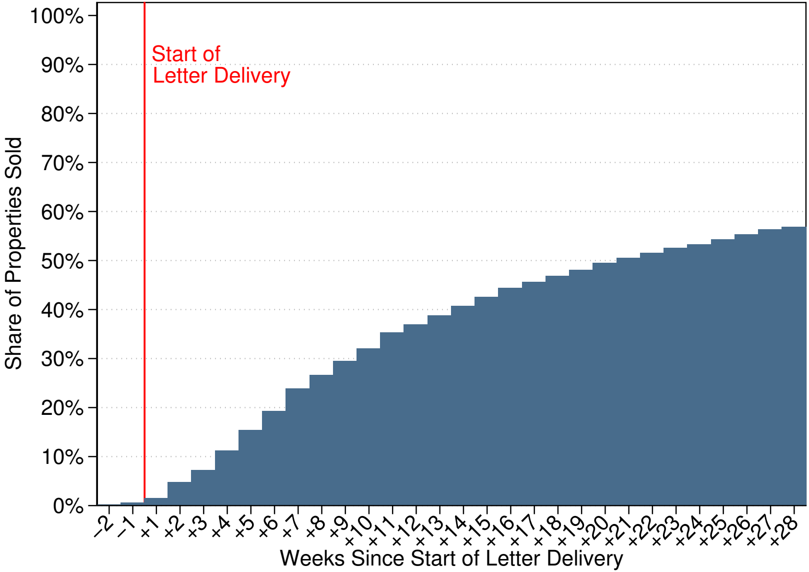
Timing

- Mailed letters to 57,910 unique homeowners.
  - From 36 different counties.
  - Properties valued at $34 billion.
- Mailed letters on June 10 2019.

Timing


Start of Letter Delivery
Share of Letters Read (Proxy)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
−2 −1 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10 +11 +12 +13 +14 +15 +16 +17 +18 +19 +20 +21 +22 +23 +24 +25 +26 +27 +28
Weeks Since Start of Letter Delivery

Timing



Start of
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100%
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30%
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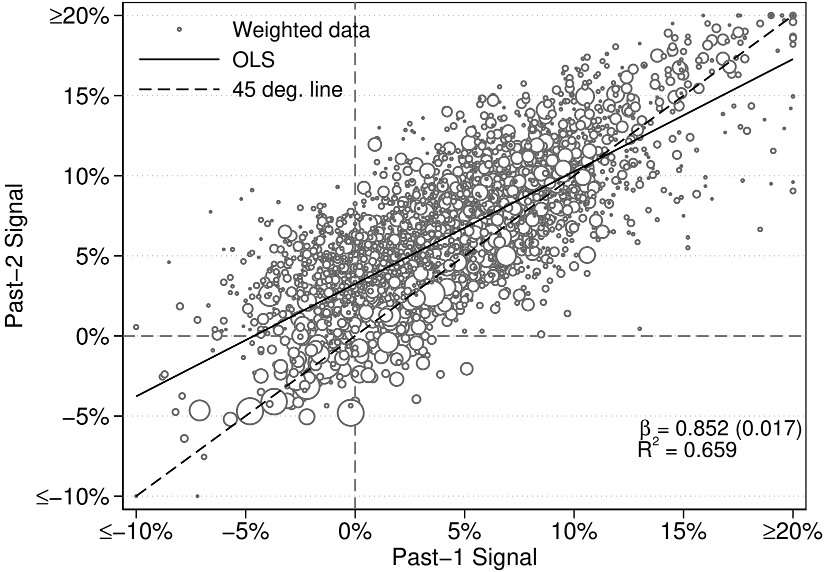
10%
0%
Share of Properties Sold
−2 −1 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10 +11 +12 +13 +14 +15 +16 +17 +18 +19 +20 +21 +22 +23 +24 +25 +26 +27 +28
Weeks Since Start of Letter Delivery

Heterogeneity in Signals



Results

Effects on Behavioral Outcomes

	Field Experiment
Information Shock	
Randomization Type	
Mean Outcome	
Std. Dev. Outcome	
Observations	

Effects on Behavioral Outcomes

	Field Experiment
	(1) S_{+12w}
Information Shock	-0.318*** (0.122)
Randomization Type	Source
Mean Outcome	36.93
Std. Dev. Outcome	48.26
Observations	46,423

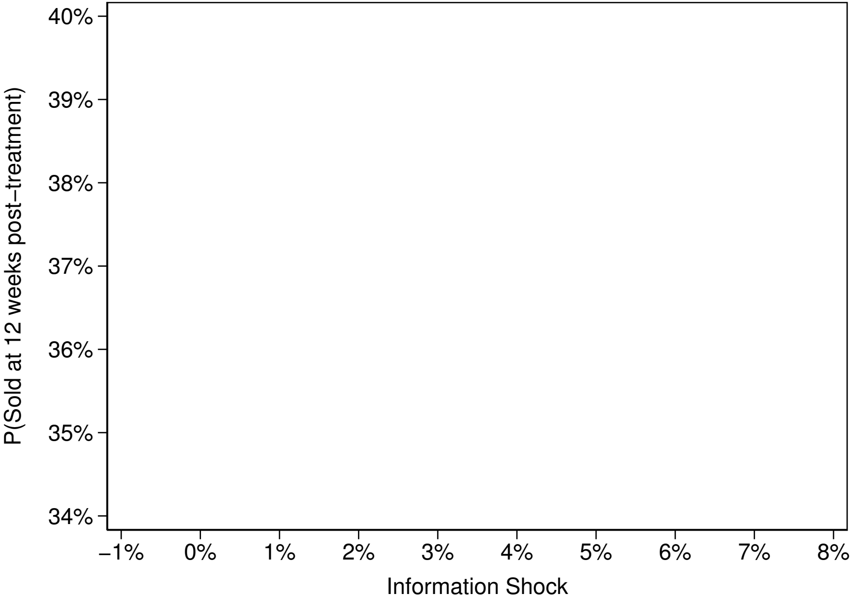
Effects on Behavioral Outcomes

	Field Experiment	
	(1)	(2)
	S_{+12w}	S_{+12w}
Information Shock	-0.318***	-0.419**
	(0.122)	(0.170)
Randomization Type	Source	Disclosure
Mean Outcome	36.93	36.99
Std. Dev. Outcome	48.26	48.28
Observations	46,423	57,910

Effects on Behavioral Outcomes

	Field Experiment		
	(1)	(2)	(3)
	S_{+12w}	S_{+12w}	S_{+12w}
Information Shock	-0.318***	-0.419**	-0.350***
	(0.122)	(0.170)	(0.105)
Randomization Type	Source	Disclosure	Both
Mean Outcome	36.93	36.99	36.99
Std. Dev. Outcome	48.26	48.28	48.28
Observations	46,423	57,910	57,910

Effects on Behavioral Outcomes



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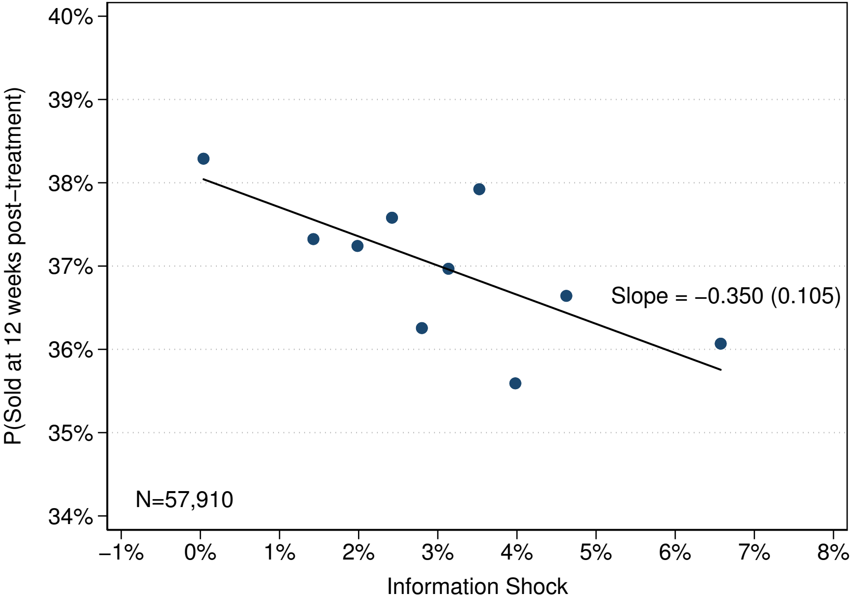
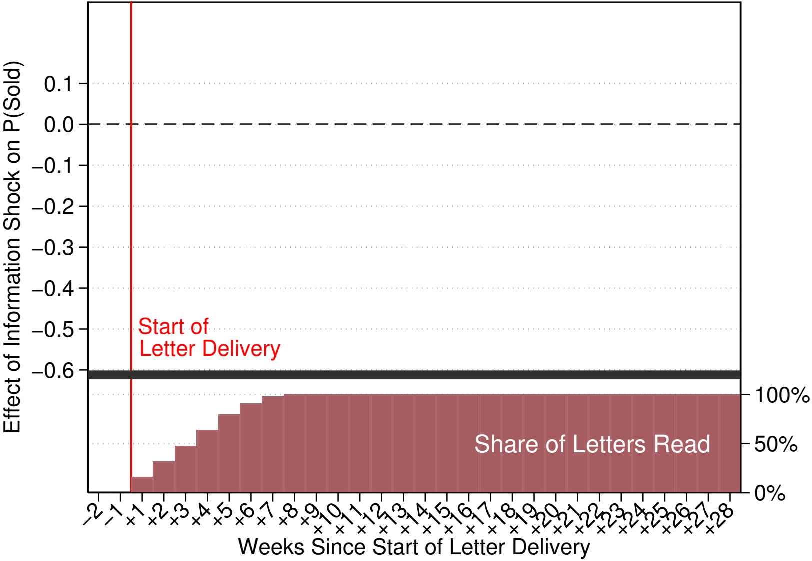


Event-Study Analysis +



Note: 90% Confidence Intervals in brackets

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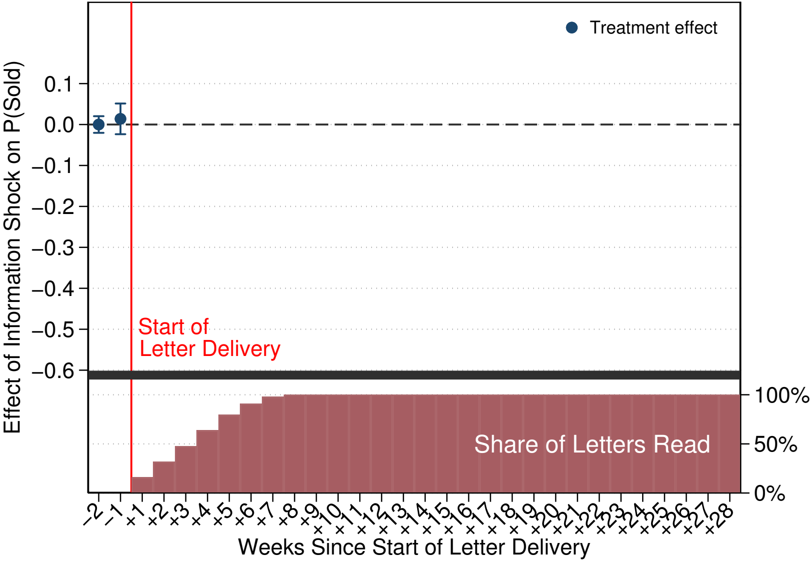

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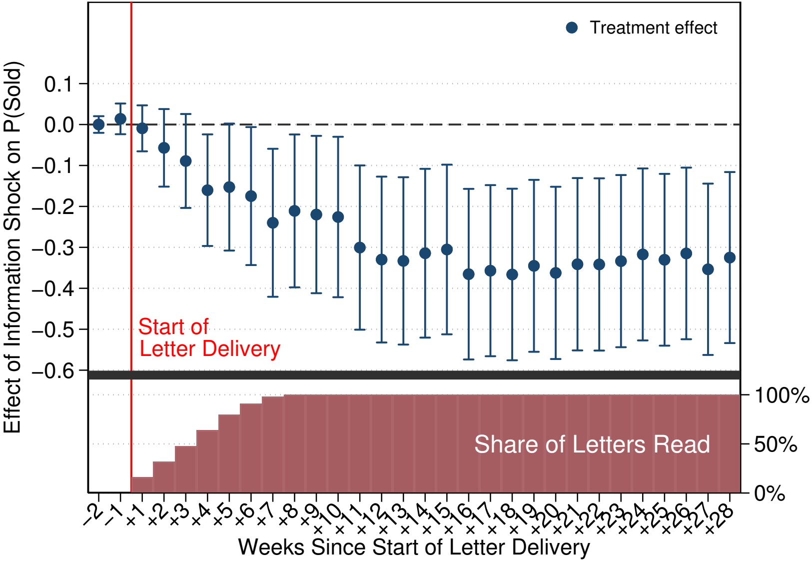

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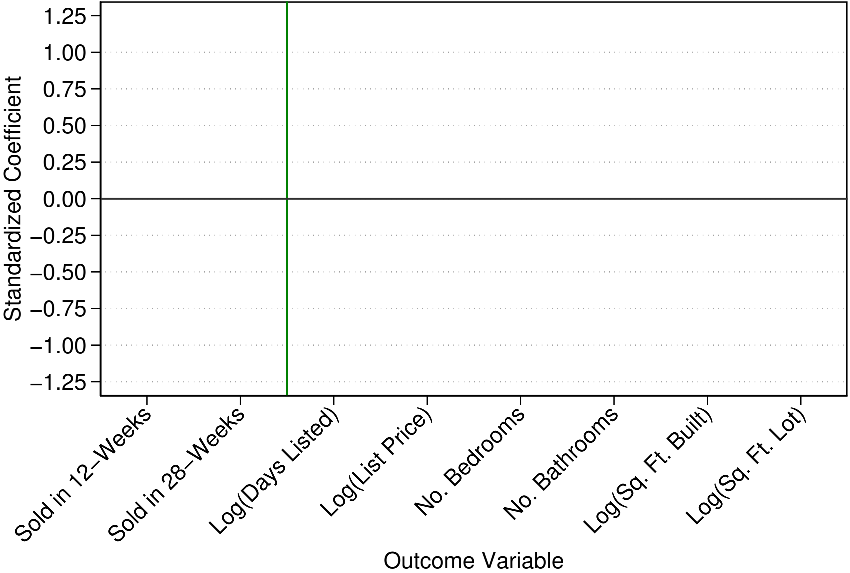
Falsification Tests



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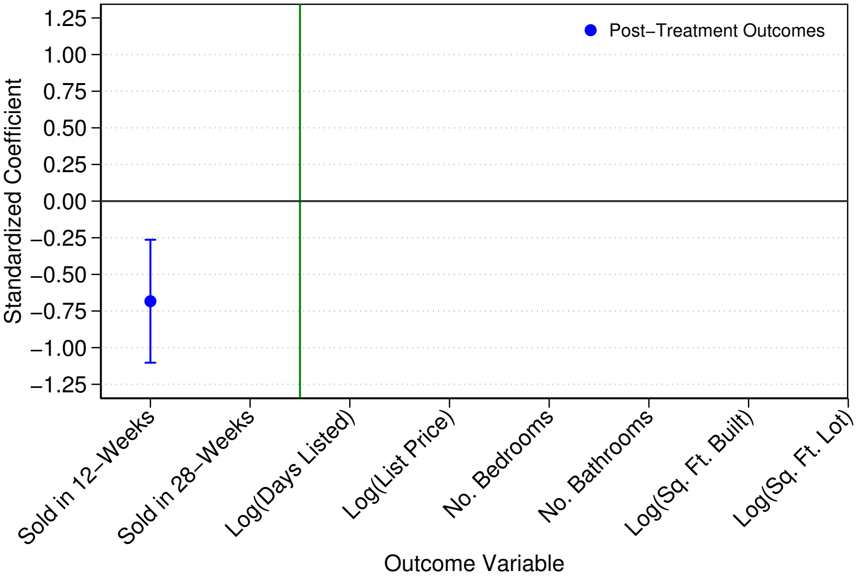

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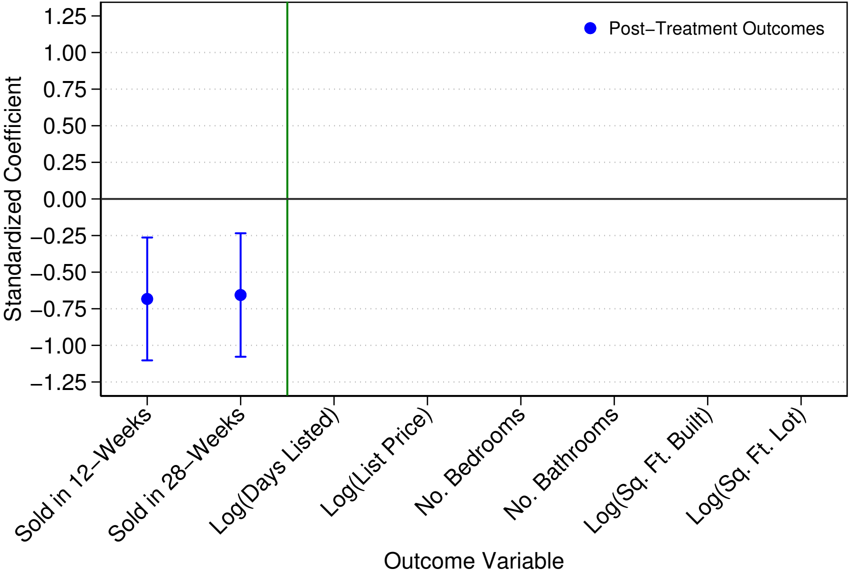

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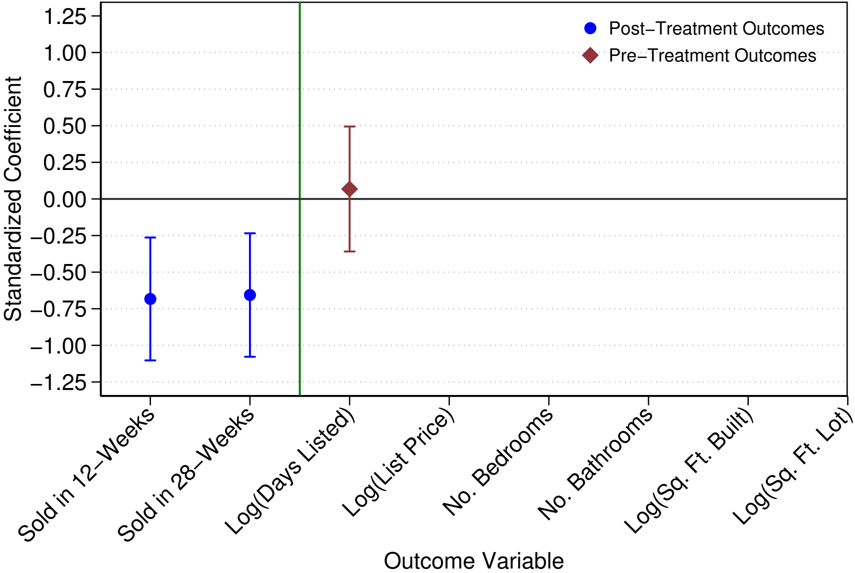

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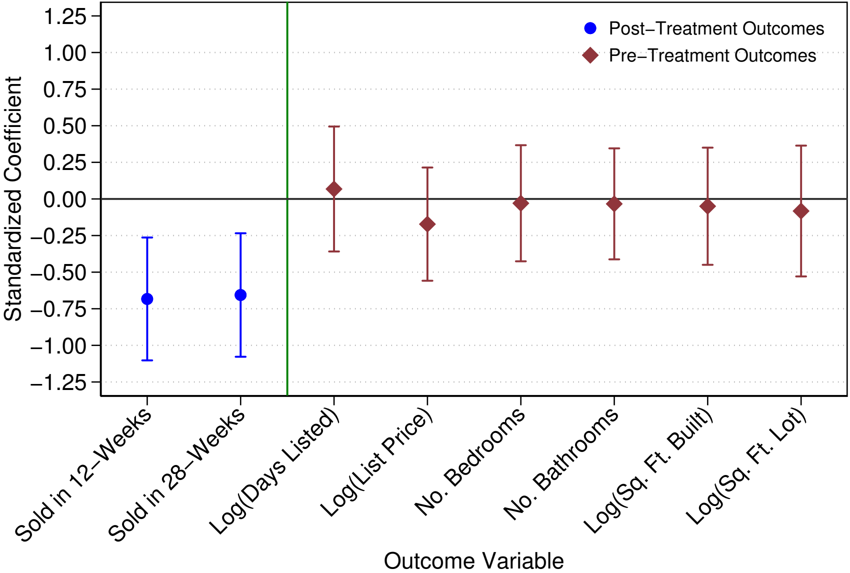

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How Elastic are Sellers?

- A 1 pp higher information shock increases sales probability (within 6 months) by 0.350 pp.

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- This is an intention-to-treat effect.
  - Some subjects may not read the letter.
  - Imperfect pass-through from information shocks to expectations.

How Elastic are Sellers?

- We estimate that 64.9% of subjects read the letter on time.
  - 95% of letters are delivered.
  - 74% of letters are not discarded.
  - 92.5% of letters are opened before property is sold.

How Elastic are Sellers?

- We estimate that 64.9% of subjects read the letter on time.
  - 95% of letters are delivered.
  - 74% of letters are not discarded.
  - 92.5% of letters are opened before property is sold.
- Adjusted elasticity: -0.539 ($= \frac{-0.350}{0.649}$).

Supplementary Online Survey

- What is the effect of information shocks on expectations?
- Collected 1,404 responses from Amazon Mechanical Turk (mTurk). +
  - Included in RCT pre-registry.
  - Conducted simultaneously with field experiment
  - Identical information-provision experiment. +

Effects on Survey Outcomes

	Survey Experiment
Information Shock	
Mean Outcome	
Std. Dev. Outcome	
Observations	

Effects on Survey Outcomes

	Survey Experiment
	(1)
	H_{1y}^{post}
Information Shock	0.205^{***}
	(0.064)
Mean Outcome	3.86
Std. Dev. Outcome	4.42
Observations	1,404

Effects on Survey Outcomes

	Survey Experiment	
	(1)	(2)
	H_{1y}^{post}	H_{5y}^{post}
Information Shock	0.205***	0.167**
	(0.064)	(0.070)
Mean Outcome	3.86	2.31
Std. Dev. Outcome	4.42	4.36
Observations	1,404	1,404

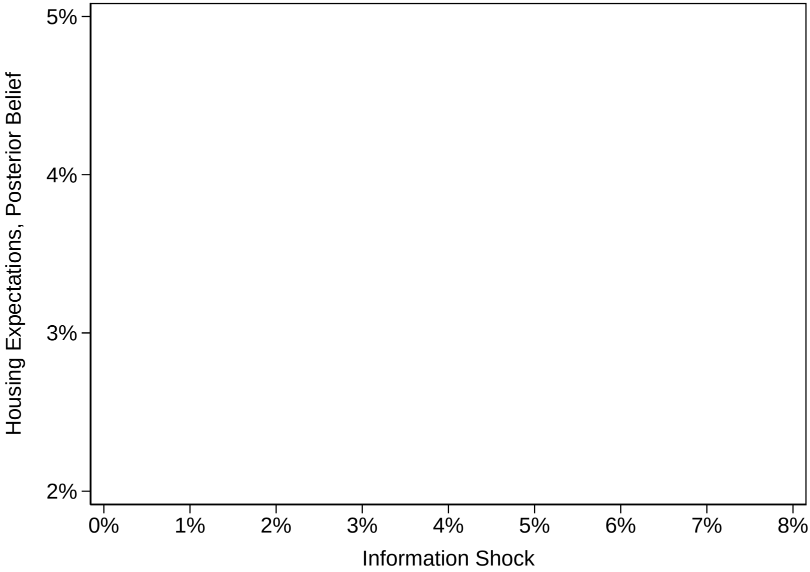
Effects on Survey Outcomes

	Survey Experiment		
	(1) H_{1y}^{post}	(2) H_{5y}^{post}	(3) H_{1y}^{prior}
Information Shock	0.205***	0.167**	-0.014
	(0.064)	(0.070)	(0.066)
Mean Outcome	3.86	2.31	3.88
Std. Dev. Outcome	4.42	4.36	5.39
Observations	1,404	1,404	1,404

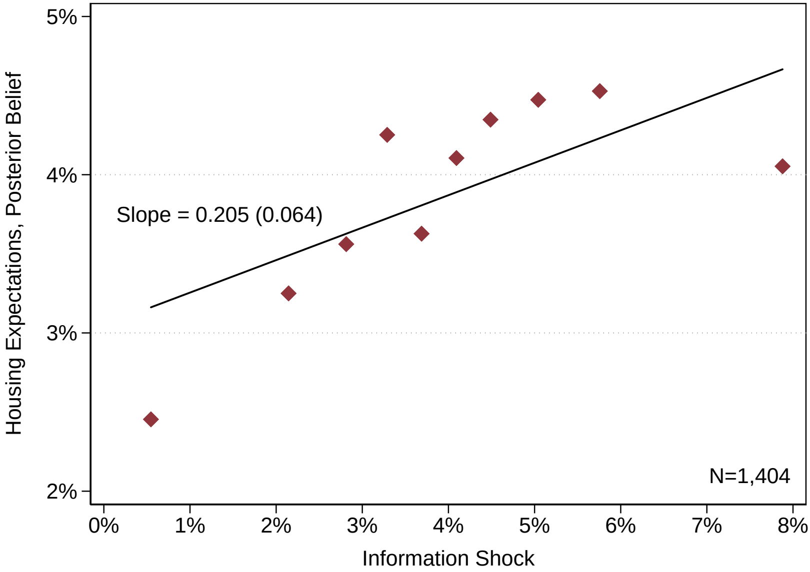
Effects on Survey Outcomes

	Survey Experiment			
	(1) H_{1y}^{post}	(2) H_{5y}^{post}	(3) H_{1y}^{prior}	(4) M_{1y}^{post}
Information Shock	0.205***	0.167**	-0.014	0.017
	(0.064)	(0.070)	(0.066)	(0.134)
Mean Outcome	3.86	2.31	3.88	3.58
Std. Dev. Outcome	4.42	4.36	5.39	9.05
Observations	1,404	1,404	1,404	1,404

Effects on Survey Outcomes +



Effects on Survey Outcomes +



How Elastic are Sellers?

- Adjusted elasticity: -2.63 ($= \frac{-0.350}{0.205 \cdot 0.649}$).
  - $\uparrow$ 1 pp expectation causes $\downarrow$ 2.63 pp in sales probability.

Additional Results

- Effects quite homogeneous except for owner occupancy status and age.
- Symmetric reaction to pessimistic/optimistic signals. +
- Suggestive evidence of backward-looking expectations. +
- Suggestive evidence that changes to listing prices was one of the mechanisms. +

Conclusions

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- Provide sharp evidence that expectations have a significant causal effect on market behavior.

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- We quantify the relationship: elasticity between expectations and sales probability of -2.63.

Conclusions

- This methodology can be applied to explore other hypotheses from behavioral economics, urban economics, finance and others.
  - Hard outcome measured with administrative data.
  - Naturally-occurring, high-stakes, context.
  - Based on 100% publicly available data.
  - Super cheap ($0.25 per subject).
  - Scalable to millions of subjects.

Conclusions

- This methodology can be applied to explore other hypotheses from behavioral economics, urban economics, finance and others.
  - Hard outcome measured with administrative data.
  - Naturally-occurring, high-stakes, context.
  - Based on 100% publicly available data.
  - Super cheap ($0.25 per subject).
  - Scalable to millions of subjects.
- We are documenting the implementation carefully.
  - Email us if you need help with implementation.
  - Happy to share data/code/tips.