Online Appendix for "The Folk Economics of Housing"

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Contents

1 Introduction

This appendix provides a detailed overview of the three surveys that generated the data for our *Journal of Economic Perspectives* paper, "The Folk Economics of Housing." The appendix also provides the results specified in registered preanalysis plans for each survey, including a small number of hypothesis tests.[1] The preanalysis plans are `R Markdown` documents with complete analysis code, and are available at osf.io/96crq (Survey 1), osf.io/e4wr6 (Survey 2), and osf.io/zujyr(Survey 3).[2] The data, survey instruments, and replication code for all results in the paper and appendix can be downloaded from: (ADD URL).

We have organized this appendix thematically rather than by survey. Section 2 details the structure of each of the three surveys, explaining the progression in content and question format from Survey 1, to Survey 2, to Survey 3. We also provide tables with the exact wording of the focal survey questions, including randomized components. Section 3 replicates the figures from the main paper, but disaggregated by survey. (To make figures in the main paper more readable, we pooled data from multiple surveys.) Section 4 has the key results on test-retest consistency that justify our principal conclusion, namely, that housing supply skepticism in the mass public is more of a non-attitude than a conviction. Section 5 establishes that housing supply skepticism is not an artifact of question complexity. Section 6 reports the results of our extensive investigation of potential explanations of housing supply skepticism—an investigation which presupposed that the skeptics harbor real beliefs about the effect of supply shocks on home prices and rents. That we found at most very weak correlations between respondents' predictions of the price (rent) effect of housing supply shocks and the factors hypothesized to explain supply skepticism is further evidence supporting the non-attitude hypothesis. Section 7 reports the correlations between housing supply skepticism and political preferences for upzoning / land-use liberalization, conditional on the respondent having an objective or subjective interest in lower (higher) home prices or rents. Once

[1] To keep the appendix from becoming unmanageably long, we have omitted some subgroup analyses that were specified in the preanalysis plan.

[2] For ease of use and cleaner figures, the replication code for the paper and Appendix streamlines the original code from the preanalysis plans, via repeatedly applied functions that implement the analyses of the PAPs.

again, the correlations are very weak. This section also includes results examining the relationship between blame for high housing prices and policy preferences, as well as a natural-language analysis of responses to several questions on Survey 1 that asked respondents to explain their thinking about land-use and housing-development issues. Finally, section 8 benchmarks the demographics of our samples against national distributions per the U.S. Census and the Congressional Elections Survey.

2 Details of Survey Structure and Question Wording

This section details the content of the three surveys. We first provide an overview of their design, explaining the evolution from Survey 1, to Survey 2, to Survey 3. Then, for each survey, we provide a flowchart diagram, followed by tables with the exact wording of the principal survey questions. Table 1 summarizes the main components of all three surveys.

2.1 Overview

As noted in the main text, each survey asks respondents whether they would prefer future home prices and rents in their city to be higher, lower, or the same, assuming no changes in the economy or quality of life. Each survey also presents a scenario depicting a significant, exogenous increase in housing supply within the respondent's metropolitan region, asking participants to forecast the impact on future home prices and rents in their town or city. Additionally, we inquire about perceptions of supply shocks and their effect on prices in other markets, including markets for automobiles, crops, consumer goods, and skilled trades labor. We also ask about a variety of potential correlates of housing supply skepticism, including both personal attributes and economic perceptions.

Our research unfolded in stages, with each survey revealing key insights used to develop subsequent survey designs. In Survey 1, we observed significant supply skepticism but found little correlation between predicted price/rent effects of a housing supply shock and predictions about the vacancies that would be created in relatively affordable neighborhoods by building new housing in

relatively expensive neighborhoods (as studied by Mast (2021)). This discrepancy made us wonder whether the wording of our questions influenced responses or if the complexity and placement of certain questions led to respondent inattention.

Accordingly, Survey 2 aimed to assess the sensitivity of housing price/rent predictions to variation in question format, counterfactual future prices, and causes of a supply shock. To this end, we used a conjoint-style design, independently randomizing for each respondent the shock's cause, the question format, and posited counterfactual future housing prices and rents. One elicitation format, which we label "complex," mirrored the housing-supply-shock questions on Survey 1 and called on the respondent to engage in expressly counterfactual reasoning. This format posits a hypothetical home or apartment that would be worth (or rent for) $X in five years in the absence of the shock, and then asks whether the same property in the same condition would be worth more or less than $X in five years if the shock were to occur. Another format, which we call "potential outcomes," separately elicited predictions of future home prices and rents under the status quo and under the supply-shock scenario. A third, which we call "simple," did not discuss explicit counterfactual prices and is meant to lower the cognitive burden on respondents. Survey 2 also asked respondents to report their confidence in their predictions.

As well, Survey 2 introduced various new questions to probe the roots and implications of supply skepticism. These included: (1) a set of questions to identify zero-sum thinking; (2) "mental model" questions about the tangible effects of new housing due to the hypothesized supply shock, followed by queries on how these effects influence prices in general; (3) a question on the location of new housing development relative to areas with rising prices and rents; (4) inquiries about who is most responsible for high housing and rental prices; and (5) a question on whether cities should ban new market-rate housing in areas designated for future affordable housing (also known as "land-banking"—a key policy plank often endorsed by supply-skeptical policy advocates) (Been, Ellen and O'Regan, 2019).

Survey 2's findings confirmed that public skepticism about the impact of a positive regional

supply shock on lowering home prices and rents remains consistent across various scenarios and methods of querying about price predictions. However, we observed only a weak relationship between price/rent forecasts and their anticipated correlates. Interestingly, though respondents who expressed confidence in their price or rent predictions exhibited similar levels of skepticism as those less confident, overall self-reported confidence was low. Generally low levels of self-reported confidence raised the possibility that supply skepticism might be less of a stable belief and more of a non-attitude (Campbell et al., 1960), reflecting confusion and guesswork rather than a coherent ideology.

Fortuitously, we were able to do additional testing around this tentative discovery using a serendipitous panel across the survey samples. About a third of the respondents from Survey 1 also participated in Survey 2, allowing an unplanned (and unregistered) analysis of test-retest consistency on the regional supply-shock questions and other repeated queries. We noted especially low retest consistency on the housing supply-shock question compared to other economic topics. This inconsistency might have been due, however, to variations in the cause of the supply shock and the question format presented in Survey 2, as these were randomly generated rather than mirroring the analogous question on Survey 1.

The findings from the serendipitous panel in Surveys 1 and 2 influenced the structure of Survey 3. First, we introduced a "super-simple" version of the regional shock question to closely align with the format used for non-housing supply shock items, in order to allay any remaining concern that the greater "supply skepticism" observed on the Survey 2 housing questions (relative to the non-housing economic shock questions) might be an artifact of the housing question's greater complexity.[3] Second, we added questions about the impact of new "luxury" housing on existing housing prices in affordable areas, and whether housing development leads to nearby price increases or vice versa.[4] Third, we included a retest question towards the end of Survey 3, randomly selecting respondents for

[3] In Survey 3, respondents were randomly assigned either the "simple" format from Survey 2 or the new "super-simple" format.

[4] This addresses the elite supply skeptic argument that new market-rate housing in poorer areas drives gentrification, thus causing, rather than resulting from, higher prices (Been, Ellen and O'Regan, 2019).

retesting on their price prediction accuracy.[5] A formal hypothesis test was preregistered, anticipating lower test-retest reliability for housing-related questions compared to other supply shock questions. Finally, to explore the notion that widespread supply skepticism could stem from innumeracy, we included items from a validated numeracy scale based on self-reported comfort with numbers and arithmetic reasoning (Fagerlin et al., 2007).

Table 1: Main Components of the Surveys.

Component	Survey 1	Survey 2	Survey 3
Regional Housing Supply Shock (used to elicit price predictions)	10% increase in regional stock over 5 years caused by cities removing development restrictions	10% increase in regional stock over 5 years, randomizing (a) cause of shock (tech change, or state preemption of local restrictions on greenfield development, transit-oriented development, or densification of single-family home neighborhoods), (b) the format of the prediction-elicitation question (complex, simple, or potential-outcomes), and (c) counterfactual future prices in the absence of the shock	10% increase in regional stock over 5 years, randomizing (a) cause of shock (tech change or state preemption) and (b) elicitation format (simple or super-simple)
Non-Housing Supply Shocks (economic knowledge questions)	- Free trade agreement - Auto supply-chain problem	- Free trade agreement - Auto supply-chain problem - Better fertilizer - Training for would-be plumbers	- Free trade agreement - Auto supply-chain problem - Better fertilizer - Training for would-be plumbers

Continued on next page

[5]To minimize survey fatigue and disguise our intent, we made minor wording changes in the retest question, such as switching the profession from plumbers to electricians in the labor supply question.

Table 1: Main Components of the Surveys.

Component	Survey 1	Survey 2	Survey 3
Housing Policy and Politics	- Support for "gentle density" in single-family zones (geographic scale randomized)	- Agreement with statements about state preemption, including making local governments allow more suburban homes near cities, more apartment buildings near transit, or more 2-4 unit buildings in single-family neighborhoods - Blame for high housing prices & rents - Support "land banking" (ban market-rate development on sites that could be developed for affordable housing) - Support for transit-oriented development - Support for sprawl development	- Blame for high housing prices & rents[6] - Support for transit-oriented development - Support for sprawl development
Potential Explanations	- Predict findings of Mast's (2021) chain-of-moves study	- Self-reported confidence in price/rent predictions - Zero-sum thinking battery - Observation of development in places where housing prices are going up - "Mental models" (beliefs about material effects of posited shock, and general consequences of such effects for prices)	- Self-reported confidence in price/rent predictions - Subjective numeracy battery - Belief about local price effects of new "luxury" housing in relatively affordable areas - Development: cause or consequence? (Do developers choose to build where prices are high, or does development cause prices to go up?)
Test-Retest Questions	N/A	N/A	- 10% regional housing supply shock - Local price effects of new luxury housing in affordable neighborhoods - Free trade shock - Auto supply chain shock - Agricultural productivity shock - Labor market shock

Notes. For diagrams of the surveys' structure and exact question wording for the main items, see SI Appendix 2.

[6]Survey 3 also included a pilot battery of other housing politics-and-policy questions. However, we did not address this battery in the preanalysis plan and, accordingly, we do not report results.

2.2 Structure of Survey 1

Fielded in March 2022, Survey 1 cast a broad net. It was effectively a pilot, but with the main analyses preregistered. We elicited respondents' understanding of land use and housing issues in their own words; we used hypothetical scenarios to tease apart "quantity skepticism" (a belief that land-use deregulation would not result in more housing) from "price skepticism" (a belief that more new housing would not reduce prices and rents for existing homes); and we challenged respondents to predict the results of Mast's (2021) chain-of-moves study. Mast estimated the number of homes that become available to buy or rent, within five years, in a region's middle-income and lower-income neighborhoods, due to the chain of relocation moves induced by the opening of 100 new homes in a high-income neighborhood.

Figure 2.1 illustrates the structure of Survey 1. The survey opens with basic demographic questions and, amidst the demographics, a question that asks respondents to think about their city's future and whether they would prefer home prices and rents to be higher, lower, or the same as today, assuming no change in the economy or quality of life. It then poses open-text questions about the main issues and problems with land use and housing. Next, respondents are given a one-paragraph primer on zoning and randomly assigned to one of three hypothetical "upzoning" scenarios. In each scenario, duplexes and triplexes would be allowed on lots that are currently restricted to single-family homes and new buildings could be one-and-a-half times as tall as existing homes.[7] The scenarios varied in the geographic scale of the upzoning: either just the respondent's neighborhood, or the respondent's entire town or city, or the respondent's state. We asked respondents whether they supported or opposed the proposed upzoning and how they thought it would affect (1) the size of their region's housing stock, (2) home prices in their neighborhood, (3) rents in their neighborhood, and (4) rents citywide.

To distinguish price skepticism from quantity skepticism, we then elicited predictions about the effect on prices and rents for existing homes of an exogenous 10% increase in the housing stock of

[7]Such measures have recently been adopted in cities like Minneapolis and in states like California and Oregon.

the respondent's metro-region caused by the removal of development restrictions. Finally, after a few questions about economic knowledge and other topics, we provide a several-paragraph description of the design of Mast's (2021) study and asked respondents to guess Mast's findings about the number of existing homes freed up through chains-of-moves vacancies in a region's middle-income and lower-income neighborhoods for every 100 new homes built in high-income neighborhoods.

This design allows us to measure quantity and price skepticism; to relate these phenomena to broader measures of economic knowledge; to examine whether price predictions correlate with respondents' understanding of the mechanism through which the development of new housing makes existing housing more affordable regionally; and to see whether "supply skeptics" who would benefit from lower prices and rents are less supportive of allowing denser housing in single-family neighborhoods their counterparts who believe that a positive regional supply shock would bring down prices.

2.3 Structure of Survey 2

Survey 2 was designed to check the robustness of the 10% supply shock results from Survey 1, Additionally, we sought to better understand the nature of housing-supply skepticism by introducing additional questions about (1) economic knowledge (supply shocks in non-housing markets); (2) beliefs ("mental models") about the material effect of the the posited supply shock, and, later in the survey, beliefs about how such material effects translate into prices as a general matter; (3) self-reported exposure to new development in places where prices and rents are going up; (4) beliefs about which actors are responsible for high housing prices and rents in the respondent's area; and (5) a question about land banking, i.e., whether cities should ban the development of new market-rate housing on sites where subsidized affordable housing could be developed in the future.[8]

The flow of Survey 2 is diagrammed in Figure 2.2. The pretreatment housing questions consist of the respondent's preference for future home prices and rents in one's city (replicated from Survey

[8]We inadvertently omitted the land-banking question from the preanalysis plan for Survey 2.

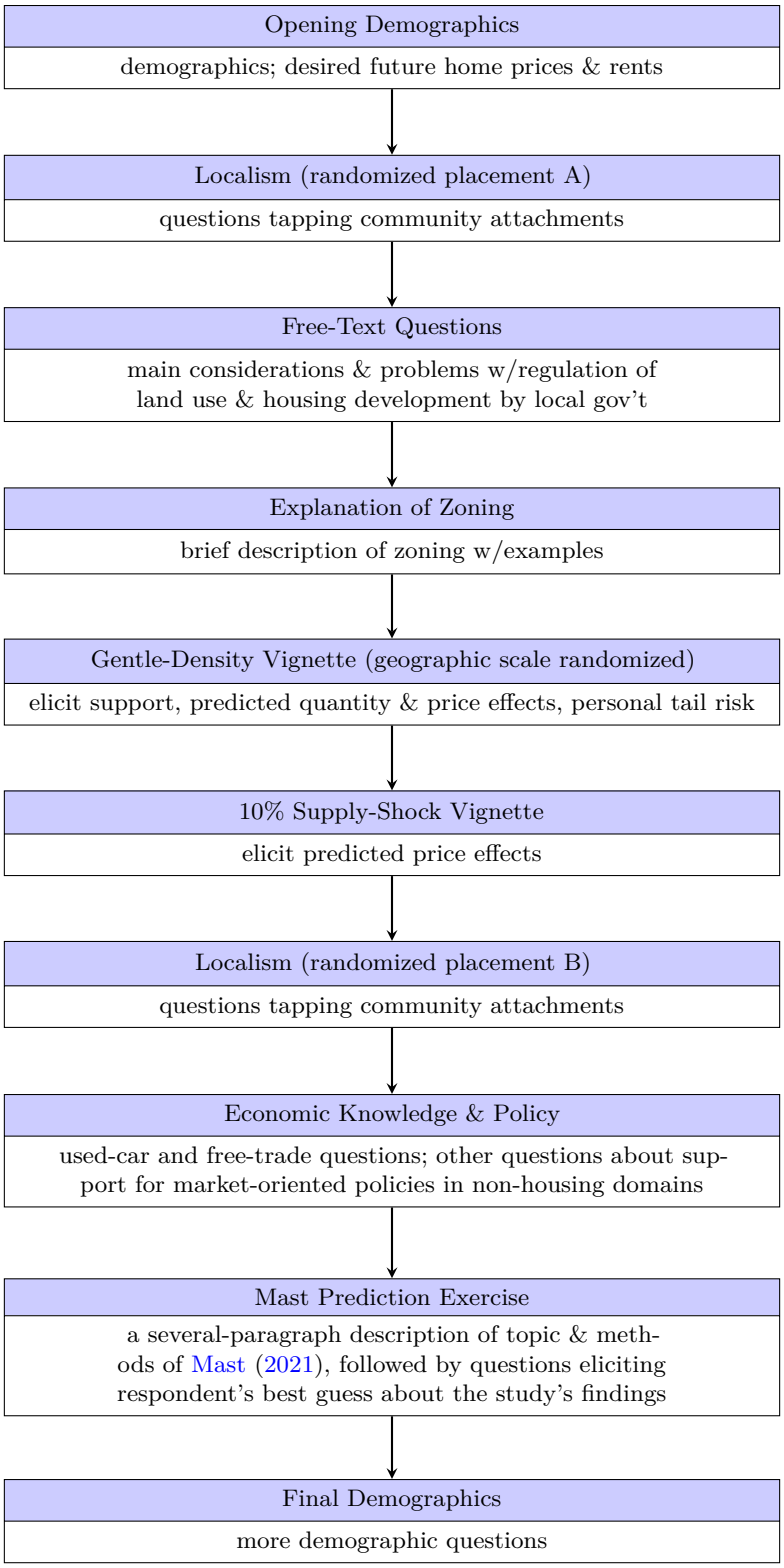

Figure 2.1: Structure of Survey 1 (pilot). The questions about local community attachments, and support for market-oriented policies, are not used in this paper.

1); a question about which actors are responsible for high prices and rents in the respondent's area; and a question about which level of government "has the most control over what gets built on urban and suburban land."

After the opening block, we provide a brief description of zoning (replicated from Survey 1). Respondents then answer a battery of questions about support for state preemption of local control over housing development; questions about the price and rent effects of a 10% regional supply shock; questions about the material effects of the 10% supply shock; and two of the economic knowledge (non-housing supply shock) questions. Respondents are randomly assigned ($p = 0.5$) to answer the preemption battery before or after these other questions, as shown in Figure 2.2 (placement A vs. B). (As explained in Appendix 6.2, this randomized placement enables a weak test of motivated reasoning as an explanation for housing supply skepticism.)

Next comes the "stage 2" battery of mental-model questions, which ask about the usual effect of each"stage 1" material impact on housing prices or rents. This is followed by the zero-sum thinking battery, and then the final demographics block. The final demographics block also includes a question about support for land banking, and the question about exposure to new development in places where prices are going up.

After the final demographics block, we ask two general questions about upzoning preferences (replicated from Hoover Institution (2015)), and two more non-housing supply shock questions. The reason for splitting the non-housing supply shock questions into two blocks, separated by a range of other questions, is to minimize respondent learning or demand effects. We thought that if we placed all of the non-housing shock questions in a single block, some respondents might realize that they were being about the same thing in different ways, inducing them to use a supply-and-demand heuristic to answer the later questions in the block.

2.4 Structure of Survey 3

The primary goals of Survey 3 were (1) to rule out the objection that the housing supply skepticism documented on Surveys 1 and 2 might be an artifact of question complexity; and (2) to investigate the hypothesis that housing supply skepticism is more of a non-opinion than a settled view. To this end, we introduced a new question format for the 10% regional shock question, which we call "super-simple," and we also randomly assigned 1 in 5 respondents to answer the same questions about housing and non-housing supply shocks but with a "don't know" option in the choice set for each question. Survey 3 also adds a new question about the local (i.e., neighborhood-level) price effects of allowing more luxury housing to be built in a relatively affordable neighborhood of an expensive city, and a question about whether new development is the cause, or the consequence, of rising prices in the area. Finally, Survey 3 includes a battery of questions about subjective numeracy, that is, whether the respondent generally likes using and reading information in quantitative form.

Figure 2.3 illustrates the structure of the survey. The opening block includes the same pretreatment housing questions found on Survey 2 (preference for future home prices and rents in one's city; attributions of blame for high prices and rents; beliefs about which level of government exercises the most control over what gets built on urban and suburban land). The explanation of zoning statement is also replicated from Surveys 1 and 2. The 10% supply-shock vignette is again conjoint-randomized, but, as noted, with a new "super-simple" elicitation format.

The retest question, designed to capture the stability of beliefs about housing and non-housing supply shocks, comes near the end of the survey. Respondents are randomly assigned to be retested on *one* of the following questions: effect of 10% regional housing supply shock on rents (super-simple format); effect of allowing more luxury housing in a relatively affordable neighborhood on rents in the same neighborhood; effect of free-trade agreements on the price of goods; effect of high-school job training program on wages for other workers in the sector; effect of supply-chain problems on the price of used cars/trucks; effect of agricultural productivity shock on the price of the agricultural product. The respondents who are randomly assigned to the "don't know" question format are

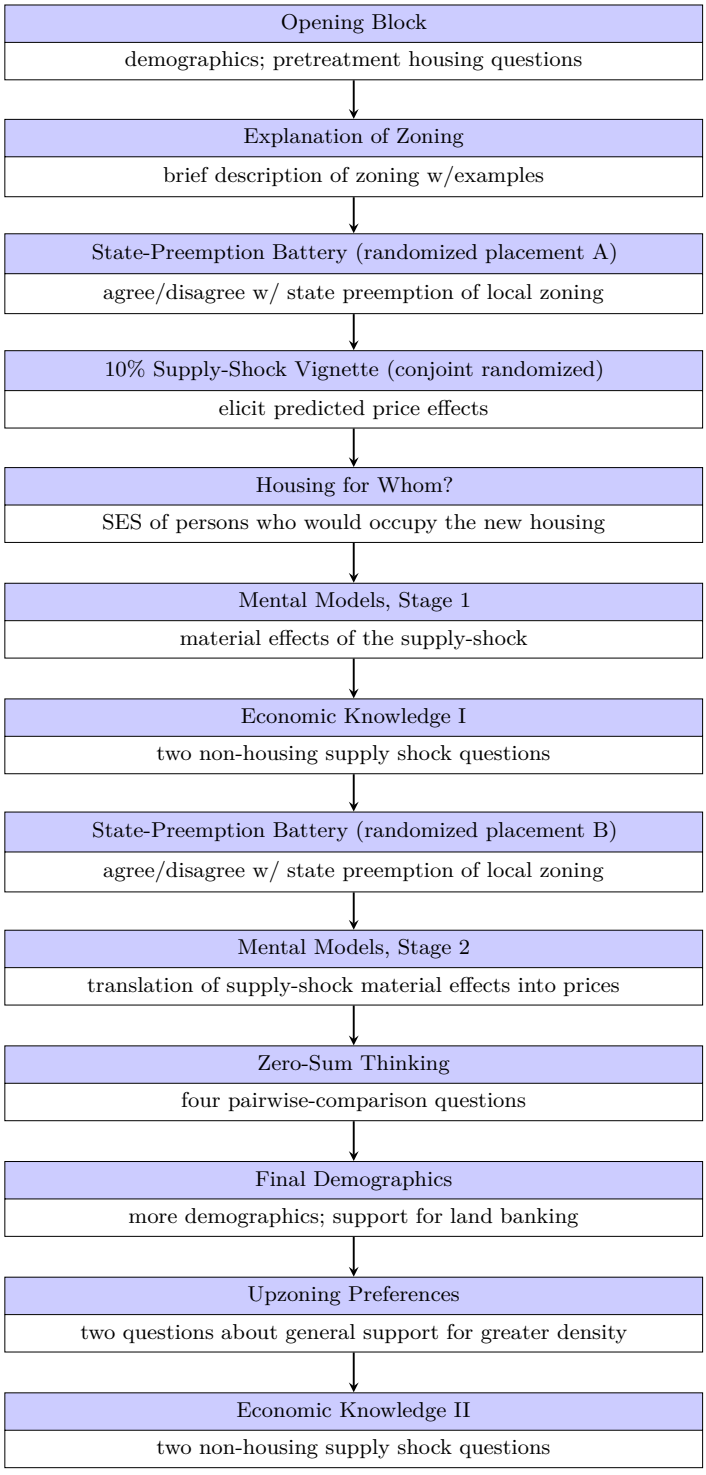

Figure 2.2: Structure of Survey 2. Order of economic knowledge questions is randomized across blocks Economic Knowledge I and Economic Knowledge II. Question order within state preemption, mental model, economic knowledge, upzoning preference, and zero-sum thinking batteries is also randomized, as is the order of eliciting the supply shock's effect on home values and rents. The order of response options (high to low or low to high) is randomized across respondents rather than across questions.

always retested on a housing-shock question (the regional shock or the neighborhood shock, with equal probability).

After the retest question, respondents receive the upzoning-preferences block and the final economic-knowledge block. These are exact replications of Survey 2 questions, and the order-randomization of the economic knowledge questions is also the same as Survey 2 (i.e., two blocks of two questions, with placement of the blocks and order of questions within blocks randomized).

Finally, respondents answer the question about whether development is the cause or consequence of rising prices, except that one out of ten respondents instead receives this question earlier in the survey, in lieu of supply-shock retest question. The reason for giving this question earlier to some respondents is to allow a low-powered test of whether respondents who answer it immediately after two non-housing supply shock questions learn from those questions and infer that developers probably choose to build where prices are going up.

2.5 Wording of Focal Survey Questions

This sub-appendix provides a series of tables with the exact wording of focal survey questions. It complements the abbreviated descriptions of the questions in Table 1 of the paper.

2.5.1 Regional Housing Supply Shock

Our principal device for testing the robustness of directional predictions about the home-price and rent effects of a large regional supply shock is a conjoint-randomized variation on Survey 1's 10% regional supply shock scenario (Hainmueller, Hopkins and Yamamoto, 2014). On Survey 2, we independently randomize the *cause of the supply shock*, the *format* of the price-elicitation question, and, for elicitation formats that use it, the *counterfactual future price or rent* of a typical home in the respondent's town or city, i.e., the price or rent that would obtain in the absence of the supply shock. On Survey 3, we also independently randomize the cause of the supply shock and the format of the price-elicitation question, replicating one of the causes and one of the formats from Survey 2.

By estimating directional home value and rent predictions under each attribute level, conditional on the joint distribution of other attributes, we can see whether the supply skepticism observed on Survey 1 may have been an artifact of an idiosyncratic feature of that survey, such as a difficult question format or too-low counterfactual prices.

Table 2 shows how the surveys communicated variations of the attribute, *cause of the supply shock*. Across all variations, the number of housing units in the respondent's metro region increases by 10% over a five-year period, but in one case ("tech") this results from a technological innovation that improves the productivity of homebuilders, and in the others, it results from a state law preempting local development restrictions. On Survey 2, the preemptive state law authorizes either more duplexes, triplexes, and fourplexes in neighborhoods of single-family homes ("denser neighborhoods"); more apartment and condo buildings near train and bus lines ("TOD," or transit-oriented development); or more suburban homes on farms and open space outside of cities ("sprawl".) On Survey 3, the nature of the preemptive state law isn't specified beyond "removing local development restrictions."

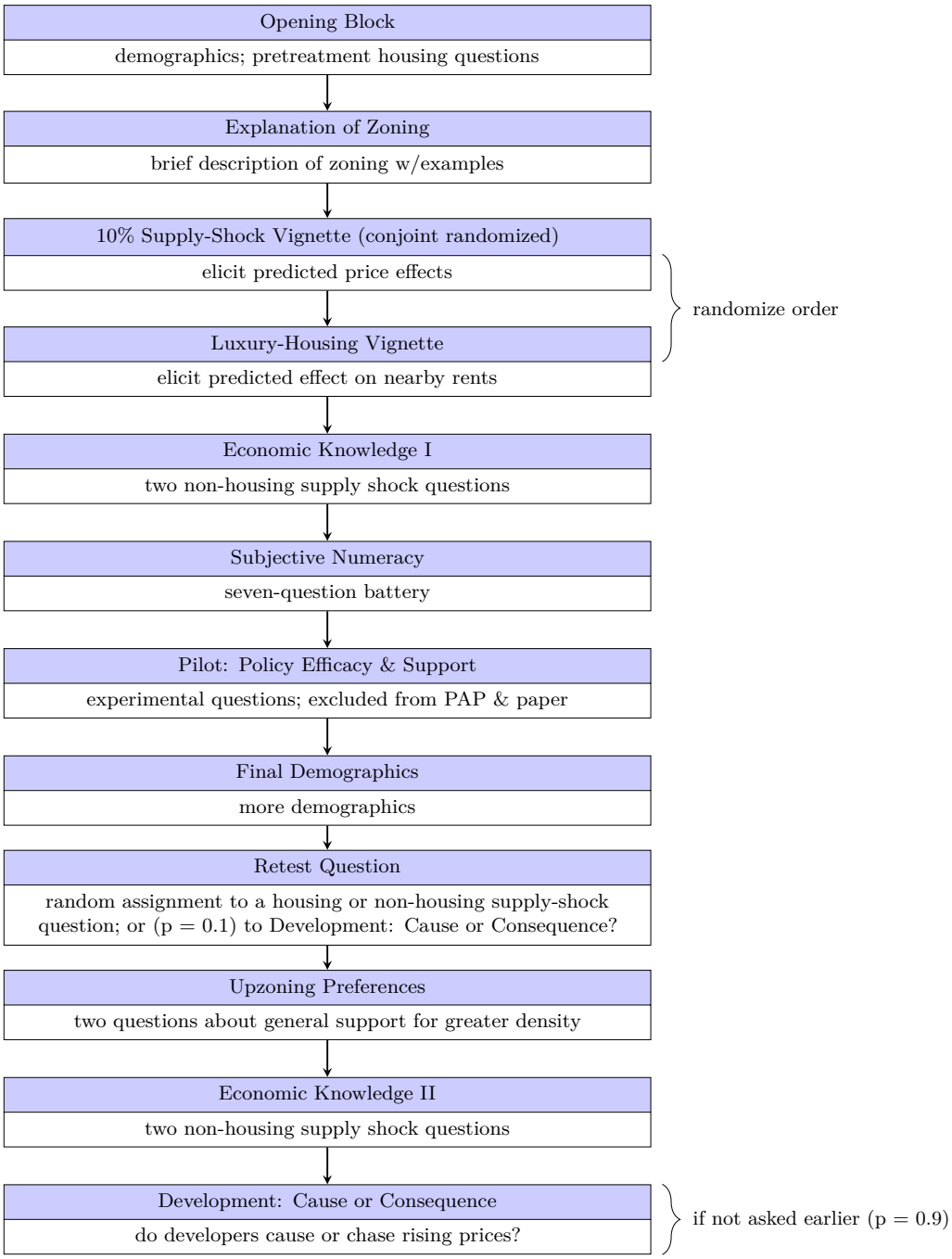

Figure 2.3: Structure of Survey 3. The order of economic knowledge questions is randomized across blocks Economic Knowledge I and Economic Knowledge II. The order of subjective numeracy questions is randomized within the block. The order of response options (high to low or low to high) is randomized across respondents rather than across questions.

If people reason about price effects mainly in terms of regional supply and demand, these variations in the type and distribution of new homes are unlikely to have much effect on their directional predictions of the effect of the shock on the future price or rent of a typical existing home in the respondent's city. Houses within a regional market are substitutes for one another, so a large, exogenous increase in the size of the regional stock will put downward pressure on prices everywhere. But if respondents reason mainly in terms of local amenity and disamenity effects in their own neighborhood, or if they project "bad" outcomes from conniving developers associated with zoning deregulation, we may observe differences across the scenarios. Homeowners, for example, may expect the "denser neighborhoods" scenario (which portends a change in single-family neighborhoods) to reduce prices more than the "transit-oriented" (TOD) scenario (which concentrates development in areas that may already have an urban character). Renters may fear that the TOD scenario would cause gentrification and rising rents in relative affordable, apartment-heavy neighborhoods. And, across our scenarios, respondents with a Manichean economic worldview may associate the loosening of zoning regulations with private-developer capture of the government—and therefore project "bad consequences"—while engaging in more standard supply-and-demand reasoning if the supply shock is just the byproduct of homebuilders becoming more productive.

Table 2: Levels and question wording for the vignette attribute, *Nature of Supply Shock*.

	Level	Question Text
Survey 1		
	NA	Imagine that cities and towns across your metropolitan region remove development restrictions. This causes the total housing stock in the region to grow by an additional 10% over the next five years. For example, a region that would have had 1,000,000 residential units in five years (without any change to development restrictions) will instead have 1,100,000 units.
Survey 2		
	Transit-Oriented Development	Imagine that **$State** passes a law to ensure that apartment and condo buildings may be developed near rail and bus stops. The new law overrides local zoning restrictions. It causes a building boom. In five years, the number of homes and apartments in your metropolitan region is 10% larger than it otherwise would have been. For example, a region that would have had 1,000,000 residential units in five years without any change to development restrictions will instead have 1,000,000 units. This is three times the rate of housing growth in the nation as a whole.
	Denser Neighborhoods	Imagine that **$State** passes a law to ensure that single-family homes may be replaced with duplexes, triplexes, and fourplexes (2-4 unit buildings). The new law overrides local zoning restrictions. It causes a building boom.... (*Vignette continues as above.*)
	Sprawl	Imagine that **$State** passes a law to ensure that suburban homes may be developed on farmland and open space near cities. The new law overrides local zoning restrictions. It causes a building boom.... (*Vignette continues as above.*)
	Technology	Imagine that new manufacturing processes increase the productivity of homebuilders. This causes a building boom.... (*Vignette continues as above.*)
Survey 3		

Table 2: Levels and question wording for the vignette attribute, *Nature of Supply Shock*.

Level	Question Text
State Preemption	Imagine that **$State** passes a law that removes local restrictions on housing development. It causes a building boom. In five years, the number of homes and apartments in your metropolitan region is 10% larger than it otherwise would have been. For example, a region that would have had 1,000,000 residential units in five years without any change to development restrictions will instead have 1,100,000 units. {This is three times the rate of housing growth in the nation as a whole.}
Technology	Imagine that a new manufacturing process increases the productivity of homebuilders. It causes a building boom. In five years, the number of homes and apartments in your metropolitan region is 10% larger than it otherwise would have been. For example, a region that would have had 1,000,000 residential units in five years without any change to homebuilders' productivity will instead have 1,100,000 units. {This is three times the rate of housing growth in the nation as a whole.}

Notes. Highlighted text depends on the attribute level; other text is independent of levels (within a survey). Bold-font terms that begin with $ represent piped-text strings that depend on the respondent's zip code or answers to previous survey questions. Phrases in curly brackets are randomized to appear with probability 0.5. The vignette description on Survey 3 varies with the elicitation format (simple vs. super-simple). Shown here is the "simple" format, as the super-simple version does not employ a vignette statement on a separate screen preceding the price-elicitation question. See Table 3 for the simple vs. super-simple comparison.

Levels and question wording for the attribute *Elicitation Format* are shown in Table 3. Survey 1 used the "Complex" format, which posits the future rent or price (in five years) of a dwelling unit in the respondent's town or city and then asks whether the unit's rent (home price) would be higher than the counterfactual, lower than the counterfactual, or unchanged from the counterfactual, if the supply shock occurred. The counterfactual value is fed from a database constructed from Zillow

local home and rent values.[9]

Whereas the Complex elicitation format asks respondents to call to mind a house with a specified value and then engage in expressly counterfactual reasoning, the "Simple" format just asks how the shock would affect the market value (rent) of a typical home (apartment) in the respondent's city.[10]

In the Potential Outcomes elicitation format, respondents are asked early in the survey to estimate the current and in-five-years price of a typical home or rental unit in their city. Later, they are presented with the supply-shock scenario and asked to predict the typical home's value (rent) in five years given the shock. Any integer value may be entered as a prediction. In contrast to the other formats, an exact "null effect" option is not built into the answer choices. This may induce more people to give a directional estimate.

[9]Home and rent values are taken from the Zillow Home Value Index (ZHVI) and the Zillow Observed Rent Index (ZORI) respectively. Both indices observe home prices and rents at the zip code level. The ZHVI is a proprietary measure that represents a typical value for home prices between the 35th and 65th percentile of a given geography and includes data on both single-family detached homes and condominiums. The ZORI measures the "typical" market rate rent in a given geography and is calculated by weighting the prevalence of various types of rental units in an area to account for changes in the type of rental stock that may enter the market at a given time. Because we are using these values only in construction of counterfactuals for price elicitation, the proprietary "black box" origins of these measures—which are widely used and accepted by consumers—does not compromise our study procedures. Data for both indices is available at https://www.zillow.com/research/data/.

[10]Respondents are then asked a follow-up question about how much more or less a given home with a posited counterfactual value would be worth, in five years, under the scenario, but we do not use answers to the follow-up question in our pre-registered design. We modeled this format on a pilot-survey question about the effect of automotive supply-chain problems on the price of used cars to maintain simplicity. Nearly all respondents answered the supply-chain question correctly, which suggested that the simple question wording would limit cognitive burdens.

Table 3: Levels and question wording for the vignette attribute, *Elicitation Format*.

	Level	Question Text
Survey 1		
	Complex	Consider a home in **$City**. Assume that its fair market value in five years would be **$Price** if development restrictions did not change. Do you think the same home would be worth more or less than that if the removal of development restrictions caused a 10% increase in your metro region's housing stock? Assume that the condition of the home stays the same. [It would be worth a lot more if the housing stock increased by 10%; ... a little more ...; It's value would not change ...; ... a little less ...; ... a lot less ...]
Survey 2		
	Complex	Scenario recap: The new state law ... • allows more suburban homes on farmland and open space near cities • causes your region's housing stock to grow by an additional 10% over the next five years Consider a home in **$City**. Assume that its market value in five years would be **$Price** if **$State** did not enact the law allowing more development. In the scenario recapped above, where the state removes development restrictions, the same unit's market value would be... [substantially higher than **$Price**; somewhat higher than **$Price**; **$Price**; somewhat lower than **$Price**; substantially lower than **$Price**]

Table 3: Levels and question wording for the vignette attribute, *Elicitation Format*.

	Level	Question Text
	Simple	Scenario recap: The new state law... • allows more suburban homes on farmland and open space near cities • causes your region's housing stock to grow by an additional 10% over the next five years How would this affect the market value of typical **$Home_type** in **$City**? It would... [substantially increase their market value; somewhat increase their market value; have no effect on their market value; somewhat decrease their market value; substantially decrease their market value.]
	Potential Outcomes	Scenario recap: The new state law... • allows more suburban homes on farmland and open space near cities • causes your region's housing stock to grow by an additional 10% over the next five years If this scenario occurred, how much do you think the typical **$Home_type** in **$City** would sell for in five years? [$____]
Survey 3		
	Simple	Scenario recap: The new law... • removes local restrictions on housing development • causes your region's housing stock to grow by an additional 10% over the next five years How would this affect the market value of typical existing **$Home_type** in **$City**? It would... [substantially increase their market value; somewhat increase their market value; have no effect on their market value; somewhat decrease their market value; substantially decrease their market value.]

Table 3: Levels and question wording for the vignette attribute, *Elicitation Format*.

Level	Question Text
Super-Simple	Imagine that **$State** passes a law that removes local restrictions on housing development. It causes a large increase in the number of new houses and apartments in your metropolitan region. Would the market value of typical existing **$Home_type** in **$City** increase, decrease, or stay the same? [Their market value would increase; ... decrease; ... stay the same]

Notes. Highlighted text depends on the attribute level; other text is independent of the level (within a survey). Bold-font terms that begin with $ are piped-text strings that depend on the respondent's zip code or answers to previous survey questions. Note that on Survey 3, the "super-simple" elicitation format does not provide a vignette on the screen before the price-effect-elicitation question, so there is no recap in the elicitation question. The order of response options is randomized from high-to-low or low-to-high at the respondent level.

Survey 2 includes one additional randomized vignette attribute, a price-adjustment factor drawn from {-20%, 0%, 20%, 40%}. It is an incremental change applied to the Zillow counterfactual price in the Complex elicitation condition.[11] We designed this manipulation as a way of checking whether observed supply skepticism may reflect careless or disbelieving survey responses from people who think the embedded counterfactual price or rent is "obviously too low for a home in my town." A respondent who has that reaction might answer that the home's value will be higher if the supply shock occurs not because they think the shock will raise prices, but because they think prices will be higher regardless of the shock.

On Survey 2 and Survey 3, we follow up the price and rent prediction questions by asking, "How confident are you about the direction of the effect of this scenario on home values (rents), that is, whether it would generally increase, decrease, or have no effect on home values (rents)? [Not at all confident, not confident, somewhat confident, confident, or very confident]." By comparing

[11]The price adjustment is also employed in the Simple format in a follow-up question about the magnitude of predicted price and rent changes which is given to respondents in the Simple format. However, our preanalysis plan for this paper does not use that follow-up question because we suspect specific dollar-value answers will have a significant stochastic component.

the distribution of predictions between more-confident and less-confident respondents, we can test our conjecture that the supply skepticism observed on Survey 1 was due to random answers by confused respondents. (As noted in the main paper, Survey 3 also tests this conjecture using retest questions.)

2.5.2 Non-housing Supply Shocks ("Economic Knowledge")

Table 4 provides the exact wording of the non-housing supply shock questions used on the three surveys.

Table 4: Economic knowledge questions.

Item	Question Text
Free Trade	A free trade agreement is a pact between two or more nations to reduce barriers to imports and exports among them. Do free trade agreements make the price of products sold in the U.S. higher, lower, or not make a difference? [Higher; Lower; Not make a difference]
Cars	If supply-chain problems cause automakers to produce fewer new cars, what happens to the price of used cars? [Used cars become more expensive; ... less expensive; The price of used cars doesn't change]
Labor	Imagine that a new high-school program for training students to be plumbers causes a large increase in the number of plumbers in a city. Would wages for other residential plumbers in the city increase, decrease, or stay the same? [Other plumbers' wages would increase; ... decrease; ... stay the same]
Grain	Imagine that a new, inexpensive fertilizer makes grain farms more productive. Farms treated with the fertilizer yield 50% more grain on average. Would widespread use of this fertilizer cause grain prices to increase, decrease, or stay the same? [Grain prices would increase; ... decrease; ... stay the same]

Notes. The items *Free Trade* and *Cars* were used on Survey 1. All four items were used on Surveys 2 and 3. Response options are denoted in square brackets; the ellipses stand in for text repeated from the preceding response option. The order of directional response options is randomized at the respondent level.

2.5.3 Housing Politics and Policy

Table 5 provides the exact wording of our questions about housing policy and politics and indicates which surveys used each question.

Table 5: Questions about housing politics and policy.

Item	Surveys	Question Text
Gentle Density	1	Proposal recap (zoning change for {your neighborhood only}{residential neighborhoods throughout **$Jurisdiction**}): • allow new and renovated buildings to be one-and-a-half times as tall as nearby homes • allow duplexes and triplexes in places where single-family homes are allowed Would you support or oppose **$Jurisdiction** adopting this zoning change? [Strongly support; Somewhat support; Neither support nor oppose; Somewhat oppose; Strongly oppose]
Blame	2, 3	In your opinion, which of the following are responsible for high housing prices and rents in your area? (Choose up to three.) [Federal or state government; Local government; Investment banks; Foreign investors; Real-estate developers; Landlords; Homeowners; Environmental activists; Anti-development activists; Rich people moving to the area; Employers]

Table 5: Questions about housing politics and policy.

Item	Surveys	Question Text
Preemption Battery	2	Next, we present four statements about whether states should override certain local restrictions on development in order to ensure that more housing may be built. Please indicate whether you agree or disagree with each statement. [Strongly agree; Somewhat agree; Neither agree nor disagree; Somewhat disagree; Strongly disagree] - "States should make local governments allow more suburban homes to be developed on farmland and open space near cities." - "States should make local governments allow more single-family homes to be replaced with duplexes, triplexes, and fourplexes (2-4 unit buildings)." - "States should make local governments allow more apartment and condo buildings near rail and bus stops." - {"States should make local governments allow more single-family homes to be replaced with larger single-family homes."}{"States should let local governments enact any restrictions on housing development that local governments want to enact."}
TOD	2, 3	Thinking about the possibility of more housing development in your metropolitan region, do you support or oppose constructing more apartment and condo buildings near rail and bus stops? [Strongly support; Somewhat support; Neither support nor oppose; Somewhat oppose; Strongly oppose]
Sprawl	2, 3	Thinking about the possibility of more housing development in your metropolitan region, do you support or oppose constructing more suburban homes on farmland and open space near cities? [Strongly support; Somewhat support; Neither support nor oppose; Somewhat oppose; Strongly oppose]

Table 5: Questions about housing politics and policy.

Item	Surveys	Question Text
Land Banking	2	{Market-rate}{For-profit} housing is built without financial support from the government and may be sold or rented to anyone at any price. Subsidized affordable housing is built with government financial support and may be sold or rented only to low- and moderate-income households at prices they can afford. Do you agree or disagree with this statement: "{Cities}{**$City**} should prohibit new {Market-rate}{For-profit} housing in places where subsidized affordable housing could be built in the future." [Strongly agree; Somewhat agree; Neither agree nor disagree; Somewhat disagree; Strongly disagree]

Notes. Bold-font terms that begin with $ represent piped information from previous survey questions. Terms in curly braces are randomized with equal probability. Response options are in square brackets. The "Gentle Density" question on Survey 1 has a geographic-scale randomization (neighborhood, city, state); **$Jurisdiction** is the name of the respondent's city in the first two cases and the name of respondent's state in the last case. On Survey 2, all respondents receive the first three statements in the preemption battery; there are two possibilities for the final statement. As indicated in Figure 2.3, Survey 3 also includes an exploratory block of housing policy questions that are not used in this paper.

2.5.4 Potential Explanations

Table 6 provides the exact wording of survey questions used to investigate potential explanations for housing supply skepticism.

Table 6: Questions about potential explanations for housing supply skepticism.

Item	Surveys	Question Text

Table 6: Questions about potential explanations for housing supply skepticism.

Item	Surveys	Question Text
Predict Mast (2021) Findings	1	A University of Notre Dame economist recently examined the effect of new apartment and condo buildings on the availability of affordable homes in the same metropolitan area. He wanted to see whether the opening of a new, expensive building would free up affordable housing through "chains of moves." The logic is that some people in the region will trade up to nicer homes in the new building. Their previous homes can then be occupied by other families. The families that move into those homes vacate other dwellings, and so forth. The economist collected the current and previous addresses of 50,000 residents of new buildings in neighborhoods with above-average household incomes. He then found the current residents of their previous homes, and where those people previously lived, and so on through six rounds of moves. For every 100 new apartments and condominiums, the economist estimated the number of residential units that become available to buy or rent in the same metro region's relatively affordable neighborhoods over the next 5 years. (A unit becomes available when its former occupant trades up to another home.) We'd like your best guess at what he found. - Within five years of the opening of a 100-unit apartment or condo building in a large city, how many homes do the resulting chains-of-moves make available to buy or rent in the metro region's affordable neighborhoods? Use the slider to give us your best guess. [Slider from 0-100, labeled "Number of homes in affordable neighborhoods"] - Of these **{piped answer}** relatively affordable homes that may become available through chains of moves, how many would you guess are in the metro region's low-income neighborhoods? [Slider from 0-100, labeled "Number of homes in low-income neighborhoods"]

Table 6: Questions about potential explanations for housing supply skepticism.

Item	Surveys	Question Text
Confidence	2, 3	*Asked after eliciting prediction of price effect of 10% regional supply shock.* How confident are you about the direction of the effect of this scenario on home values—that is, whether it would generally increase, decrease, or have no effect on home values? [Not at all confident; Not confident; Somewhat confident; Confident; Very confident]
Zero-Sum Thinking Battery	2	*Four questions, each in the form, "Which statement is closer to your views?," presenting the following pairs:* - ["The art of politics is finding compromises that are good for everyone"; "The art of politics is dominating the other side."] - ["In life, when somebody gains, others usually have to lose"; "In life, when somebody gains, others usually benefit too."] - ["When government policies help one group get ahead, other groups are usually held back"; "When government policies help one group get ahead, other groups usually benefit too."] - ["If someone gets richer it means that someone else gets poorer"; "If someone gets richer it means they're satisfying other people's wants and needs."]

Table 6: Questions about potential explanations for housing supply skepticism.

Item	Surveys	Question Text
Mental Models Stage 1	2	*These statements are preceded by a recap of the respondent's 10% regional supply shock scenario. After the 5th statement, we pose a factual question about the nature of the supply shock and then recap the vignette again. For each statement, the response set is:* [Strongly agree; Somewhat agree; Neither agree nor disagree; Somewhat disagree; Strongly disagree] - "This scenario would make it easier to find a home to buy or rent in the region's less-expensive neighborhoods." - "This scenario would make it easier to find a home to buy or rent in the region's more-expensive neighborhoods." - "This scenario would result in more companies opening or expanding offices in the region." - "This scenario would result in more demolition of currently-affordable homes in the region." - "This scenario would result in more corporations buying up housing in the region." - "This scenario would reduce the overall quality of life in my neighborhood." - "This scenario would result in more high-income people moving into lower-income neighborhoods." - "This scenario would increase the amount of expensive new housing built next door to older, more affordable homes." - "This scenario would result in more new housing being built for people like me."

Table 6: Questions about potential explanations for housing supply skepticism.

Item	Surveys	Question Text
Mental Models Stage 2	2	Next, we present several alternative statements about how certain land use changes may affect home prices or rents, other things equal. Please choose the statement that's closest to your views. - "When more companies open or expand offices in a region, this generally results in... [higher / lower / no change in] home prices and rents in the region." - "When there's more demolition of affordable homes, this generally results in... [higher / lower / no change in] rents for other affordable homes." - "When corporations buy up more of the housing in a region, this generally results in... [higher / lower / no change in] in rents." - "When the overall quality of life in a neighborhood declines, this generally results in... [higher / lower / no change in] home prices and rents in the neighborhood." - "When more high-income people move into a lower-income neighborhood, this generally results in... [higher / lower / no change in] home prices and rents in the neighborhood." - "When expensive new housing is built next door to older, more affordable homes, this generally... [decreases / increases / has no effect on] the market value of the older homes." - "When there's more construction of new housing for people like me, this generally results in... [higher / lower / no change in] home prices and rents for people like me." - "When more homes become available to buy or rent in a region's more-expensive neighborhoods, this generally results in... [higher / lower / no change in] home prices and rents in the region's less-expensive neighborhoods." - "When more homes become available to buy or rent in a region's less-expensive neighborhoods, this generally results in... [higher / lower / no change in] home prices and rents in the same less-expensive neighborhoods."
Observed Development	2	Do you agree or disagree with this statement: "Most of the new housing in my area has been built in neighborhoods where home prices and rents are going up." [Strongly agree; Somewhat agree; Neither agree nor disagree; Somewhat disagree; Strongly disagree]

Table 6: Questions about potential explanations for housing supply skepticism.

Item	Surveys	Question Text
Subjective Numeracy Battery	3	- How good are you at working with fractions? [Not at all good; Hardly good; Somewhat good; Very good; Extremely good] - How good are you at working with percentages? [Not at all good; Hardly good; Somewhat good; Very good; Extremely good] - How good are you at calculating a 15% tip? [Not at all good; Hardly good; Somewhat good; Very good; Extremely good] - When reading a news story, how helpful do you find tables and graphs that are part of the story? [Not at all helpful; Hardly helpful; Somewhat helpful; Very helpful; Extremely helpful] - When people tell you the chance of something happening, do you prefer that they use words ("it rarely happens") or numbers ("there is a 1% chance")? [Always prefer words; Usually prefer words; Sometimes prefer words; Sometimes prefer numbers; Usually prefer numbers; Always prefer numbers] - When you hear a weather forecast, do you prefer predictions using percentages ("there will be a 20% chance of rain today") or predictions using only words ("there is a small chance of rain today")? [Always prefer percentages; Usually prefer percentages; Sometimes prefer percentages; Sometimes prefer words; Usually prefer words; Always prefer words] - How often do you find numerical information to be useful? [Never; Rarely; Sometimes; Often; Always]
Local Price Effects of "Luxury" Housing	3	Consider a neighborhood of older, relatively affordable homes in an expensive city. If the city allowed more luxury housing to be built in the neighborhood, rents for older housing in the same neighborhood would. . . [increase; decrease; stay the same.]
Development: Cause or Consequence	3	Which of the following statements is closer to the truth? [Developers don't make places more expensive when they build new housing; they just pick more expensive places to build in. Developers make places more expensive when they build new housing. I have no opinion.]

Table 6: Questions about potential explanations for housing supply skepticism.

Item	Surveys	Question Text

Notes. Terms in curly braces are randomized. Bold-font terms that begin with $ convey piped information from previous survey questions. Response options are in square brackets.

2.5.5 Within-Survey Test-Retest Questions

As noted, Survey 3 respondents were randomly assigned to be retested on a supply-shock question near the end of the survey. To reduce monotony and discourage recall-based responding, we made slight changes to question wording between the "test" and "retest" version of each question, as shown in Table 7.

Table 7: Test-retest questions on Survey 3.

Item	Test Wording	Retest Wording
Price Effects of 10% Regional Shock	Imagine that **$State** passes a law that removes local restrictions on housing development. It causes a large increase in the number of new houses and apartments in your metropolitan region. Would rents for typical existing **$Home_type** in **$City** increase, decrease, or stay the same?	Imagine that a new manufacturing process increases the productivity of homebuilders. It causes a large increase in the number of new houses and apartments in your metropolitan region. Would rents for typical existing **$Home_type** in **$City** increase, decrease, or stay the same?
Local Price Effects of "Luxury" Housing	Consider a neighborhood of older, relatively affordable homes in an expensive city. If the city allowed more luxury housing to be built in the neighborhood, rents for older housing in the same neighborhood would...	Consider a city where housing is generally expensive, but poorer neighborhoods have relatively affordable homes. If the city removed restrictions on building high-priced condos in one of the poorer neighborhoods, rents for existing housing in the same neighborhood would...

Table 7: Test-retest questions on Survey 3.

Item	Test Wording	Retest Wording
Free Trade	A free trade agreement is a pact between two or more nations to reduce barriers to imports and exports among them. Do free trade agreements make the price of products sold in the U.S. higher, lower, or not make a difference?	A tariff-reduction agreement is a pact between two or more nations to reduce barriers to imports and exports among them. Do tariff-reduction agreements make the price of products sold in the U.S. higher, lower or not make a difference?
Cars	If supply-chain problems cause automakers to produce fewer new cars, what happens to the price of used cars?	If labor shortages cause automakers to produce fewer new trucks, what happens to the price of used trucks?
Labor	Imagine that a new high-school program for training students to be plumbers causes a large increase in the number of plumbers in a city. Would wages for other residential plumbers in the city increase, decrease, or stay the same?	Imagine that a new high-school program for training students to be auto mechanics causes a large increase in the number of auto mechanics in a city. Would wages for other auto mechanics in the city increase, decrease, or stay the same?
Grain	Imagine that a new, inexpensive fertilizer makes grain farms more productive. Farms treated with the fertilizer yield 50% more grain on average. Would widespread use of this fertilizer cause grain prices to increase, decrease, or stay the same?	Imagine that a new, inexpensive greenhouse design makes vegetable farms more productive. Farms using the new greenhouses yield 50% more vegetables on average. Would widespread use of the new greenhouses cause vegetable prices to increase, decrease, or stay the same?

Notes. The aspects of a question that vary between the test and the retest are highlighted in this table, but not on the survey. For the question about a 10% regional housing supply shock, we randomize whether the respondent is assigned to the technology shock or the state-preemption shock in the initial vignette and we present the other version of the shock as the retest question.

3 *JEP* Paper Results, Disaggregated by Survey

Several of the figures in the main paper pool data from all three surveys. This appendix provides corresponding figures with results disaggregated by survey. Results are similar across the three surveys.

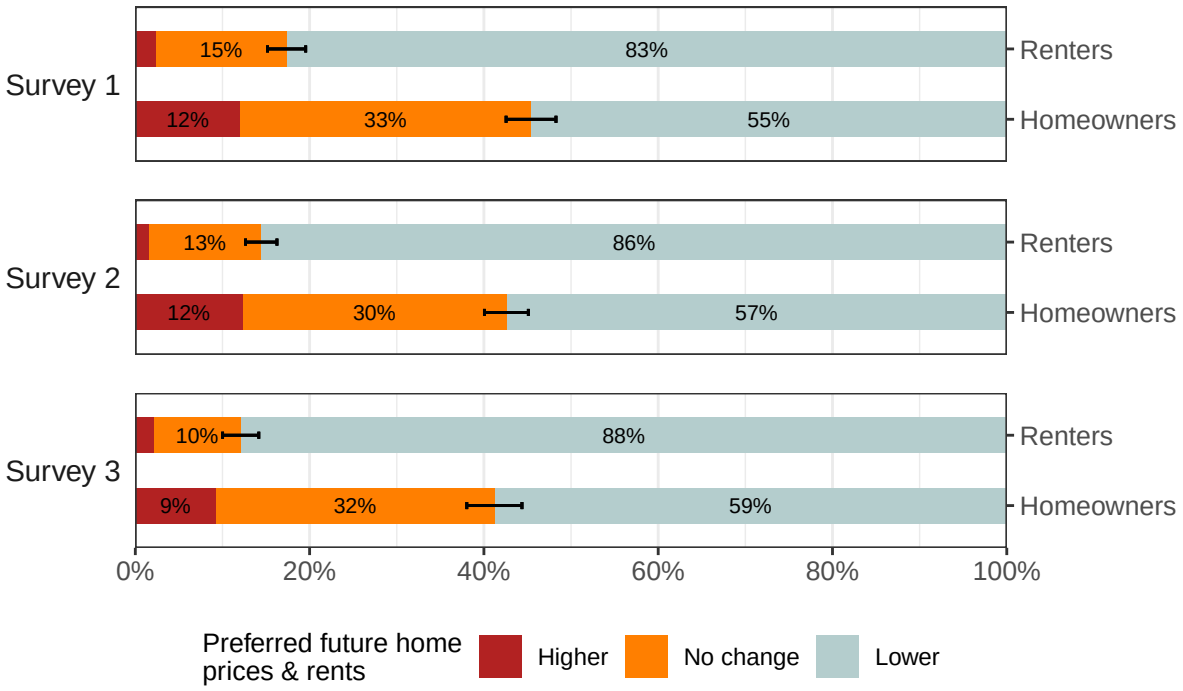

Figure 3.1: Desired future home prices and rents in respondent's city, assuming no change in the economy or quality of life. Error bars are 95% confidence intervals.

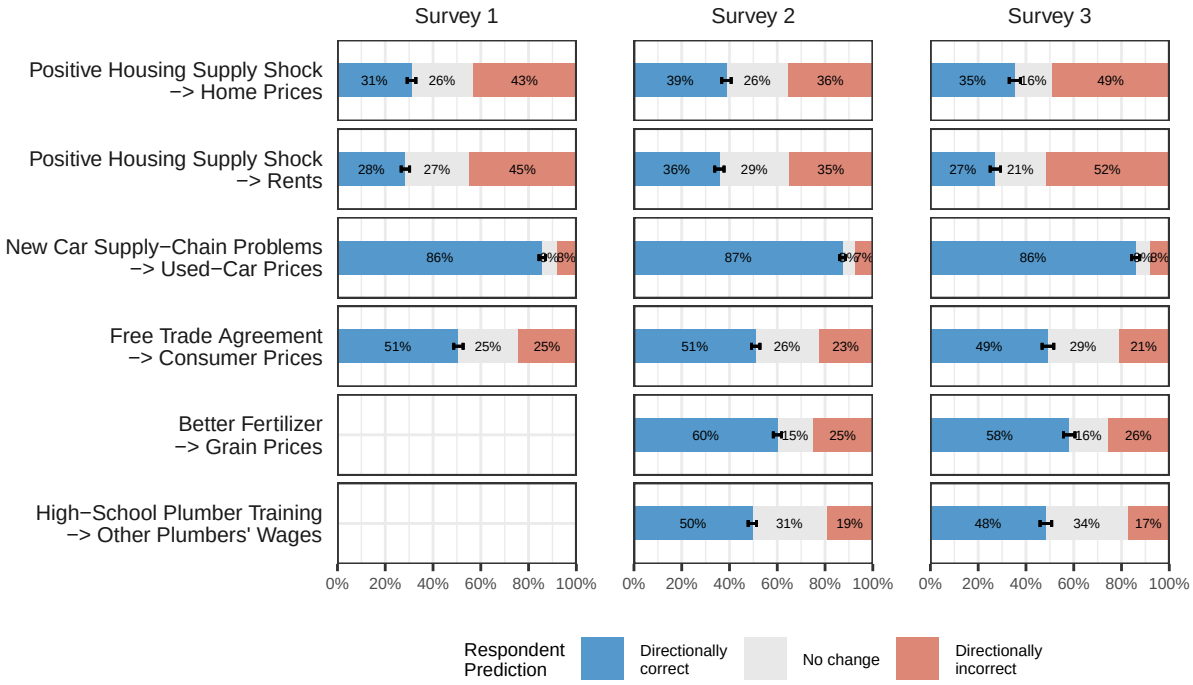

Figure 3.2: Beliefs about price effects of housing vs. non-housing supply shocks, Surveys 1-3. Error bars are 95% confidence intervals on proportion of respondents who did not give the directionally correct answer.

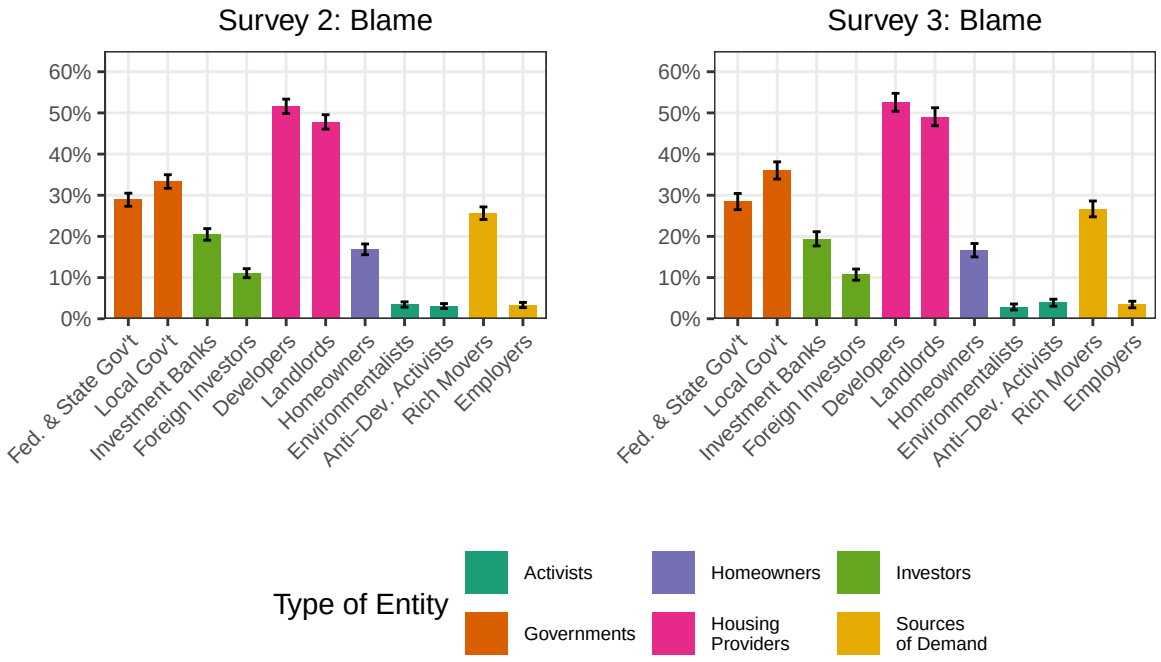

Figure 3.3: Blame for high housing costs in the respondent's area, Surveys 2 and 3. Error bars are 95% confidence intervals on proportion of respondents who blamed the actor or group.

4 Is Housing Supply Skepticism a Non-Attitude? (Surveys 1-3)

As detailed in Section 2.5.4, Survey 2 (and to a lesser extent Surveys 1 and 3) contained numerous questions about hypothesized correlates of housing supply skepticism. The observed correlations, reported below in Section 6, are weak. This led us to wonder whether housing supply skepticism might be more of a non-attitude (Campbell et al., 1960) than a firm belief.

We explored the non-attitude conjecture in four ways. First, we exploited an serendipitous panel that we discovered in the data from Survey 2. Approximately a third of the individuals who took Survey 1 also took Survey 2. (Similarly, about a third of the individuals who took Survey 2 also took Survey 3.) We compared the consistency of their responses across surveys to the housing supply shock questions and, as a benchmark, to other questions that also have a 3-point response format. Second, near the end of Survey 3, we randomly assigned respondents to be retested on one of the housing or non-housing supply-shock questions they had answered near the beginning of the survey. We preregistered a test of the hypothesis that within-survey retest consistency would be lower on housing than non-housing questions. Third, following the housing supply-shock question on Survey 2 and 3, we asked respondents how confident they were in their prediction about the directional effect of the shock on prices. Finally, on Survey 3, we randomly assigned some respondents to a question format on the supply shock questions that includes a "don't know" response option. We preregistered a test of the the hypothesis that "don't know" responses would be more common on housing than non-housing supply shock questions.

To preview the results: We find that between-survey consistency on housing supply-shock questions is barely better than chance (draws from the uniform distribution); and that within-survey consistency is substantially and significantly lower on housing than non-housing supply-shock questions. However, self-reported lack of knowledge about the price effects of supply shocks is *not* higher on housing than non-housing questions, and people who self-report low levels of confidence in their directional prediction of the price effect of a housing supply shock are not more likely to predict that the shock increases prices than people who self-report high levels of confidence. In sum,

housing supply skepticism has the objective characteristics of a non-attitude (inconsistent responses to similar questions over time), but is not subjectively regarded or acknowledged by respondents as a non-attitude.

4.1 Test-Retest Consistency (Surveys 1-3)

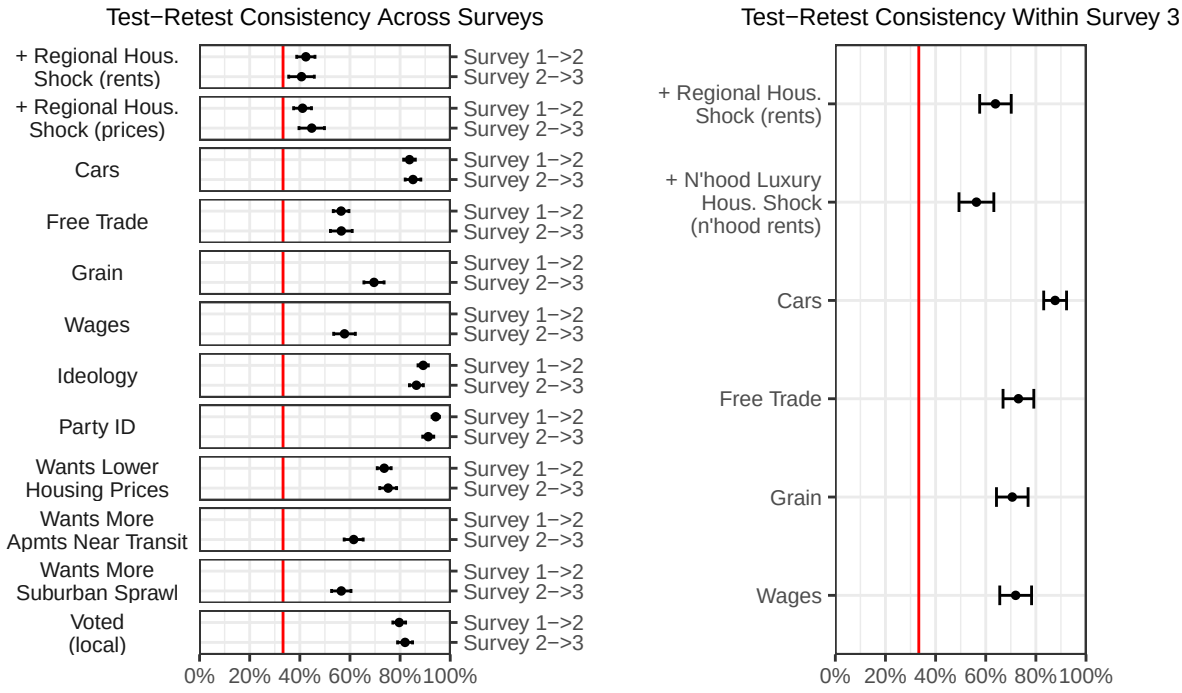

Figure 4.1: Test-retest reliability for the price prediction question and other survey items using our "serendipitous" panel data (left panel) and test-retest design within Survey 3 (right panel).

The left panel in Figure 4.1 displays between-survey consistency results. The vertical red line in the figure marks the 33% consistency level expected if responses were offered at random from the uniform distribution. As expected, respondents gave stable responses when asked to recall personal facts. Self-reports of local election turnout, party identification, and political ideology were answered in the same way 75% to 85% of the time on the second survey. Preferences for future home prices and rents were also relatively stable. Non-housing price predictions on topics like cars, free trade, and agricultural and labor shocks were somewhat less consistent, but still outperformed random guessing. So too for housing-development preferences: support for more transit-oriented or

suburban development demonstrated 60% consistency.

Yet consistency on the regional housing supply shock questions was only 40%, barely better than chance. This suggests that most respondents answered the question by "throwing darts," or that their beliefs change frequently.

We recognized that low test-retest consistency on the housing supply-shock question between Surveys 1 and 2 may have been due, in part, to randomization of various features of the supply shock question on Survey 2 (including cause of the shock, question format, and posited counterfactual future prices), whereas the non-housing supply-shock questions were identical on both surveys. The within-survey consistency test on Survey 3 addresses this concern. Near the end of the survey, respondents were randomly assigned to receive one of the supply-related questions they had answered earlier in the survey—either the regional supply shock question, the question about how new "luxury" housing affects rent in more affordable neighborhoods, or a non-housing economic question.[12] As shown in the right panel in Figure 4.1, within-survey consistency was higher than between-survey consistency, but again the housing items show less consistency than non-housing items. (For the exact wording of these items, see Section 2.5.5.)

Our preanalysis plan for Survey 3 registered a formal test of the hypothesis that within-survey test-retest consistency would be lower, on average, on the housing items than on other economic knowledge items. Table 8 provides the results of this test, as specified in our pre-analysis plan. Relative to the average consistency on the non-housing economic items, responses to the regional supply-shock question and luxury development question were 13 points and 21 points less consistent, respectively. However, as the second panel in Figure 4.1 indicates, the difference in consistency between the regional supply shock question and most of the constituent economic items is modest (around 8-10 percentage points), save for the "cars" item which produced much more consistent responses.[13]

[12]To minimize tedium or recall-based responding, we slightly modified the scenario in the retest version of the question, while keeping its substance unaltered.

[13]We also hypothesized that respondents would more frequently select "don't know" for housing than non-housing supply-shock questions, but this was not supported. Response instability does not seem to arise from *conscious*

Table 8: Hypothesis Test on Within-Survey Test/Retest Reliability

Item	Estimate	95% CI[1]	p-value	Romano-Wolf p-value
(Intercept)	0.77	0.73, 0.80	<0.001	
Regional Supply Shock (rents)	-0.13	-0.20, -0.06	<0.001	<0.001
N'hood Luxury Dev. (rents)	-0.21	-0.28, -0.13	<0.001	<0.001

Note: Results of hypothesis tests specified in the preanalysis plan for Survey 3. OLS estimates. The dependent variable is coded 1 if the respondent gave a consistent response to the retest question, 0 if inconsistent. The reference condition (intercept) averages the four non-housing economic knowledge items included on Survey 3.

In our preanalysis plan for Survey 3, we speculated that respondents who are supply-skeptical about the effect of a large, positive regional housing supply shock on rents are more likely to be guessers on economic-knowledge questions generally (compared to respondents who predict that a regional increase in housing supply would lower rents). We said we would provide a "low-powered test" of this conjecture by plotting retest consistency after subsetting the data by skepticism on the regional-shock question (rents). Figure 4.2 provides these results. Though the differences on individual items are imprecisely estimated, the overall picture is clear: people who predicted that a large, positive regional housing-supply shock would lower rents tend to retest more consistently on any question about economic knowledge than people who predicted that the regional housing shock would raise rents. This corroborates our thesis that housing supply skepticism is in substantial part a manifestation of guesswork-style responding, rather than well-formed beliefs. But note that even the strong skeptics retest within the survey nearly twice as consistently on the housing question (when the retest is in the same question format) as would be expected if they were drawing answers from the uniform distribution.

To summarize succinctly the average difference in test-retest consistency among respondents who gave "supply optimist" vs. "strongly skeptical" answers to the question about how a regional housing shock would affect rents, we ran an off-plan regression that pools all of the housing and non-housing supply questions. The average retest consistency rate is 9 pp higher among supply optimists than supply skeptics, a difference which is highly significant ($p = 0.003$). See Table 9.

confusion.

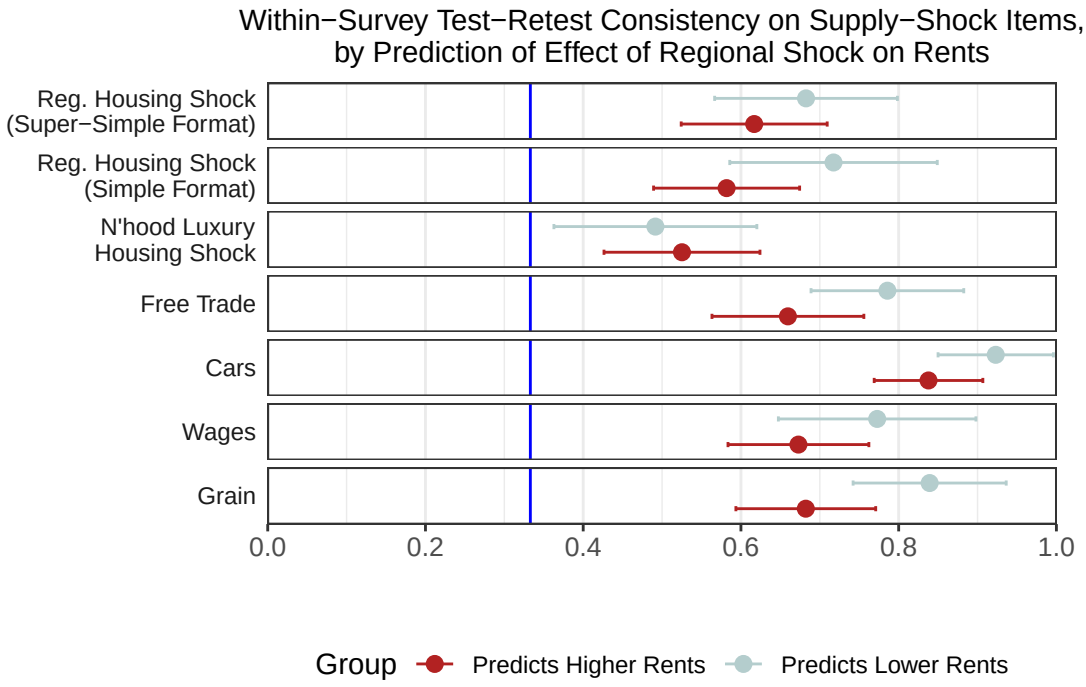

Figure 4.2: Test-retest consistency on housing and non-housing supply shock questions, subset by whether the respondent predicted higher rents (strong supply skepticism) or lower rents (supply optimism) from a 10% regional housing supply shock. The vertical blue line depicts the rate of test-retest consistency that would be observed if survey responses were drawn from the uniform distribution.

Table 9: Average Difference in Test-Retest Consistency Between Respondents Who Did / Didn't Answer Regional Shock Question Correctly (Survey 3)

Characteristic	**Beta**	**95% CI**	**p-value**
(Intercept)	0.66	0.62, 0.69	<0.001
Group			
Predicts Higher Rents	—	—	—
Predicts Lower Rents	0.09	0.03, 0.14	0.003

Note: This table reports an off-plan test for the significance of the average difference in within-survey test-retest consistency between respondents who provided supply optimist (negative price prediction) and strongly skeptical (positive price prediction) responses to the question about the effect of a 10% regional supply shock on rents, summarizing the information which is depicted graphically in Figure 4.2. The model is a robust linear regression of (1) an indicator for test-retest consistency on an economic knowledge question on (2) an indicator ("Group") for whether the respondent predicted higher or lower rents from the regional housing shock, aggregating across all economic knowledge questions and clustering standard errors on the respondent. Respondents who predicted no change in rents are dropped, for consistency with Figure 4.2.

4.2 Self-Reported Uncertainty About Price and Rent Predictions (Surveys 2 & 3)

4.2.1 Confidence in Predictions of the Directional Effect of a Regional Housing Supply Shock on Prices

On Surveys 2 and 3, we investigated whether respondents would self-report that their predictions of the price and rent effects of a 10% regional supply shock are guesswork. We did this in two ways. First, on both surveys, we posed a follow up question asking respondents how confident they were that the shock would have the directional effect on prices (rents) that they predicted. Second, on Survey 3, we randomly assigned some respondents to a version of the survey that included "don't know" as a response option on the housing and non-housing supply-shock questions. We hypothesized that don't-know responses would be more common on the housing questions.

Figure 4.3 plots the distribution of responses to the confidence question, by elicitation format. The main takeaways are (1) that the proportion of respondents who report being "confident" or "very confident" is fairly low (roughly 25%-40%), though higher than than the proportion who report being "not confident" or "not at all confident" (roughly 15%-25%); and (2) that simpler elicitation formats do not induce greater confidence in reported predictions. In other words, whatever confusion or uncertainty respondents may feel does not appear to be an artifact of the manner in which we elicited price and rent predictions. It more likely manifests genuine uncertainty about how a large positive shock to regional housing supply would affect home prices and rents.

Figure 4.4 plots the distribution of directional price and rent predictions, by self-reported confidence. On Survey 2, confident respondents are not more likely to be supply skeptics than non-confident respondents. However, on Survey 3, the more confident respondents are substantially and significantly more supply skeptical. Only about 40% of the less-confident Survey 3 respondents predicted that a positive 10% regional shock would cause home prices or rents to rise, whereas 60% - 70% of the confident respondents made the strongly supply skeptical prediction. This may reflect

the salience of inflation generally, or home-price inflation specifically, during the time of the fielding of Survey 3 (May of 2023).

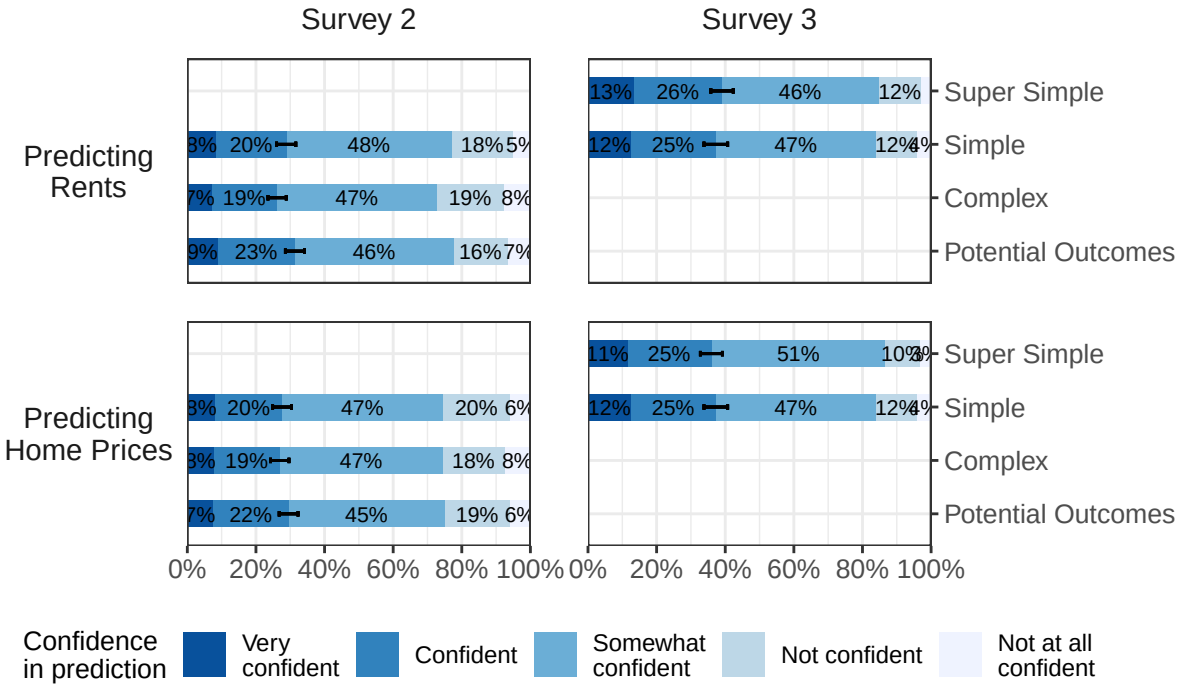

Figure 4.3: Self-reported confidence in respondents' prediction of price and rent effects of 10% regional housing supply shock, by elicitation format. Errors bars are 95% confidence intervals on the proportion of the population that is "very confident" or "confident" in the direction of their prediction.

4.2.2 Adding a "Don't Know" Response Option

Our hypothesis that "don't know" responses would be more common on housing than non-housing questions is not borne out.

Figure 4.5 shows the distribution of responses to all price-prediction questions among respondents who received (left panel) or did not receive (right panel) the don't-know option (Survey 3). For most questions, about 10% of respondents chose the don't-know options. The don't-know rate may be marginally higher on the labor-markets question (about 13 pp, and it's substantively and significantly higher on the free-trade question (about 23 pp). The "super-simple" elicitation format

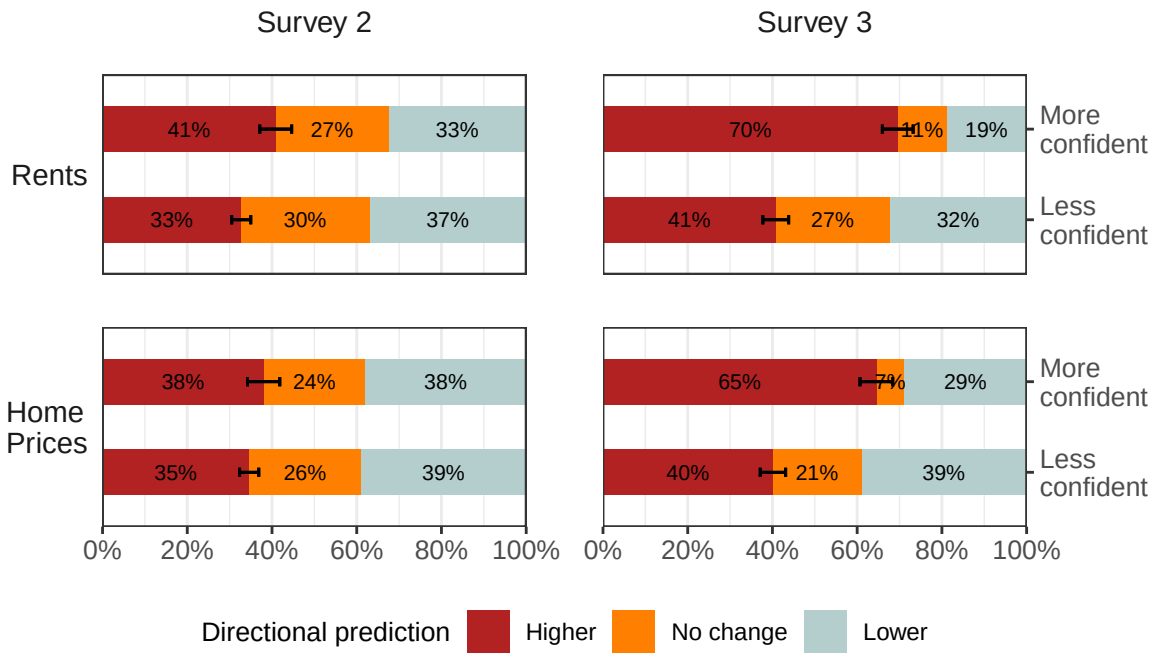

Figure 4.4: Elicited directional predictions of home-price and rent effects of 10% regional housing supply shock, by self-reported confidence in direction of prediction. "More confident" respondents are above median, which in this case is equivalent to answering "very confident" or "confident" on the confidence question. "Less confident" respondents are everyone else. Errors bars are 95% confidence intervals on the proportion of the population that is at least weakly supply skeptical.

does not attenuate the don't-know rate or supply-skepticism. (See also Figure 5.2.)

We also preregistered a test of the hypothesis that the don't-know rate would be higher for each rent-effect prediction question on Survey 3 than for the average of the labor, cars, and grain questions. For purposes of this hypothesis test, we excluded the trade question, because we thought answer might reflect partisan identities more than economic knowledge, and we focused on rent rather than home-price predictions because the effect of land-use liberalization on home prices is more ambiguous in theory than its effect on rents (home prices reflect the value of the parcel of land on which the home sits as well as the value of physical improvements, and land-use liberalization may increase the value of some parcels).

Table 10 reports the results of this test. In keeping with the graphical results in Figure 4.5, it shows that the baseline don't-know rate for the non-housing questions is about 0.10; that the don't-know rate on the regional-shock housing question is virtually identical; and that the don't know rate on the neighborhood-shock housing question is slightly but not statistically significantly lower.

Table 10: Difference in Don't-Know Rates on Rent-Prediction Questions Relative to Baseline of Non-Housing Supply-Shock Questions (Survey 3)

Item	**Estimate**	**95% CI**	**p-value**	**Romano-Wolf p-value**
(Intercept)	0.11	0.09, 0.13	<0.001	
Regional Supply Shock (rents)	0.00	-0.04, 0.04	>0.9	>0.9
N'hood Luxury Dev. (rents)	-0.03	-0.06, 0.00	0.056	0.14

Note: This table reports a preregistered test for the significance of the difference (if any) between don't-know response rates on housing vs. non-housing questions included on Survey 3. We subsetted to observations on the neighborhood housing shock (rents), regional housing shock (rents), cars, labor market, and grain questions, and then regressed an indicator for a don't-know response on indicators for whether the question was the neighborhood-housing-supply-shock or the regional-housing-supply-shock question. The reference condition (intercept) captures the average don't-know rate on the labor market, commodity market, and automobile market questions.

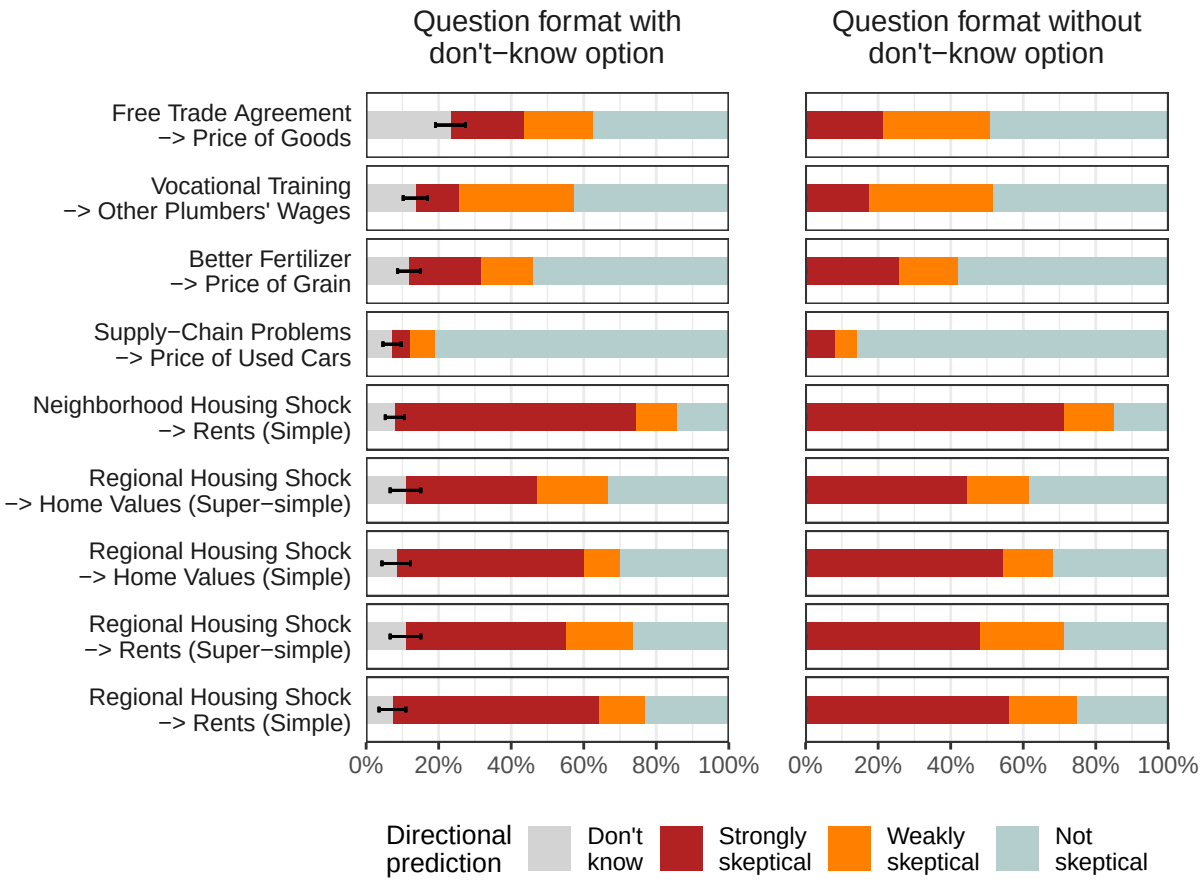

Figure 4.5: Effect of "don't know" response option. Survey 3. The left plot shows the distribution of responses among respondents who were randomly assigned to questions with don't-know in the choice set. The right plot shows the distribution of responses among respondents who did not receive a don't-know option. Error bars are 95% confidence intervals on proportion of don't-know responses. Strong skeptics are those who predict that a positive (negative) supply shock leads to higher (lower) prices. Weak skeptics are those who predict no change. Not-skeptics are those who predict that a positive (negative) shock leads to lower (higher) prices.

4.3 Is Blaming Providers for High Housing Prices a Non-Attitude Too? (Surveys 2 & 3)

We elicited perceptions of responsibility for high housing prices using the same question on Survey 2 and 3, which allows us to measure between-survey consistency on this item too.

Respondents were invited to nominate up to three of eleven actors as "responsible for high housing prices and rents in your area." Housing providers—developers and landlords—were most frequently named. Groups called out in the economics and political science literature, such as homeowners, anti-development activists, and environmentalists, were rarely selected. Of the respondents who took both surveys, 87.3% on Survey 3 blamed at least one actor they had blamed on Survey 2 (95% CI: 84.7%, 89.9%). Those who blamed developers or landlords on Survey 2 were likely to do so again on Survey 3, whereas less frequently blamed groups (e.g., environmentalists and anti-development activists) were reselected at rates closer to random choice. See Figure 4.6

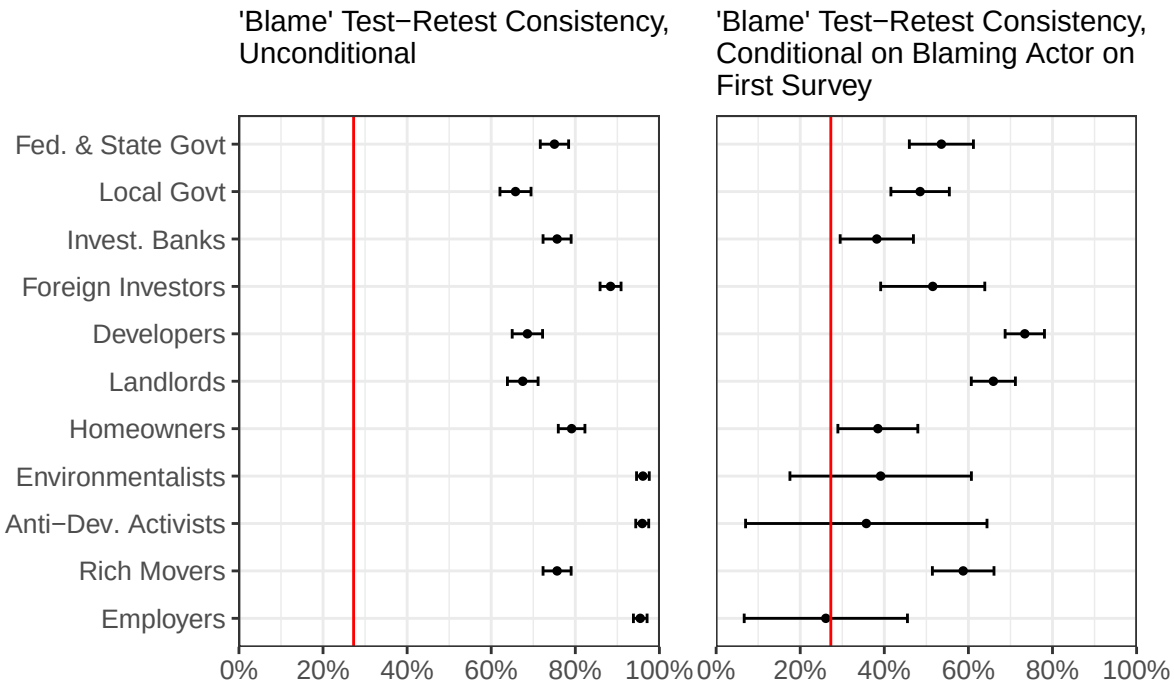

Figure 4.6: Test-retest consistency on attribution of blame for "high housing prices in your area." Surveys 2 and 3. Respondents were allowed to select up to three actors. The left-hand panel treats a response as consistent if the respondent either listed, or did not list, the actor on both surveys. The right-hand panel conditions on respondents who blamed the actor on Survey 2 and codes a Survey 3 response as consistent only if the actor was also blamed on the latter survey.

5 Design-Based Robustness Check on Housing Supply Skepticism (Surveys 2 & 3)

This section reports the results of our design-based robustness checks on respondents' perceptions of the directional effect of a 10% regional supply shock on home prices and rents.

Recall that on Survey 2, we replaced the regional supply-shock question used on Survey 1 with a conjoint-style question, varying the *cause* of the shock (technological change, or one of several forms of state preemption of local land-use restrictions); the *elicitation format* of the survey question; and, for those elicitation formats that require it, *posited future home prices and rents* in the respondent's area absent the shock. On Survey 3, we also used a conjoint-style supply-shock

question, varying the cause of the shock (tech change vs. preemptive state deregulation) and the elicitation format ("simple" vs."super-simple"). See section 2.5 for question-wording details.

Figures 5.1 and 5.2 report the results of these robustness checks, for Surveys 2 and 3, respectively. We categorize respondents as at least weakly supply skeptical if they don't predict that the large, positive regional supply shock will lead to lower home prices (rents). Across all conditions except the "potential outcomes" elicitation format, at least 60% of respondents are weakly supply skeptical. Unsurprisingly, the potential-outcomes format—which requires respondents to enter in dollar terms their prediction of home prices (rents) in five years, and later similarly elicits a expectations under the shock—leads to fewer "no change" predictions. But even in this format, almost as many respondents predict that the shock will lead to higher prices (about 35%) as predict that it will lead to lower prices (about 45%).

There is also weak evidence (Figure 5.1, third row of plots) that positing a high counterfactual future price (absent the shock) leads a higher share of respondents to "predict" that future home prices will be lower than the stated counterfactual. We think this probably reflects disbelief in the stated counterfactual.

On Survey 3, we again observe little effect of the cause of the shock on elicited rent and price predictions. The "super-simple" elicitation format may *slightly* reduce skeptical home-price predictions relative to the "simple" format, but the different is small (about 5 pp) and not observed with respect to rent-predictions. We think it's probably just chance variation. Certainly the super-simple format—which, again, is the same format used in our non-housing supply shock questions—does not reduce the rate of observed housing-supply skepticism (about 60%-70%) to the levels observed for other goods and services (50% or less). Compare Figure 5.1 with Figure 3.2.

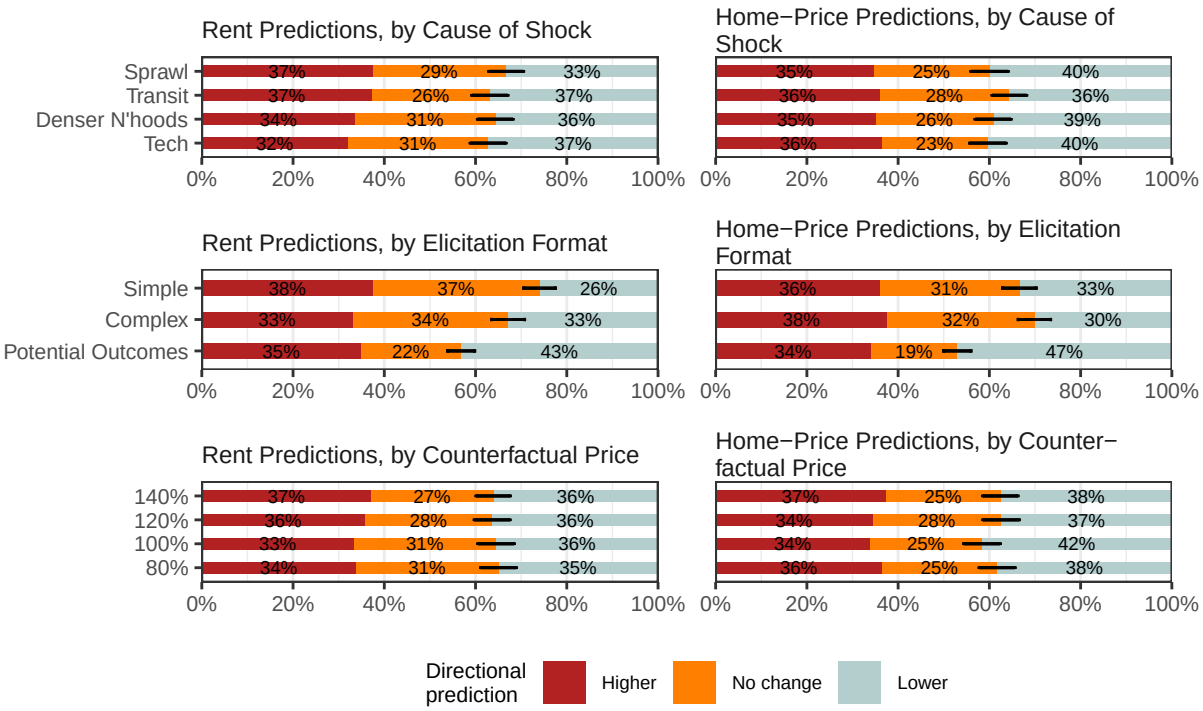

Figure 5.1: Design-based robustness checks, Survey 2. This figure depicts marginal means of directional price and rent predictions associated with each level of the attributes *Cause of Supply Shock*, *Elicitation Format*, and *Counterfactual Future Price*. Errors bars are 95% confidence intervals on the proportion of respondents who express strong or weak supply skepticism. Counterfactual prices are presented to respondents only in the Complex elicitation format, so for plots in the third row of this figure, we restrict the sample to respondents who received that question format.

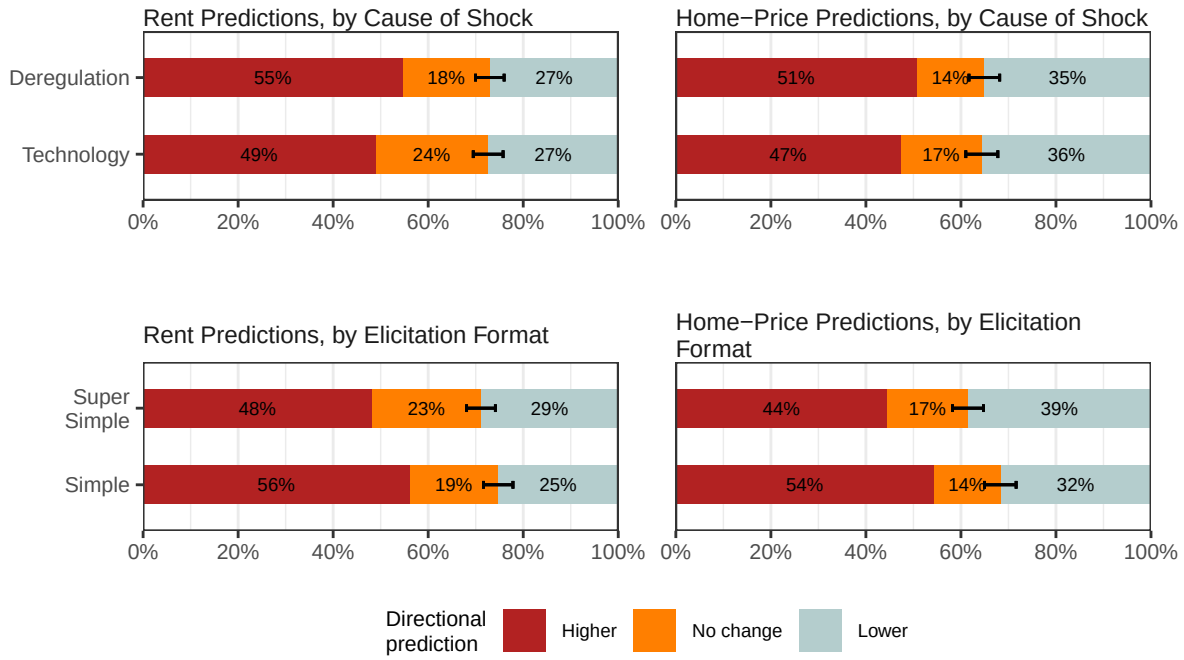

Figure 5.2: Design-based robustness checks: Survey 3. This figure depicts marginal means of directional price and rent predictions associated with each level of the attributes *Cause of Supply Shock* and *Elicitation Format*. Errors bars are 95% confidence intervals on the proportion of respondents who express strong or weak supply skepticism.

6 The Weak Relationship Between Housing Supply Skepticism and Factors Hypothesized to Explain It (Surveys 1 - 3)

As detailed in Section 2.5.4, our surveys included a wide variety of questions probing for possible "roots" of housing supply skepticism in personal attributes, experiences, or beliefs. Contrary to our original expectations—but consistent with the thesis that housing supply skepticism is largely a non-attitude—none of these factors explain much of the variation in elicited predictions of the price and rent effects of a large regional housing supply shock. In this section, we first report pairwise correlations between directional price and rent predictions and the discrete predictors. Then, we discuss the "two-stage" questions included on Survey 2, through which we sought to explain housing supply skepticism as a function of the interaction between beliefs about material effects of housing development and general views about how such material effects translate into prices. We present both preregistered and off-plan models, finding that the mental-model items explain little of the variation in answers to the regional-shock question.

6.1 Pairwise Correlations Between Price Predictions and Personal Attributes or Experiences (Surveys 1 - 3)

For Survey 1, we anticipated a link between responses to the chain-of-moves prediction (more vacancies in middle and lower-income areas due to new upper-income housing) and the belief that a regional shock would lower existing home prices. We also expected a strong negative correlation between housing supply skepticism and economic knowledge, as indicated by responses to non-housing supply shock questions. For Survey 2, we hypothesized that respondents observing new housing in high-price areas would be more prone to believing that a positive regional supply shock would increase prices. We also thought that zero-sum thinkers would show higher levels of supply skepticism. For Survey 3, we hypothesized that supply skepticism might be linked to a broader discomfort with numerical reasoning.

Figure 6.1 shows that our initial hypotheses about the correlations between housing supply

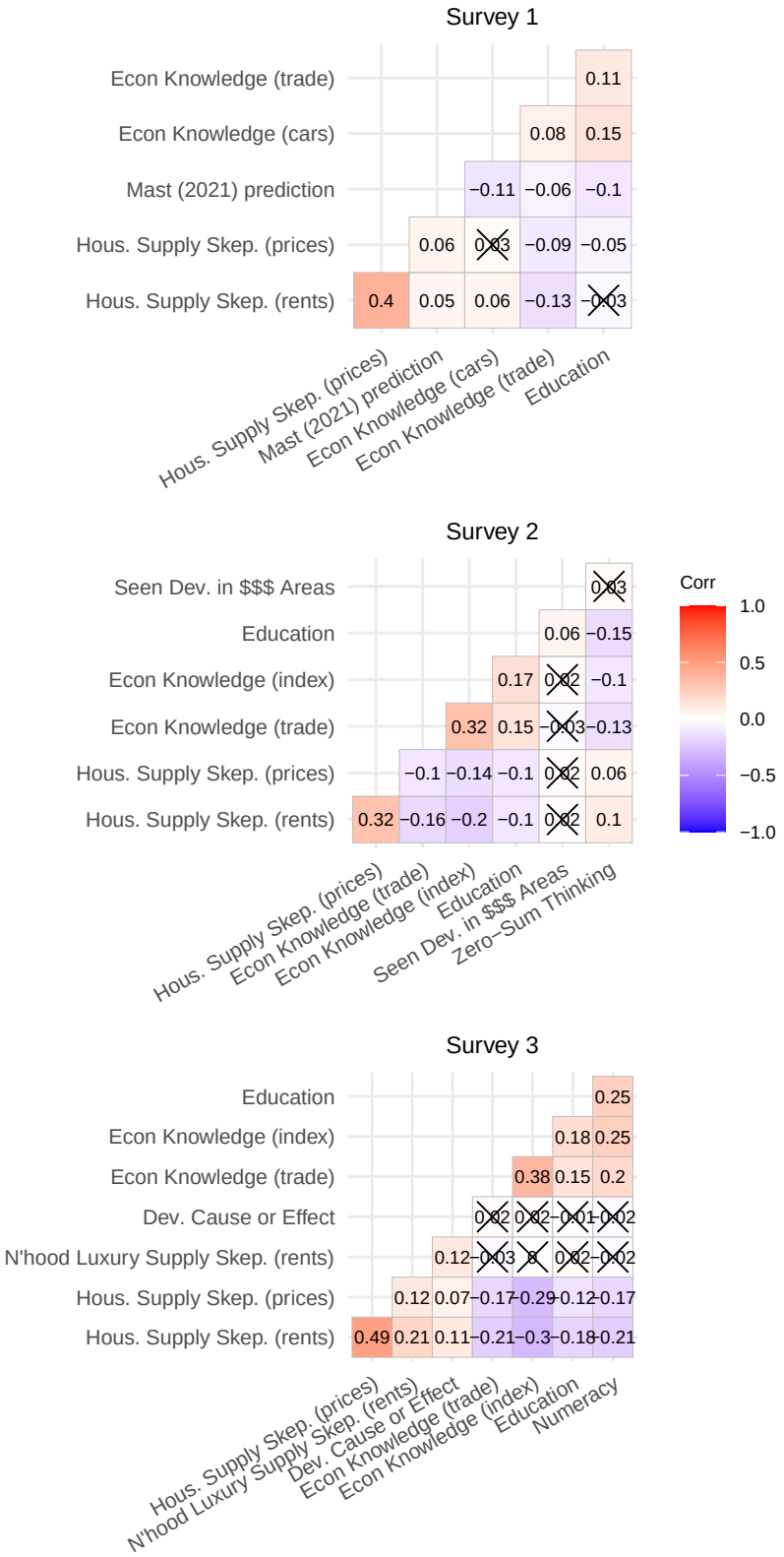

Figure 6.1: Correlation matrices for housing supply skepticism, economic literacy, numeracy, and exposure to development in high-cost areas. Price-prediction questions are encoded on a 3-point numerical scale (1 = increase, 0 = no change, -1 = decrease).

skepticism and economic knowledge were at best partially confirmed. Surveys 2 and 3 revealed only moderate negative correlations between housing supply skepticism and an economic-knowledge index defined as the first principal component of responses to the non-housing supply-shock questions ($r = -.2$, $r = -.3$).[14] While there is a relationship between housing supply skepticism and a lack of general economic understanding, they are not identical: housing supply skepticism rates are significantly higher (See Figure 2 in the main text), and general economic knowledge accounts for only a small part of the variation in beliefs about housing supply. Furthermore, numeracy and education levels correlate in the expected direction with housing supply skepticism, but not so strongly that it appears to be the driving factor. In summary, respondents' economic knowledge, education level, and numeracy are interrelated, but the correlations among them are not particularly strong, and no one factor individually or collectively explains much of the variance in supply skepticism.

The correlation between housing supply skepticism and chain-of-moves predictions is almost nonexistent and what correlation exists is opposite the expected direction (Survey 1; $r = 0.05$, $r = 0.06$)). Nor did we find the expected "availability heuristic" relationship between housing supply skepticism and self-reports of new housing going in where prices and rents are going up (Survey 2). Finally, zero-sum thinkers are only weakly more likely than positive-sum thinkers to be skeptical that more housing supply would reduce prices (Survey 2; $r = 0.08$, $r = 0.10$).

On Survey 3, we found that majorities or large pluralities embrace the view (1) that new "luxury" housing in a relatively affordable neighborhood would lead to higher rents for other housing in the neighborhood, and (2) that new development is generally the cause, not the consequence, of rising prices in the vicinity of the development.[15] These propositions are central to the ideology

[14]Pursuant to our pre-analysis plan, we omitted the free-trade question from the economic knowledge index due to potential partisan bias and reported its correlation separately. The other items in the economic index are not salient, heavily debated policy issues.

[15]Specifically, 72% of respondents predicted that new luxury housing leads to more expensive rents nearby (95% CI: 69.0%, 73.4%); and 55% (95% CI: 48.9%, 52.6%)said it was closer to the truth that new development causes prices to go up nearby than that developers choose to build in places where prices are going up, whereas only 22% picked the "developers choose to build..." answer. Likewise, on Survey 2, 71% of respondents either "strongly" or "somewhat" agreed that "Most of the new housing in my area has been built in neighborhoods where home prices and rents are going up" (95% CI: 69.4%, 72.5%). Similarly, about 65% of respondents on Survey 2 said that the development of

of elite supply skeptics (Been, Ellen and O'Regan, 2019). Yet as Figure 6.1 shows, there is only a modest positive correlation between supply skepticism on the regional-shock question and the neighborhood-shock question ($r = 0.21$), and an even smaller correlation between answers to the regional-shock question and the development-cause-or-consequence question ($r = 0.11$, $r = 0.07$, $r = 0.12$).

6.2 Is Housing Supply Skepticism Driven by Motivated Reasoning? (Surveys 1-3)

One possible explanation for housing supply skepticism is motivated reasoning: people who don't want land uses to change, but who want (or think they should say) that housing should be more affordable, may rationalize their preference for a preserve-the-status-quo land use policy by predicting that an increase in supply would not bring down prices.

As an initial cut on this question, we subset respondents' predictions of the price and rent effects of a regional supply shock by tenure (homeowner vs. renter) and desired future home prices and rents (lower vs. not lower). See Figure 6.2. The fact that renters and homeowners (and people who do / do not say they want lower prices and rents in the future) make similar predictions about the effect of a supply shock cuts against the motivated-reasoning conjecture. On Survey 1 and 2, renters' predictions (and those of people who want lower prices) were statistically indistinguishable from homeowners' predictions (and those of people who don't want lower prices), while on Survey 3, renters (and people who want lower prices) were *more* supply-skeptical than owners.

When we designed Survey 2, we tried to provide a little more evidence on the motivated-reasoning conjecture by manipulating the salience of policy considerations. Specifically, we randomly assigned about half of the respondents to answer a battery of support-for-state-preemption policy questions before they received the questions about the effect of a 10% supply shock on prices and rents. The other respondents answered the policy questions after the supply-shock questions. We

expensive new housing increases the market value of older, relatively affordable homes nearby.

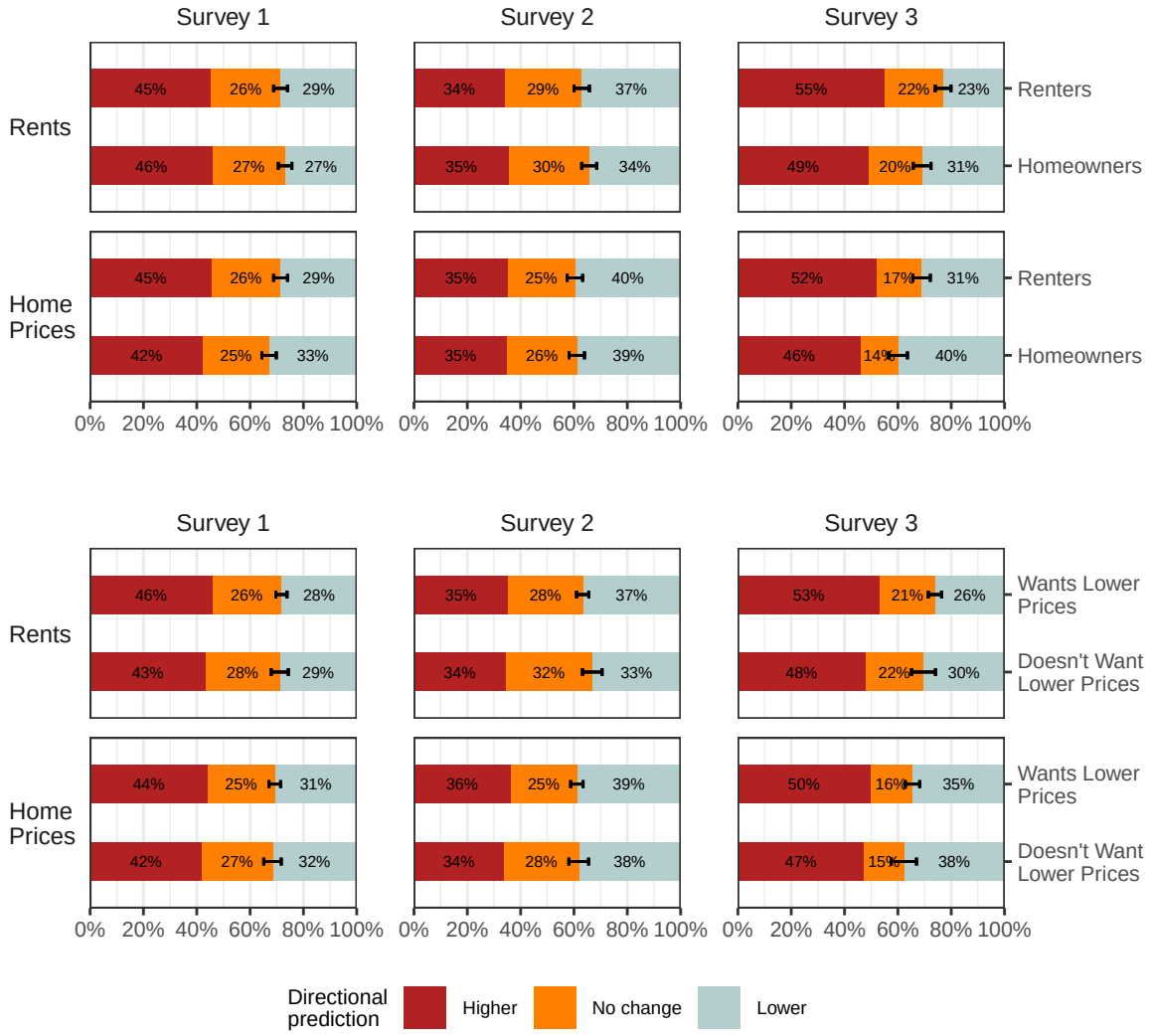

Figure 6.2: Elicited predicted effect of 10% supply shock on home prices and rents, Surveys 1-3. Error bars are 95% confidence intervals on the proportion of each group that is at least weakly supply skeptical (i.e., does not believe that the large regional supply shock would reduce prices).

figured that answering the the policy-support questions would raise the salience of the policy choice, making respondents who received a supply-shock scenario caused by a policy they disfavor less likely to predict that the shock would affects prices and rents in a manner that aligns with their preference for future prices and rents.

The dependent variable in this analysis is a concordant prediction: for respondents who stated a preference for higher home prices and rents at the beginning of the survey, a prediction that the

shock will increase prices; and for respondents who stated a preference for lower prices, a prediction that the shock will decrease prices.[16]

One difficulty with this test of motivated reasoning is that we cannot observe a given respondent's preference for state policies without applying the treatment, i.e., asking whether they favor or oppose the policy in question. Therefore, in our preanalysis plan, we hypothesized that the treatment would have a positive average treatment effect on concordant predictions for preemptive state upzoning policies that are *generally popular*, and a negative average treatment effect on preemptive state upzoning policies that are *generally unpopular*. Ex ante, we did not know which policies would prove popular or unpopular.

Figure 6.3 shows that the transit-oriented development policy is fairly popular, supported by about 50% of owners and renters and opposed by only about 20%, whereas proposals to allow 2-4 unit buildings in single-family neighborhoods, or more suburban homes on open space, are substantially less popular, supported by about 25%-35% of owners and renters and opposed by about 40%-50%.

Table 11 reports the average treatment effect of the state-preemption policy battery on concordant price and rent predictions for each state upzoning policy. There is marginal evidence that the treatment reduces concordant predictions about the rent effects of the (generally unpopular) neighborhood-density scenario, and it may increase concordant predictions about the rent effect of the (generally popular) transit-oriented development scenario. This is consistent with motivated reasoning. However, the effects are imprecisely estimated and do not manifest in home-value predictions. Also, the policy-preference treatment does not reduce concordant rent-effect predictions in the sprawl scenario, which is nearly as unpopular as the neighborhood-density scenario. Given this, and given the lack of treatment effect on concordant home-value predictions, we think the "rent effect" in the denser-neighborhooods condition is probably just noise.

[16]For this analysis, we restrict the sample to respondents who said in response to the future-prices-in-your-city question that they wanted "higher" or "lower" prices.

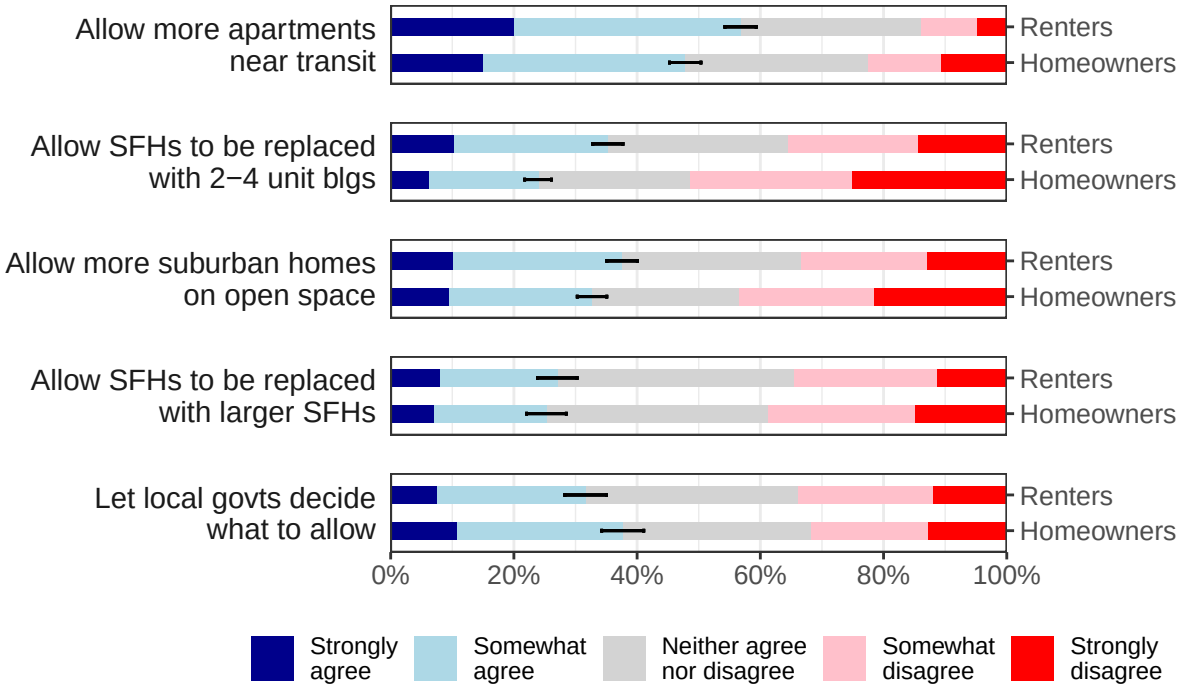

Figure 6.3: Agreement with proposal for the respondent's state to preempt local control over certain types of development. Survey 2. Error bars are 95% confidence intervals on proportion of respondents who agree with the proposal. See Table 5 for exact question wording.

To be clear, this test does not rule out motivated reasoning. The point estimate of the treatment effect on concordant rent predictions in the generally unpopular neighborhood-density scenario is pretty large (10 pp), especially given that we are looking at the average effect across the whole sample, not just people who dislike the neighborhood-density policy. Also, the treatment itself is probably pretty weak. Though seeing the battery of support/oppose questions should increase the salience of the policy choice, respondents in the control condition may also rely on their policy preferences when making price predictions.

Cause of Supply Shock	Preference-Concordant Prediction	ATE	P-Value
Denser N'hoods	Rent	-0.10	0.02
Denser N'hoods	Home Value	-0.01	0.89
Transit-Oriented	Rent	0.03	0.54
Transit-Oriented	Home Value	-0.01	0.88
Sprawl	Rent	0.02	0.69
Sprawl	Home Value	-0.02	0.59

Table 11: Effect of Asking About Support for Preemptive State Upzoning on Concordant Price and Rent Predictions. Respondents in the treatment condition receive a battery of questions about support for state preemption of local land-use restrictions before they answer the question about the effect of a 10% regional housing supply shock on prices and rents for a typical housing unit in their city.

6.3 Is Housing Supply Skepticism Rooted in "Quantity Skepticism"? (Survey 1)

Most of our housing-supply-shock results are from questions that stipulate an exogenous quantity change and elicit expectations about the effect of that change on home prices and rents. However, on Survey 1, we also presented an upzoning scenario and elicited expectations about its effect on quantity as well as price. This allows us to address "quantity skepticism" (disbelieving that land-use liberalization would increase housing development) as well the relationship between quantity predictions and price predictions.

The hypothetical rezoning on Survey 1 would (1) "allow duplexes and triplexes in places where single-family homes are allowed" and (2) "allow new and renovated buildings to be one-and-a-half times as tall as nearby homes." We randomized whether this proposed zoning change was for "your neighborhood only," "residential neighborhoods throughout [the respondent's city]," or "residential neighborhoods throughout [the respondent's state]." To elicit quantity predictions, we asked "[B]y how much do you think the housing stock of the metropolitan region would grow as a result? By 'housing stock,' we mean the total number of houses, apartments, and condominiums."

We also elicited predictions of the effect of the same rezoning on the price in five years of a hypothetical home in the respondent's neighborhood, the rent in five years of a hypothetical apartment in the respondent's neighborhood, and the rent in five years of a hypothetical apartment in the respondent's city. These questions used the "Complex" elicitation format (see Table 3). We characterized the home or apartment by a stipulated counterfactual future (no-upzoning) price or rent, and we asked whether it would be worth or rent for "a lot more," "a little more," "the same amount," "a little less," or "a lot less" if the zoning change was adopted, assuming no change to the condition of the property.

Figure 6.4 plots the distribution of responses to the quantity-effect question, disaggregated by tenure.

More than 75% of respondents predicted that their assigned rezoning scenario would increase

the size of their metropolitan region's housing stock. Homeowners and renters give similar answers. However, these results should be taken with several grains of salt, for two reasons. First, quantity predictions were only *slightly* larger for the statewide rezoning scenario (top) than the neighborhood rezoning scenario (bottom), which is implausible. The fact that many respondents predicted large regional changes from a neighborhood-level rezoning suggests that they were not paying close attention to the geographic scale stated in the vignette, perhaps due to the complexity of the question. Second, the response choices were not symmetrically distributed around zero, so guesswork-style responding anchored on the midpoint of the scale, or guesses drawn from the uniform distribution, would lead to the (possibly mistaken) conclusion that most respondents aren't quantity skeptics.

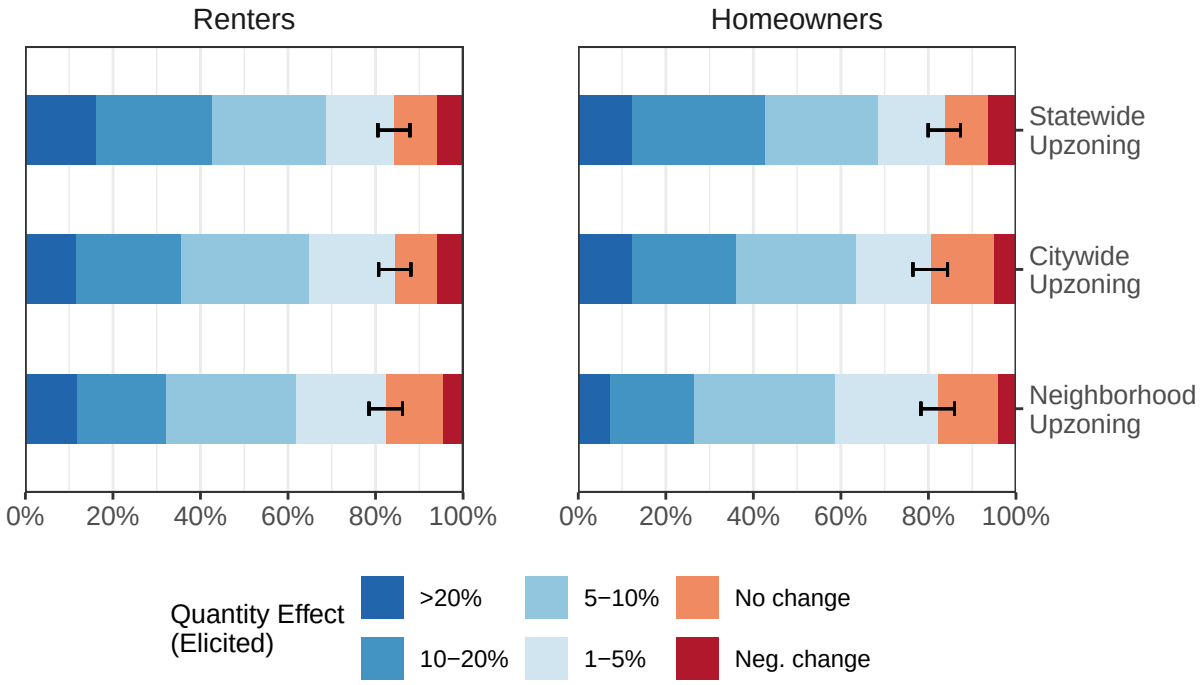

Figure 6.4: Elicited effect of modest, "gentle density" upzoning on size of metro-area housing stock. Survey 1. Respondents were randomly assigned to neighborhood, citywide, or statewide version of the upzoning plan. Error bars denote 95% confidence interval on proportion of "quantity skeptics," i.e., persons who predict negative or no change in quantity from the upzoning.

Figure 6.5 plots the distribution of responses to the price-effect questions, recoded to be on the

same 3-point scale we have used for other price-prediction questions in this study. Again, we observe a similar pattern of responses from homeowners and renters. There is no expectation that upzoning over a larger area (citywide or statewide, relative to neighborhood) will create more downward pressure on prices, with the possible exception of renters' beliefs about effects on citywide rents.

We figured that if price and rent predictions diverged, more people would predict an increase in home prices and than an increase in rents, reflecting the effect of developers' competition for redevelopable sites on the price of single-family homes. We observe exactly the opposite. Roughly 40-45% of homeowners and renters alike believe that the upzoning plan would bring down home prices in their neighborhood, regardless of the geographic scale of the upzoning, whereas only about 20-25% believe it would bring down rents. About 45-50% say it would increase rents. These predictions are for a unit of fixed quality, whose condition does not change. Perhaps some respondents suppose that moderately dense new housing in an existing residential neighborhood would be regarded by typical homeowners, but not typical renters, as a disamenity (Gyourko and McCulloch, 2024).

How are price and quantity predictions related? Not in the expected way. Figure 6.6 plots the frequency of responses to the price questions by answers to the quantity question. If respondents were following conventional economic logic, the circles on the far left side of the plots would be decreasing in size from "Prices Up" to "Prices Down"; on the right side of the plot, the relationship would run the other way. That is, people who predict big quantity effects would be most likely to predict negative price effects. This is not what we observe. In fact, if one treats the price predictions as cardinal values on 5-point scale, and the quantity predictions as cardinal values on a 6-point scale, the bivariate relationship between quantity and price predictions is (very) mildly positive, as indicated by the blue regression lines. People who predict larger quantity effects also tend to predict slightly higher prices. This is consistent with the "supply skeptical" view that new development causes prices to go up.

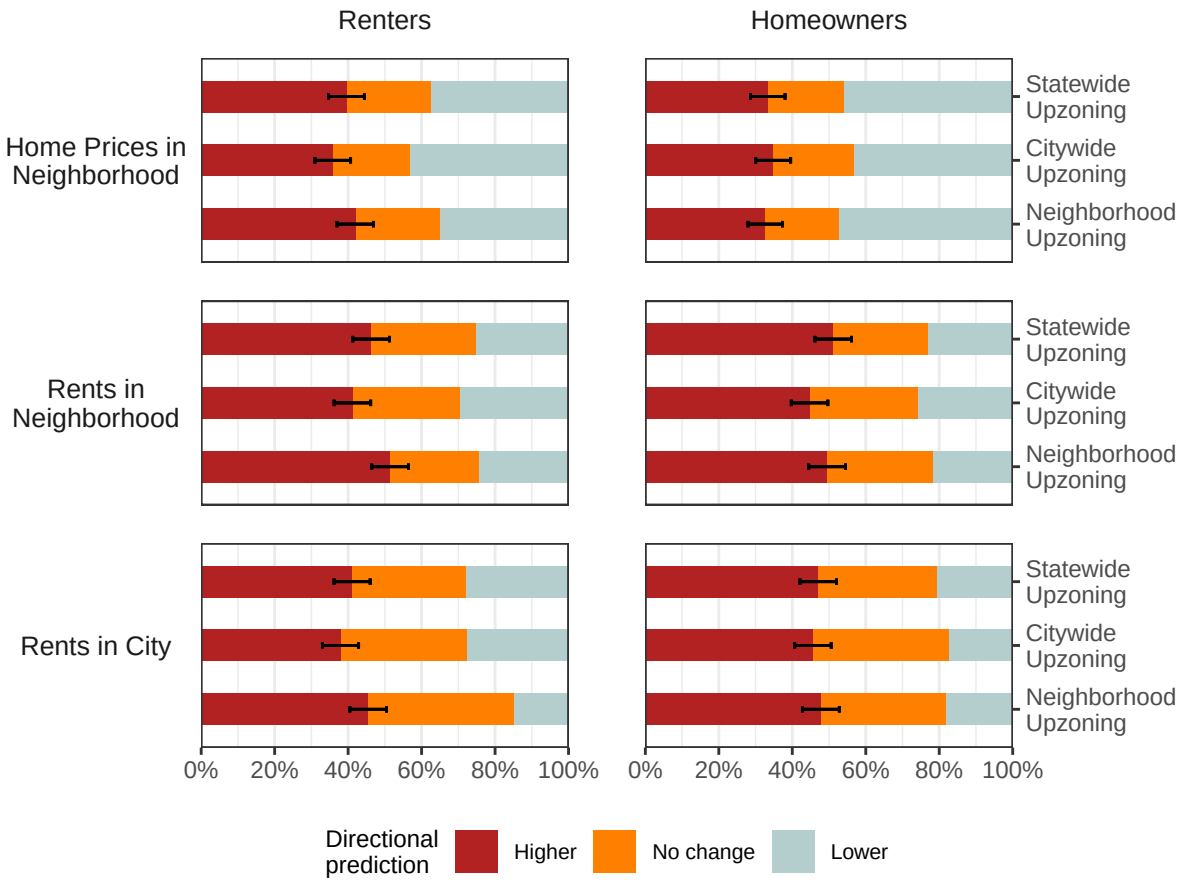

Figure 6.5: Elicited directional effect of modest, "gentle density" upzoning on prices and rents. Survey 1. Respondents were randomly assigned to neighborhood, citywide, or statewide version of the upzoning plan. Each respondent predicted its impact on price in five years of hypothetical home in the respondent's neighborhood, on rent in five years for a hypothetical apartment in the respondent's neighborhood, and on rent in five years for a hypothetical apartment in their city. Error bars denote 95% confidence interval on proportion of "price skeptics," i.e., persons who predict negative or no change in price from the upzoning.

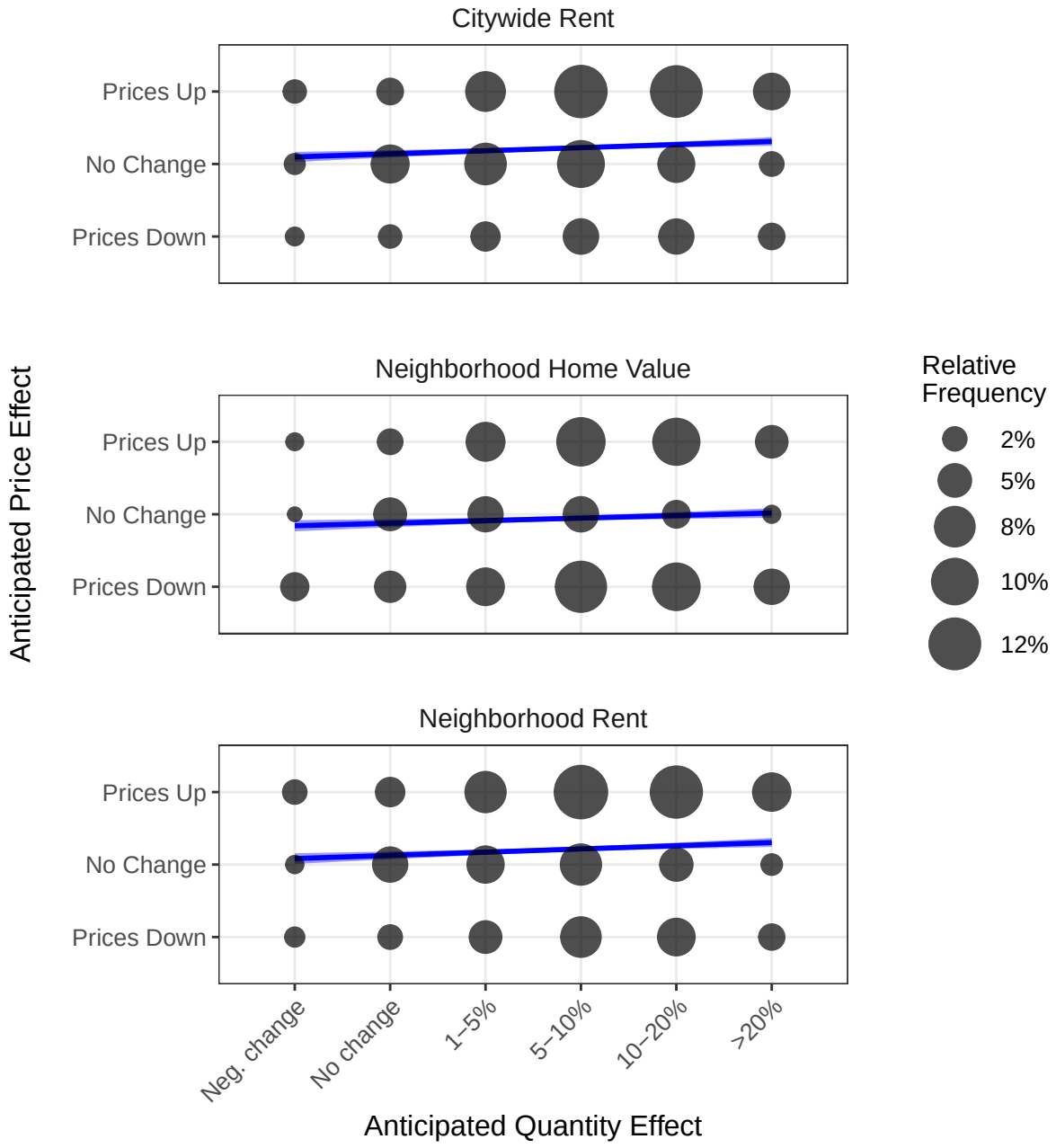

Figure 6.6: Relationship between anticipated quantity and price effects of gentle-density upzoning. Survey 1. Quantity effects are predictions of change in metro region's housing stock. The survey question randomizes the geographic scale of the upzoning (the respondent's neighborhoood, citywide, or statewide). Dark-grey circles represent the relative frequency of each combination of price and quantity responses. The blue line is a linear regression of anticipated price on anticipated quantity, with the variables encoded numerically (-1, 0, 1 for price; 0, 1, 2, 3, 4, 5 for quantity). The light blue band depicts the 95% confidence interval on the regression line.

6.4 Two-Stage Mental Models of Housing Supply Shocks (Survey 2)

Survey 2 included a battery of questions about the proximate effects of new housing development on certain material outcomes at neighborhood, citywide, and regional scales, and, later in the survey, another battery of questions about how such material changes generally affect prices or rents, other things equal. See Table 12. These questions were written to convey certain tenets of elite Supply Skepticism summarized in Been, Ellen and O'Regan (2019), e.g., the segmented-markets thesis (which holds that new "luxury" housing does not affect prices for existing, relatively affordable housing), and also to capture concerns that were expressed in the free-text responses on our Survey 1, e.g., fear of corporate ownership. Within each block, item order was randomized. We thought that regional housing supply skepticism might be explicable in terms of such underling beliefs.

Table 12: Mental-Model Questions

Material Outcome	Price-Related Outcome	Concept tested	Notes
1A. This scenario would make more homes available to buy or rent in the region's more-expensive neighborhoods.	1B. When more homes become available to buy or rent in a region's more-expensive neighborhoods, this generally results in [higher/lower] home prices and rents in less-expensive neighborhoods.	Chain of moves and filtering (together with 2)	We expect Supply Skeptics to reject Proposition 2A (but not 1A) and Proposition 2B (but not 1B). This would be consistent with the view that supply-and-demand forces operate within but not between market segments. By contrast, recent research finds that new housing in expensive neighborhoods frees up housing in less affluent neighborhoods, facilitating "chains of moves" (Mast, 2021; Hansena and Rambaldib, 2022).
2A. . . . would make more homes available to buy or rent in the region's less-expensive neighborhoods	2B. When more homes become available to buy or rent in a region's less-expensive neighborhoods, this generally results in [higher/lower] home prices and rents in the same less-expensive neighborhoods.	Chain of moves and filtering (together with 1)	
3A. . . . would result in more companies opening or expanding offices in the region.	3B. When more companies open or expand offices in a region, this generally results in . . . [higher/lower] home prices and rents.	Agglomeration	We expect Supply Skeptics and optimists alike to agree with these propositions, though skeptics may be more likely to believe that new housing will attract in-migration of firms and workers.

Table 12: Mental-Model Questions

Material Outcome	Price-Related Outcome	Concept tested	Notes
4A. . . . would result in more demolition of currently-affordable homes in the region.	4B. When there's more demolition of affordable homes in a region, this generally results in . . . [higher/lower] rents for other affordable homes in the region.	Segmented markets / direct effect	These items capture a mechanism that we expect to manifest only in the supply-shock scenarios that focus on redevelopment (TOD and plex). Expectations about the 'direct effect' of a scenario on existing affordable homes will be more salient in laypeople's thinking about prices than the indirect effect of a larger housing stock on prices across all market segments.
5A . . . would result in more corporations buying up housing in the region.	5B. When corporations buy up more of the housing in a region, this generally results in . . . [higher/lower] rents.	Scapegoating	We expect people who are high in zero-sum thinking will expect pro-housing state policy interventions to generate more corporate ownership of housing, and more corporate ownership to translate into higher rents.
6A. . . . would reduce the overall quality of life in my neighborhood.	6B. When the overall quality of life in a neighborhood declines, this generally results in [higher/lower] home prices and rents in the neighborhood.	Neighborhood disamenities (aggregate)	We expect that almost all respondents will agree with 6B, since Supply Skeptics may still hold standard views of the demand side of the housing market. Answers to 6A will reveal whether people expect the different scenarios, which vary with respect to the geographic distribution of new housing (greenfields, transit corridors, existing residential neighborhoods), to have different impacts on neighborhood amenities.
7A. . . . would result in more high-income people moving into lower-income neighborhoods.	7B. When more high-income people move into a lower-income neighborhood, this generally results in . . . [higher/lower] prices and rents for other homes in the neighborhood.	Gentrification (people)	This gentrification story is standard in big-city politics. We expect that gentrification impacts (7A) will be highly correlated with price predictions among urban renters, consistent with a myopic focus on local rather than market-wide effects. We expect nearly all respondents to agree with Proposition 7B.
8A. . . . would result in more expensive new housing being built next door to older, relatively affordable homes.	8B. When expensive new housing is built next door to older, relatively affordable homes, this generally . . . [increases/decreases] the market value of the older homes.	Gentrification (building)	We expect nearly all respodents to agree with 8B. Agreement with 8A is likely to vary across scenarios (most in TOD, least in sprawl)
9A. . . . would result in more new homes being built for people like me.	9B. When more new homes are built for people like me, this generally results in . . . [higher/lower] prices and rents for people like me.	Segmented markets / personal story	These questions pertain to possible identitarian / zero-sum thinking about housing policy.

6.4.1 Stage 1 and Stage 2 Beliefs

The stacked bar graphs in Figure 6.7 show the distribution of responses to our material-effect questions and, in the second column, beliefs about whether this material effect tends to cause higher,

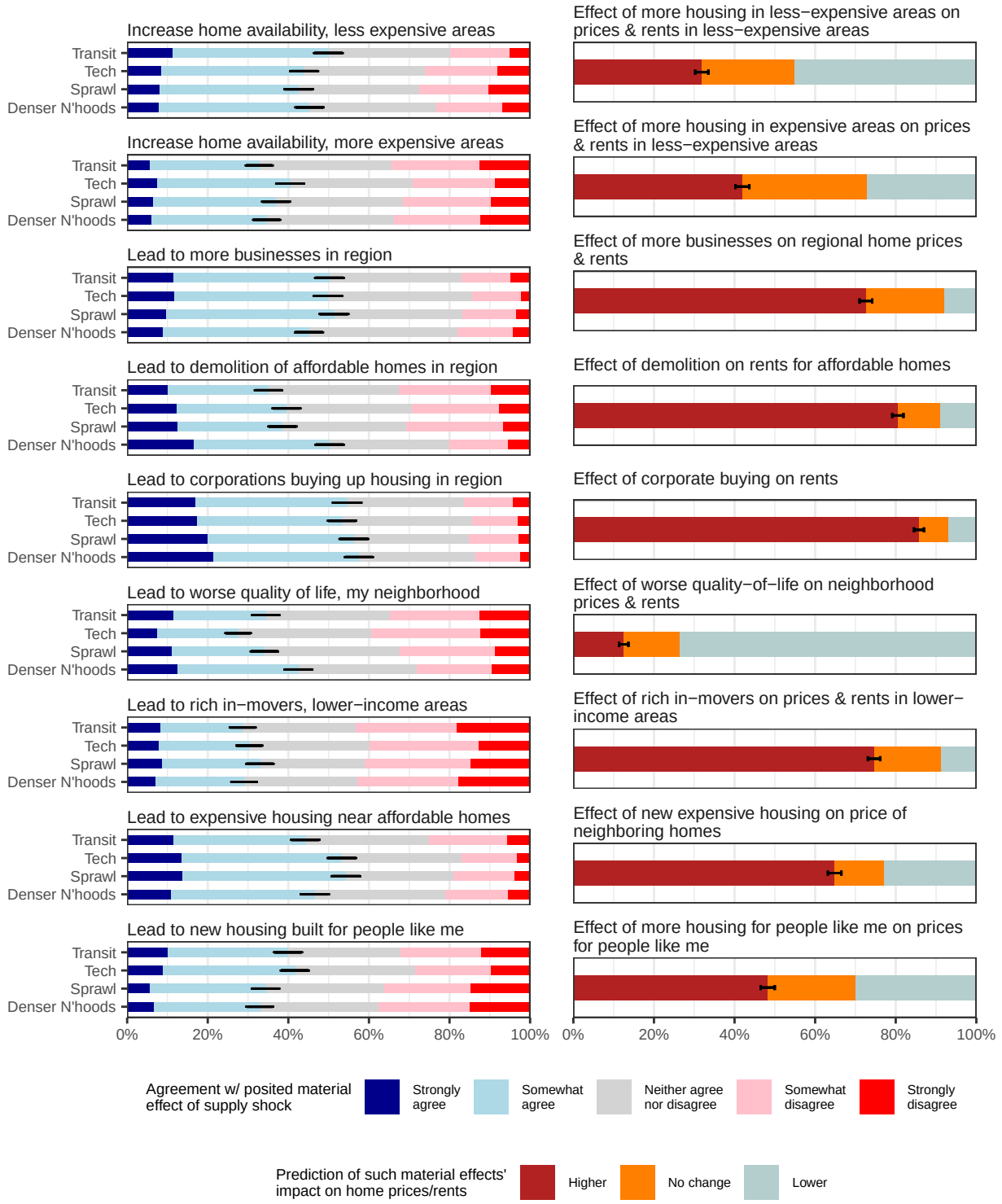

Figure 6.7: Mental models of material effects of 10% supply shock ("stage 1") and their translation into prices ("stage 2"). Left column: Agreement with stage-1 statements about the material effects of assigned supply-shock scenario (technology, transit, sprawl, or neighborhood density). Right column: Reported beliefs about stage-1 material effect role in housing prices. Each "row" in the figure depicts a related question pair. Error bars are 95% confidence intervals on the proportion who strongly/somewhat agree (first column) or who think the material effect would increase home values or rents (second column).

lower, or no change in prices. Responses to the material-effect questions are disaggregated by cause of the supply shock, in recognition of the fact that the different scenarios may impact existing neighborhoods quite differently.[17]

The main inference from Figure 6.7 is the existence of a substantial consensus about all of the price-effect questions *except for questions about how a positive quantity change within a regional market affects prices in the same market.* Respondents overwhelmingly agreed about how, other things being equal, local amenity effects translate into prices (quality of life, effect of new expensive homes on value of older home next door); about how demand-side shocks translate into prices (expansion of businesses, rich in-movers); and even about how a negative shock to the stock of one type of home affects prices for other homes of that type (demolition of affordable homes). Respondents were also of one mind that corporate ownership increases rents.

Where disagreement at stage 2 exists, it is mostly about the effect of increases in supply on prices: whether new housing in expensive places reduces the price of housing in relatively affordable neighborhoods elsewhere in the region; whether new housing in less-expensive places tends to reduce the price of housing in the same less-expensive neighborhoods; and even whether "more new housing for people like me" tends to reduce the price of housing for people like me.

There appears to be some support for the view that housing markets are "segmented," in that the proportion of respondents who expect new supply in less-expensive neighborhoods to reduce prices in those neighborhoods (about 40%-50%) is about twice as large as the proportion who expect new supply in more-expensive neighborhoods to reduce prices in less expensive neighborhoods (about 25%). Put differently, however, this result shows that half of respondents are at least weakly skeptical about the effect of new supply *within* less-expensive neighborhoods.[18]

[17] In the preanalysis plan for Survey 2, we stated that we would also provide versions of this figure subset of by tenure (homeowners vs. renters) and zero-sum thinking. Given that the mental-model responses explains explain little of the variation in housing supply skepticism (see Section 6.4.3), we decided not to weigh down this already long appendix with those subgroup results.

[18] Perhaps this reflects an expectation about local amenity effects from new construction near relatively affordable older homes (see Figure 6.7, column 2, plots 7 and 8).

The material-effect ("stage 1") predictions do not vary greatly with the cause of the shock, for the most part. As we anticipated (see Table 12), however, the neighborhood-density upzoning was predicted to result in more demolition of affordable homes than the sprawl and homebuilding-technology scenarios. But contrary to our expectations and commonplace narratives about urban gentrification, the proportion of respondents who predicted an increase in demolition of affordable homes was no higher in the transit-oriented upzoning condition than in the technology and sprawl conditions. And the proportion who expect more "expensive new housing next door to affordable homes" is actually about 5-10 points *lower* in the transit and neighborhood-density scenarios than in the sprawl and technology scenarios. This runs contrary to the standard gentrification narrative.

As for quality of life, we observe substantial, statistically significant differences across conditions in the proportion of respondents who predict that the supply shock would adversely affect their own neighborhood. The neighborhood-density scenario elicited the most concern on this front, whereas respondents were least concerned about the homebuilding-technology scenario, perhaps because it is so abstract.

The most surprising stage-1 result is that across all scenarios, respondents were somewhat more likely to expect homes to become available to buy or rent in less-expensive neighborhoods than in more-expensive neighborhoods. The difference is most pronounced in the transit scenario. We would expect developers in all scenarios to target higher-priced neighborhoods, and that homes would become available in less-expensive neighborhoods, at somewhat lower rates, via chains-of-moves induced by new construction in expensive places (Mast, 2021; Hansena and Rambaldib, 2022). Perhaps many respondents figured that the residents of a region's more expensive neighborhoods would find a way to prevent development nearby, even if that means subverting a preemptive state law.[19] Or perhaps they interpreted the question egocentrically, reading "more homes available" to mean "more homes available *and affordable to people like me*."

[19] On the other hand, respondents report by overwhelming margins that in their own area, new construction occurs in places where prices and rents are going up. We asked about this on Survey 2, and 71% of respondents either "strongly" or "somewhat" agreed (95% CI: 69.4%, 72.5%).

6.4.2 Correlations Among Mental-Model Items

Figure 6.8 shows bivariate correlations among the mental-model items, and between each item and beliefs about the directional price (rent) effect of the regional housing supply shock. The top panel has the stage-1 results; stage-2 is in the bottom panel.

The correlations between material-effect and price predictions are modest but nearly all in the direction one would expect, given the answers to the stage-2 questions. The one anomaly is that a prediction of "more housing for people like me" is negatively correlated with price/rent predictions, which is the standard-economics answer but not the typical answer to the stage-2 question about the effect of more housing for people like me on prices.

One way of reading these results is that respondents project good things onto supply-shock scenarios they happen to like, and bad things onto scenarios they dislike. For example, "more homes for people like me" is associated with the belief that the additional housing stock will lead to better quality of life, less demolition of affordable homes, less corporate ownership, and lower rents. By contrast, believing that a supply shock would lead to more corporate ownership is associated with belief that the shock would cause more demolition of affordable homes, worse quality of life, more expensive housing next-door to affordable homes, and higher rents.

In the stage-2 responses, two clusters of correlated items stand out. First, people who expect a positive supply shock to increase (decrease) prices in one market segment generally expect it to do the same thing to prices in other segments (see the top-right corner of the figure). For example, respondents who expect new housing in expensive neighborhoods to decrease prices in less-expensive neighborhoods also expect new housing in less-expensive neighborhoods to decrease prices in the same less-expensive neighborhoods. Second, there are strong positive associations among the view that corporate ownership raises rents, that rich in-movers raise rents, and that demolition of affordable homes raises rents for other affordable homes. This complex of concerns is often voiced by elite opponents of new market-rate housing in expensive cities (Been, Ellen and

O'Regan, 2019).

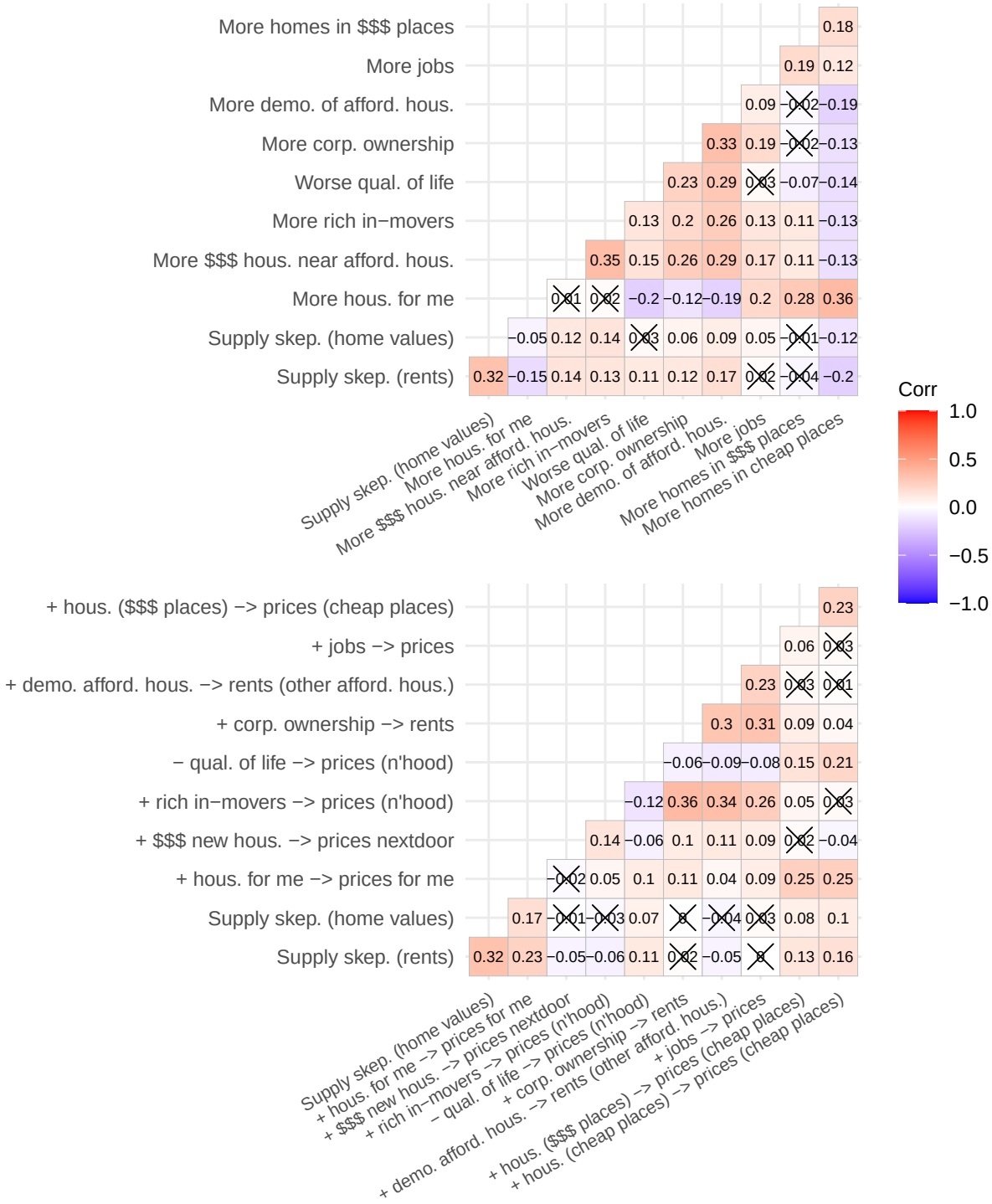

Figure 6.8: Bivariate correlations among elicited directional price and rent predictions, and mental models of supply-shock effects. Stage-1 items are in the upper plot; stage-2 items in the lower plot.

6.4.3 Modeling Housing Supply Skepticism as a Function of Mental-Model Responses

We thought that, taken together, answers to the stage-1 and stage-2 questions might predict housing supply skepticism, and we preregistered LASSO and Random Forest analyses of this question. We also report an off-plan dominance analysis, which is more transparent and easily interpretable. The mental-model responses together explain very little of the variation in directional predictions about the price or rent effects of a large regional housing supply shock. This is consistent with housing supply skepticism being more of a non-opinion than a reasoned belief. (Readers may wish to skip the balance of this subsection, which we include for the sake of fidelity to our preanalysis plan but which contains little of substantive interest.)

Standardized Dominance Analysis

A dominance analysis compares each predictor's relative contribution to the total variance explained by a model (Azen and Budescu, 2003). We begin with a linear model of directional price (rent) predictions using stage 1, stage 2, and coupled stage-1-by-stage-2 interaction terms. This model only explains about 12% of the variance in directional rent predictions, and 6% of the variance in directional home-value predictions.

We fit a linear model of directional price (rent) predictions as a function of the interactions between each of the nine material-effect beliefs (stage 1) and the corresponding price-effect beliefs (stage 2), and then compared the percentage of the total variance explained by each of the nine belief sets. See Table 12 for a summary of the stage 1 and stage 2 questions.[20] Of these belief sets, respondents' consideration of whether the supply shock scenario would result in more housing for people like them and their associated beliefs about how this would affect prices and rents for people like them dominated the other mental-models sets, for both dependent variables. Thoughts about the supply shock's effect on housing supply in more affordable areas came in second for predictions about rents, whereas thoughts about gentrification were second for predictions about home prices.

[20] Calculations were performed with the R package *domir*. See https://cran.r-project.org/web/packages/domir/domir.pdf.

But the main takeaway is that the underlying models explain only about 12% (6%) of the variation in directional rent (home price) predictions, consistent with those predictions arising from guesswork rather than any coherent mental schema.

	Predicted Home Values		Predicted Rents	
Rank	Set	Stand. Dominance	Set	Stand. Dominance
1	Set: Create new housing for people like me	34.78	Set: Create new housing for people like me	32.91
2	Set: Lead to gentrification	17.69	Set: Increase home availability, less expensive areas	23.78
3	Set: Increase home availability, less expensive areas	16.20	Set: Lead to demolition of affordable homes	10.41
4	Set: Lead to expensive housing near affordable homes	10.16	Set: Lead to gentrification	9.55
5	Set: Increase home availability, more expensive areas	6.55	Set: Lead to worse quality of life	7.33
6	Set: Lead to demolition of affordable homes	5.62	Set: Lead to expensive housing near affordable homes	5.56
7	Set: Attract businesses to area	3.66	Set: Increase home availability, more expensive areas	5.37
8	Set: Lead to worse quality of life	3.38	Set: Lead to corporate ownership of housing	4.26
9	Set: Lead to corporate ownership of housing	1.95	Set: Attract businesses to area	0.83

[a] Total Variance of Home Price Predictions Model: 6.17
[b] Total Variance of Rent Predictions Model: 12.41

Table 13: Dominance Analysis. A "set" of predictors consists of one of the nine material-effect mental models, its corresponding price effect, and the interaction of the two. The Standardized Dominance measure sums to 100% and measures each set's contribution to the overall model R^2.

	Predicted Change Home Prices	Predicted Change in Rents
Lead to more businesses in region	0.047 (0.027)+	0.019 (0.026)
Effect of more businesseson regional home prices & rents	0.098 (0.104)	−0.061 (0.097)
Lead to more businesses to area x Price prediction	−0.022 (0.029)	0.012 (0.027)
Lead to demolition ofaffordable homes in region	0.018 (0.027)	0.061 (0.026)*
Effect of demolition onrents for affordable homes	−0.033 (0.091)	0.003 (0.088)
More demolition of affordable homes x Price prediction	0.000 (0.027)	−0.017 (0.026)
Lead to corporations buying uphousing in region	0.012 (0.031)	0.036 (0.032)
Effect of corporate buying on rents	0.055 (0.110)	0.065 (0.112)
Lead to corporations buying up housing in region x Price prediction	−0.022 (0.031)	−0.009 (0.032)
Lead to worse quality oflife, my neighborhood	−0.038 (0.022)+	−0.038 (0.021)+
Effect of worse quality-of-lifeon neighborhood prices & rents	0.081 (0.080)	0.205 (0.075)**
Worse quality of life x Price prediction	−0.020 (0.023)	−0.052 (0.022)*
Lead to rich in-movers,lower-income areas	0.020 (0.025)	−0.012 (0.023)
Effect of rich in-movers onprices & rents in lower-income areas	−0.188 (0.082)*	−0.243 (0.079)**
Lead to rich in-movers,lower-income areas x Price prediction	0.050 (0.025)*	0.055 (0.024)*
Lead to expensive housingnear affordable homes	0.061 (0.022)**	0.033 (0.021)
Effect of new expensive housingon price of neighboring homes	0.071 (0.076)	−0.042 (0.072)
Lead to new housing builtfor people like me	−0.027 (0.018)	−0.068 (0.017)***
Effect of more housing for peoplelike me on prices for people like me	0.024 (0.059)	0.065 (0.057)
Lead to new housing built for people like me x Price prediction	0.035 (0.018)*	0.024 (0.017)
Increase home availability,less expensive areas	−0.051 (0.019)**	−0.079 (0.018)***

Effect of more housing in expensiveareas on prices & rents in less-expensive areas	0.065 (0.066)	−0.078 (0.061)
Increase home availability, less expensive areas x Price prediction	−0.011 (0.019)	0.044 (0.018)*
Increase home availability,more expensive areas	−0.011 (0.018)	−0.002 (0.017)
Effect of more housing in less-expensiveareas on prices & rents in less-expensive areas	−0.113 (0.065)+	−0.025 (0.062)
Increase home availability, more expensive areas x Price prediction	0.043 (0.020)*	0.017 (0.019)
Num.Obs.	2299	2288
R2	0.064	0.125
R2 Adj.	0.053	0.115

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 14: Coefficients for linear models used in dominance analysis. Dependent variables are three-point directional predictions, pooled across all scenarios, of whether the 10% regional supply shock would increase, decrease or have no effect on rents or home prices.

LASSO Regression

We also implement a Least Absolute Shrinkage and Selection Operator or LASSO regression (Tibshirani, 1996) to identify the mental models that are most clearly associated with Supply Skepticism. LASSO regressions are popular for feature selection in situations where users with large datasets are uncertain as to which variables will correlate with the dependent variable, but are also concerned about overfitting. Introducing a shrinkage factor (denoted by λ) to the OLS model, these models reduce coefficient variance by adding a penalty to β estimates that varies depending on the size of λ, (a λ of 0 is equivalent to a typical OLS model.) As opposed to other penalized regressions such as Ridge regression, LASSO regressions reduce non-influential variable coefficients to zero.

We plot a modified LASSO regression to account for interactions between beliefs about material effects of upzoning (stage 1) and their impact on housing prices (stage 2). We do so using the glinternet package (Lim and Hastie, 2015) for R which tests all possible pairwise interactions of included variables and produces a listing of the interacted variables that improved the predictive power of the model. We report those predictive interactions below for each dependent variable.

Neither model produced any predictive interaction between a mental model and its associated effect on prices (Figure 6.9.) This result held when setting λ to one standard error greater than the value that minimizes cross-validation error (Krstajic et al., 2014; Hastie, Tibshirani and Friedman, 2009) or taking a less conservative approach and simply adopting the value that minimizes CV error.

Random Forest Regression

The random forest model produces a statistic measuring the "importance" of each variable by the percent change in model mean squared error it contributes, on average, across all the models produced by this method (Grömping, 2009). Variables with higher values contribute most to correct classification out of sample. The random-forests algorithm does not impose functional form assumptions, but because each predictor is applied separately, the algorithm does not reveal interactions between a specific belief about material effects of a housing supply shock (stage 1) and

Figure 6.9: Interacted LASSO model results. All interactions between first state mental models and price predictions produced zero coefficients, indicating they were poor predictors of respondents' directional predictions about the effect of the supply shock on home prices and rents.

beliefs about how such material affects generally manifest in prices (stage 2). Figure 6.10 presents the variable-importance results. Rent-effect predictions are most clearly associated with beliefs that a housing supply shock would generate "more housing for people like me" and "rich in-movers in relatively affordable neighborhoods." Home-price predictions are associated with a wider range of predictors.

Overall, the weak correlations between housing supply skepticism and various factors—such as economic beliefs, zero-sum ideology, exposure to new development, and perceptions about local effects of new development—imply that housing supply skepticism among the general public might not be connected to a cohesive worldview or any consistent set of beliefs or experiences. It is more likely to be a "non-opinion," consistent with the low test-retest reliability of the item documented in Figure 4.1.

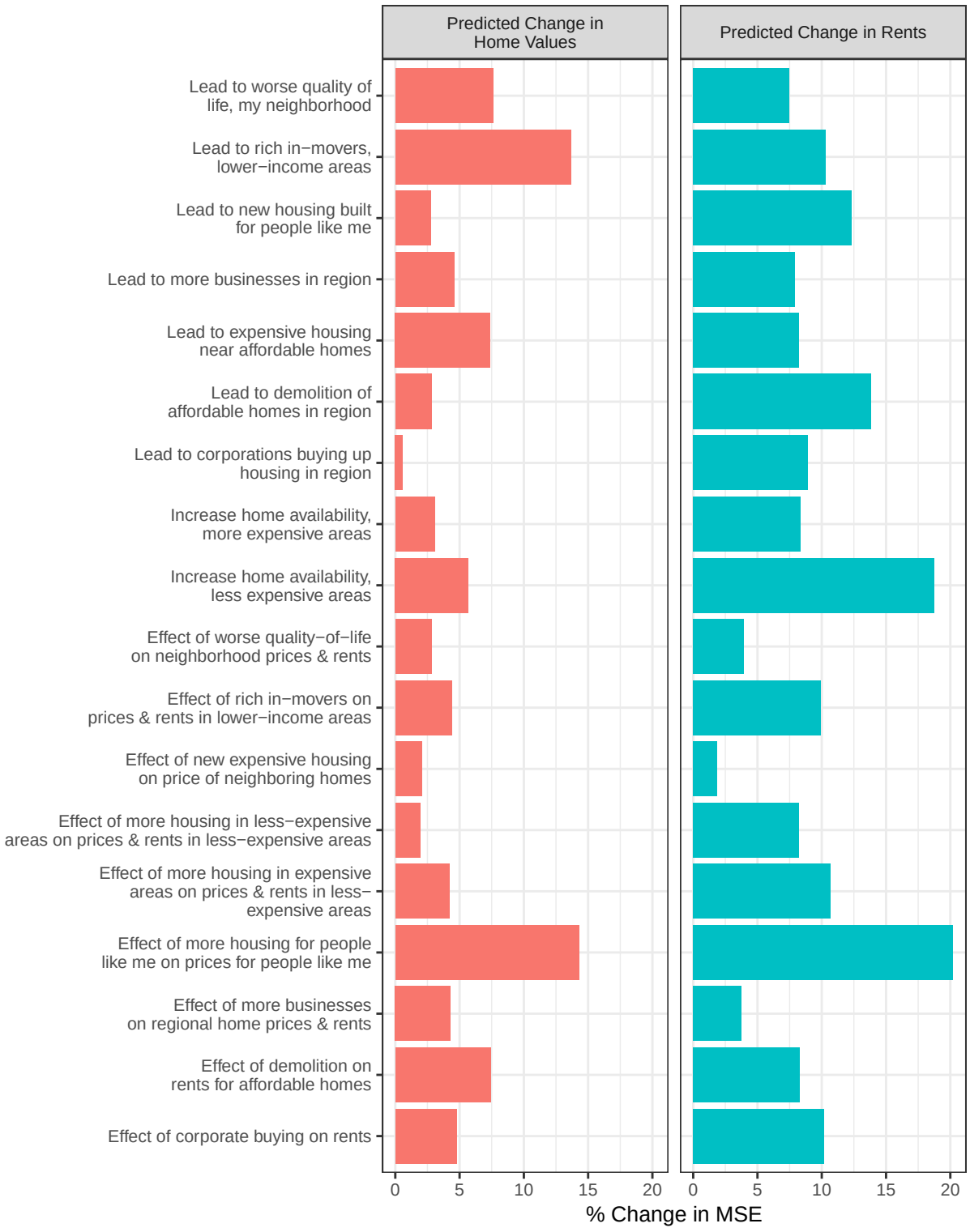

Figure 6.10: Random forest model. Size of bar indicates relative predictive power of each variable.

7 Supply Skepticism and Housing-Policy Preferences (Surveys 1 - 3)

On Survey 1, we asked respondents whether they would support or oppose a "gentle density" upzoning scenario (allowing 2-4 unit buildings up to 50% taller than the houses nearby in neighborhoods of single-family homes). On Survey 2, we asked about support for several preemptive statewide upzoning policies, and about support for an affordable housing "land banking" policy (prohibiting new market-rate housind development on sites that could be developed for affordable housing in the future). Surveys 2 and 3 also asked about support for land-use liberalization in the respondent's region: both "constructing more apartments and open space near cities" and "constructing more suburban homes on farmland and open space near cities." See Table 5 for the exact question wording.

7.1 Correlations Among Supply-Shock Price Predictions and Policy Preferences, Conditional on Interest (Surveys 1 & 3)

To provide a rough sense of how housing policy preferences vary with beliefs about the effect of a large regional shock on prices, we plot the pairwise correlation coefficients among policy preferences and price predictions, *conditional on the respondent having an objective or subjective interest in lower housing prices*. We operationalize objective interest as tenure (being a renter), and subjective interest as whether the respondent stated that they would prefer lower home prices and rents when thinking about "possible futures" for their city.

On Survey 1, we see moderate correlations, in the expected direction, between support for the gentle-density upzoning proposal and elicited predictions of the price effect of a regional housing supply shock. A one-standard-deviation increase in supply skepticism about rents (per the regional-shock question) is associated with a 0.18 standard deviation decrease in support for the upzoning proposal among renters; among homeowners, a 1 s.d. increase in supply skepticism about home prices is associated with a 0.21 s.d. increase in support for the gentle-density proposal. The correlations are similar when using the subjective measure of interest. See Figure 7.1.

However, on Surveys 2 and 3, we observe little if any relationship between supply skepticism about the price effects of a regional shock and support for land-use liberalization. On Survey 2, supply-skeptical renters (per rent predictions) are a bit less supportive of transit-oriented development than non-skeptical renters ($r = -0.11$, $r = -0.15$), but there's almost no difference between skeptical and non-skeptical renters with respect to support for suburban development ($r = -0.01$, $r = -0.06$). Among homeowners, those who are skeptical that more regional housing supply would reduce home values have essentially the same policy opinion as those think it would reduce home prices. See Figure 7.2. Results from Survey 3 are similar. See Figure 7.3. They are also similar when one conditions on the subject measure of interest. See the lower plots in Figures 7.2 and 7.3.

The generally weak correlations between housing supply skepticism (as measured by directional predictions of the price effect of a regional shock) and support for land-use liberalization, conditional on interest, are consistent with respondents having very weak views about the price effects of supply shocks.

Figure 7.1: Housing supply skepticism and policy preferences, Survey 1. Figure depicts Pierson's correlation coefficients among policy-preference items and directional predictions of price (rent) effects of large regional housing supply shock. An X through a coefficient indicates that it is not significantly different from zero. Data restricted to respondents who were asked about citywide or statewide gentle-density upzoning proposal, rather than the neighborhood-only proposal. See Section 2.5.3 for details about the policy items.

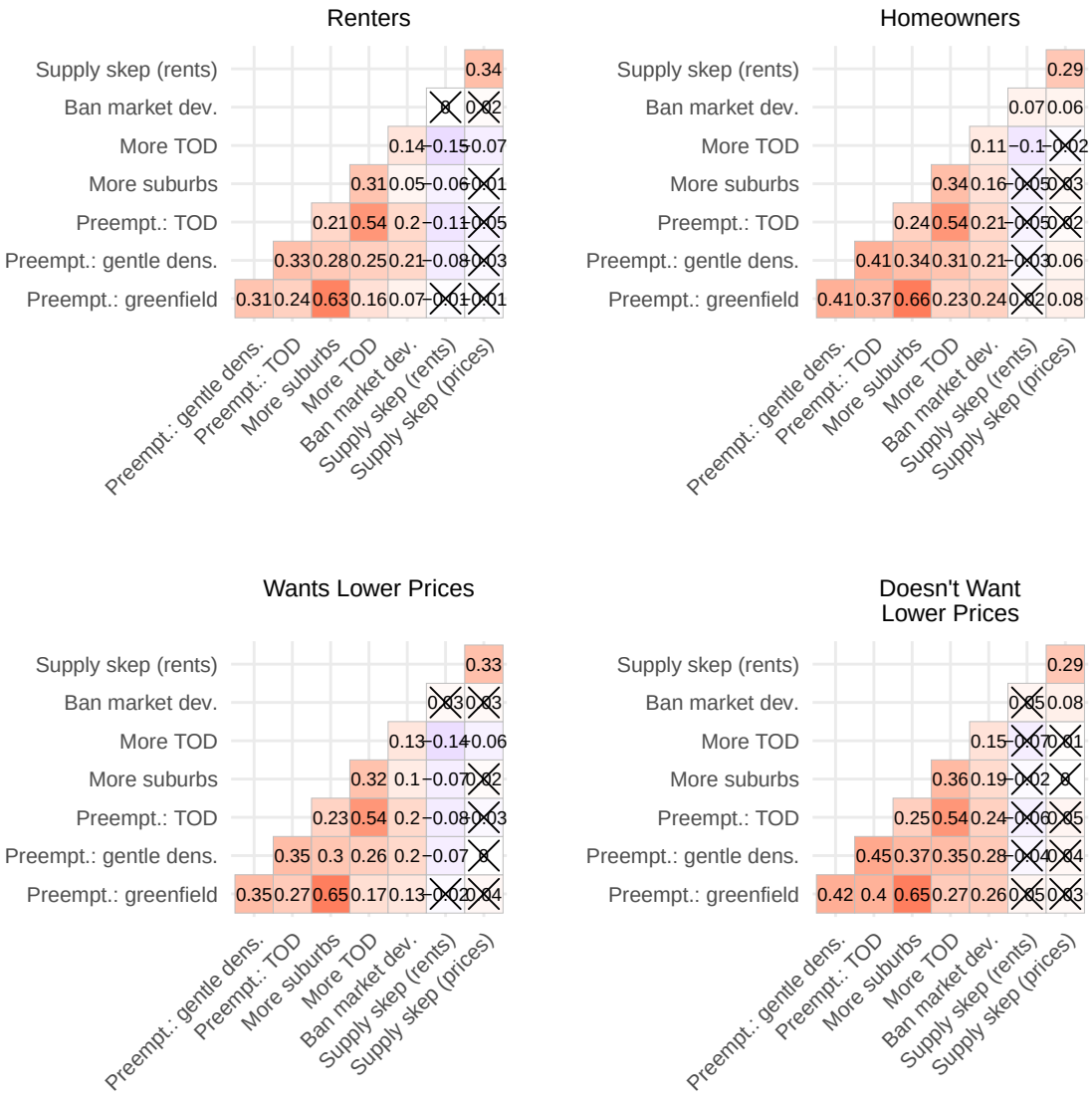

Figure 7.2: Housing supply skepticism and policy preferences, Survey 2. Figure depicts Pierson's correlation coefficients among policy-preference items and directional predictions of price (rent) effects of large regional housing supply shock. An X through a coefficient indicates that it is not significantly different from zero. See Section 2.5.3 for details about the policy items.

Figure 7.3: Housing supply skepticism and policy preferences, Survey 3. Figure depicts Pierson's correlation coefficients among policy-preference items and directional predictions of price (rent) effects of large regional housing supply shock. An X through a coefficient indicates that it is not significantly different from zero. See Section 2.5.3 for details about the policy items.

7.2 Correlations Among Price Predictions, Price Anxiety, and Policy Preferences (Surveys 1 & 2)

Fischel (2001) hypothesizes that homeowner opposition to new development is driven by risk aversion. If this is right, we would expect to see (1) a substantial share of homeowners express anxiety about the *possibility* that upzoning would have a large adverse effect on their home values, and (2) that these homeowners would be more opposed to the upzoning than homeowners who express less worry. Similarly, Hankinson (2018) posits that renter opposition to new development in their neighborhood may be driven by analogous concerns, with renters worrying that new development would increase the rental value of nearby buildings.

To explore Fischel's hypothesis, we posed the following question to homeowners after eliciting their predictions of the price and rent effects of the gentle-density rezoning (Survey 1) or 10% regional supply shock caused by preemptive state upzoning (Survey 2):

> Set aside for a moment whether you think this zoning change would generally cause local market values to go up or down. How worried would you be that it might greatly reduce the market value of your home specifically?
>
> [Very worried; Somewhat worried; A little worried; Not at all worried]

Similarly, renters were asked how worried they would be that it "might greatly increase the rental value of your home specifically."

Figure 7.4 shows the distribution of responses to these "anxiety" questions. Interestingly, a larger fraction of renters express concern about the possibility that the upzoning would cause a large *increase* in the rental value of their home than homeowners express concern about the possibility of a large *decrease* in the value of their home. Renter anxiety is actually about 5 pp higher on Survey 2 than Survey 1,[21] even though all of the rezoning scenarios on Survey 2 were statewide reforms, whereas two of the three gentle-density scenarios on the pilot would play out only in the

[21] And homeowner anxiety is about 5 pp lower.

respondent's neighborhood or city. This suggests that the "renter anxiety" phenomenon identified by Hankinson (2018) is not, as he posited, limited to worries about the local effects of individual projects or neighborhood-scale rezonings.

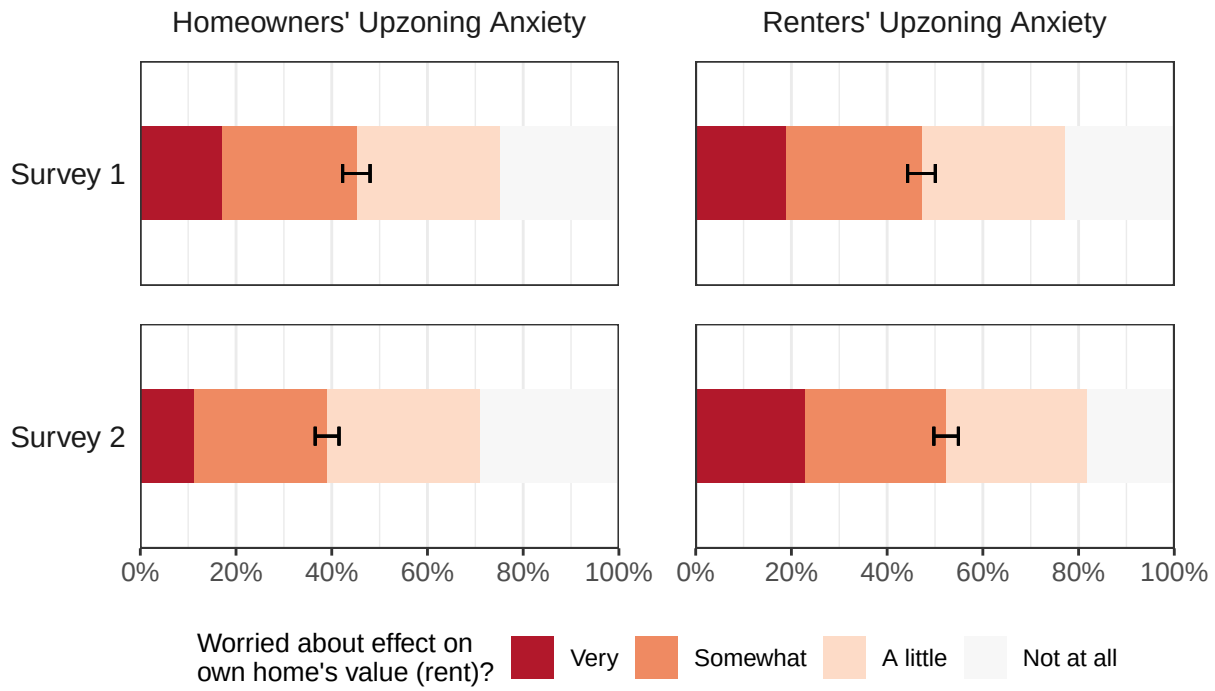

Figure 7.4: Distribution of responses to question about perceived risk that gentle-density upzoning (Survey 1) or preemptive state upzoning (Survey 2) would decrease the market value (homeowners) or increase the rent (renters) of respondent's home. Error bars depict share of renters or homeowners who say they would be "somewhat" or "very" worried.

In Figure 7.5 , we provide pairwise correlations between the anxiety responses, rent predictions (for renters), home-value predictions (for homeowners), and support for the type of upzoning at issue. On Survey 1, which presented an illustrated gentle-density upzoning scenario, we see a strong negative correlation between homeowners' anxiety about home-value impacts and their support for the upzoning proposal.

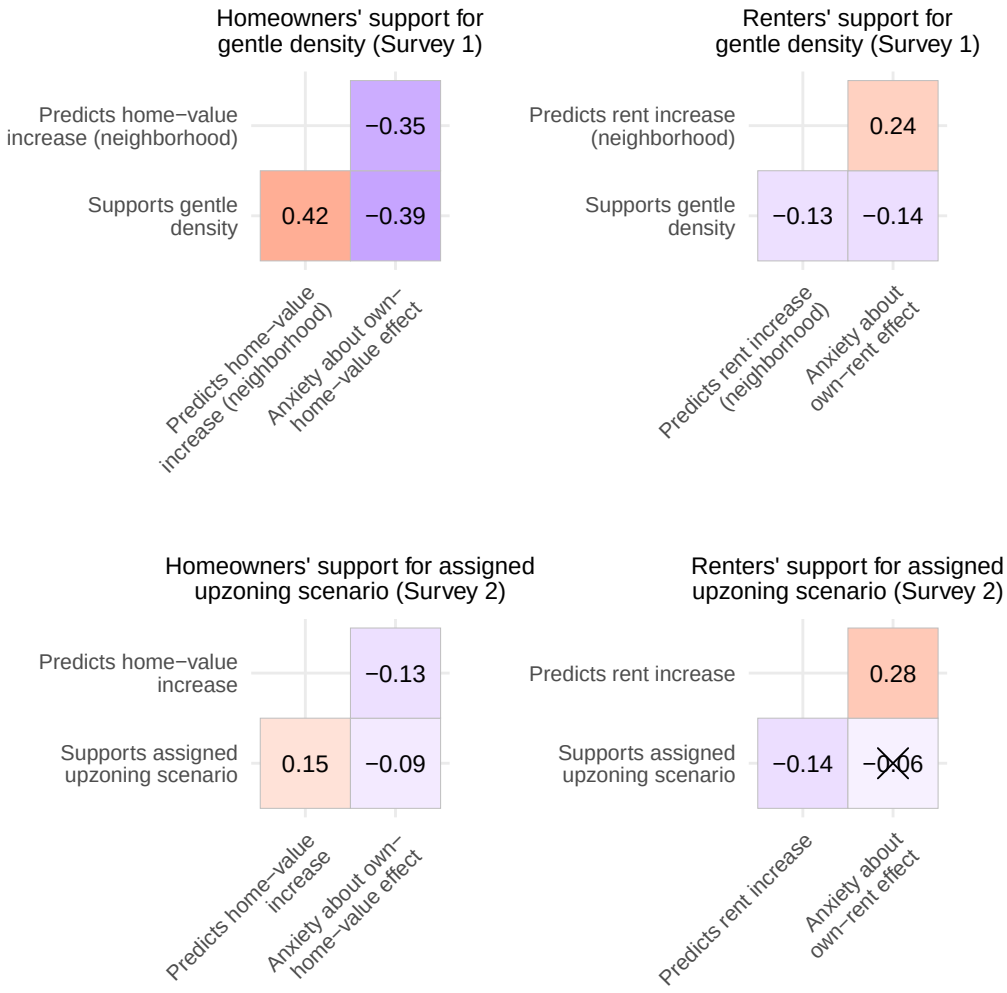

Figure 7.5: Pairwise correlations among support for upzoning, directional predictions of its effect on the market value (homeowners) or rent (renters) of a typical existing dwelling in the respondent's city, and anxiety about its potentially negative effect on the value of the respondent's own home (for homeowners) or potentially positive effect on rent for the respondent's own home (for renters). Surveys 1 and 2.

7.3 Regression Models (Survey 2)

In the preanalysis plan for Survey 2, we registered several exploratory models of support for preemptive state upzoning as a function of supply skepticism, stated desire for future housing prices and rents, and anxiety about the state policy's impact one on the respondent's home value (for homeowners) or rent (for renters).[22] The models explain only about 2%-12% of the variation in support, with the models that include only the price prediction, anxiety and price desire variables performing the worst. The poor performance of these models is consistent with price predictions being mostly noise.[23]

Though the models perform poorly, we report them here in the interest of completeness. One set of models (Table 15) proxies supply skepticism with a binary measure of "rent skepticism," coded as 1 if the respondent predicted higher or unchanged rents from the 10% supply shock and 0 otherwise. In another (Table 16), we proxy supply skepticism with an analogous measure of home-value skepticism. In the third (Table 17), we use a median split on an index composed of responses to the two mental-model questions that tap beliefs about the effect of new expensive housing on the availability and affordability of homes in less expensive market tiers.[24]

The dependent variable in each model is support for the preemptive state upzoning scenario to which the respondent was assigned (neighborhood density, transit, or sprawl).

[22] In some model specifications, we also included "material effect" predictions that we thought would be most strongly associated with support (quality of life, new housing for "people like me," or a statement about which socioeconomic class the new housing would mostly be for).

[23] It may be that the dependent variable has a large stochastic component as well. Also, the models pool across three very different types of state preemptive upzoning (transit-oriented development, neighborhood density, and sprawl), and, as shown by the difference-in-means results in Figure 6.3, people seem to have quite different preferences as between these types of upzoning.

[24] Specifically, agreement with the statement, "This scenario would make it easier to find a home to buy or rent in the region's less-expensive neighborhoods" [strongly agree . . . strongly disagree], and responses to the question "When more homes become available to buy or rent in a region's more-expensive neighborhoods, this generally results in . . . " [(1) higher home prices and rents in the region's less-expensive neighborhoods, (2) lower home prices and rents in the region's less-expensive neighborhoods, or (3) no change in home prices and rents in the region's less-expensive neighborhoods].

	(1)	(2)	(3)	(4)
(Intercept)	0.484***	0.473***	0.438***	0.423***
	(0.021)	(0.021)	(0.021)	(0.036)
Supply Skeptic?	−0.156***	−0.132***	−0.059+	−0.148***
	(0.030)	(0.030)	(0.031)	(0.031)
Wants Higher Prices?	−0.098**	−0.073+	−0.049	−0.078*
	(0.038)	(0.038)	(0.036)	(0.037)
Price Anxious	−0.018	0.008	0.013	0.003
	(0.013)	(0.013)	(0.013)	(0.013)
Supply Skepticx Wants Higher Prices	0.052	0.037	0.009	0.046
	(0.054)	(0.054)	(0.052)	(0.053)
Upzoning WorsensQuality of Life		−0.085***	−0.064***	−0.082***
		(0.013)	(0.013)	(0.013)
Upzoning CreatesMore Housing for Me			0.123***	
			(0.013)	
New Housing forLow-Mid Income				0.019
				(0.039)
New Housing forMid Income				0.079*
				(0.040)
New Housing forMid-Upper Income				0.130**
				(0.043)
New Housing forUpper Income				0.043
				(0.057)
Num.Obs.	1489	1489	1487	1489
R2	0.028	0.057	0.114	0.065
R2 Adj.	0.026	0.054	0.111	0.060

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 15: Preregistered model of support for preemptive state upzoning as function of "rent skepticism" and other covariates. Rent skepticism is dummy variable indicating belief that 10% supply shock caused by preemptive state upzoning would not lower rents. In baseline model (1), a higher than median level of anxiety towards upzoning correlated with decreased support for the state preemption scenario.

	(1)	(2)	(3)	(4)
(Intercept)	0.442***	0.444***	0.430***	0.419***
	(0.028)	(0.028)	(0.027)	(0.044)
Home Price Skeptic?	−0.032	−0.037	−0.018	−0.038
	(0.036)	(0.035)	(0.034)	(0.036)
Wants Same/Higher Prices?	−0.115*	−0.087+	−0.066	−0.084+
	(0.051)	(0.050)	(0.049)	(0.050)
Price Anxious	−0.025+	0.005	0.015	0.003
	(0.015)	(0.015)	(0.014)	(0.016)
Home Price Skeptic	0.059	0.047	0.029	0.040
x Wants Same/Higher Prices	(0.065)	(0.064)	(0.062)	(0.064)
Upzoning Worsens Quality of Life		−0.098***	−0.073***	−0.096***
		(0.015)	(0.015)	(0.015)
Upzoning Creates More Housing for Me			0.119***	
			(0.014)	
New Housing for Low-Mid Income				0.000
				(0.046)
New Housing for Mid Income				0.046
				(0.047)
New Housing for Mid-Upper Income				0.072
				(0.051)
New Housing for Upper Income				−0.016
				(0.067)
Num.Obs.	1136	1136	1134	1136
R2	0.008	0.046	0.102	0.050

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 16: Preregistered model of support for preemptive state upzoning as function of "home-price skepticism" and other covariates. Home-price skepticism is dummy variable indicating belief that 10% supply shock caused by preemptive state upzoning would not lower home values.

	(1)	(2)	(3)	(4)
(Intercept)	0.484***	0.473***	0.437***	0.423***
	(0.021)	(0.021)	(0.020)	(0.036)
Housing Filtering Skeptic?	−0.157***	−0.132***	−0.058+	−0.148***
	(0.030)	(0.030)	(0.031)	(0.031)
Wants Same/Higher Prices?	−0.098**	−0.073+	−0.048	−0.078*
	(0.037)	(0.038)	(0.036)	(0.037)
Price Anxious	−0.017	0.008	0.014	0.004
	(0.013)	(0.013)	(0.012)	(0.013)
Housing Filtering Skeptic	0.052	0.037	0.009	0.046
x Wants Same/Higher Prices	(0.054)	(0.054)	(0.052)	(0.053)
Upzoning Worsens Quality of Life		−0.086***	−0.065***	−0.082***
		(0.013)	(0.013)	(0.013)
Upzoning Creates More Housing for Me			0.123***	
			(0.013)	
New Housing for Low-Mid Income				0.019
				(0.039)
New Housing for Mid Income				0.079*
				(0.040)
New Housing for Mid-Upper Income				0.130**
				(0.043)
New Housing for Upper Income				0.042
				(0.057)
Num.Obs.	1491	1491	1489	1491
R2	0.028	0.057	0.115	0.066

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 17: Preregistered model of support for preemptive state upzoning as function of "filtering skepticism" and other covariates. Filtering skepticism is dummy variable indicating above-median level of skepticism that new housing in expensive areas would increase home availability or lower rents in less-expensive areas.

7.4 Blame and Policy Preferences (Surveys 2 & 3)

Complementing Figure 3 in the main paper, Figure 7.6 displays bivariate correlations among the blame items, and elicited price and rent effects of a 10% regional supply shock. We also include party identification (measured on 7-point scale, with higher values corresponding to Democratic identification), support for more suburban development or more transit-oriented development in one's metro region, and, on Survey 2, support for affordable-housing "land banking" (banning new market-rate development on sites that could be developed for affordable housing in the future. Blame correlations on both surveys are similar. Respondents who blamed the federal and state government tended also to blame local governments, while those who blamed developers and rich movers tended not to blame governments. Curiously, although landlords and developers are by far the most commonly blamed actors (see Figure 3 in the *JEP* paper), and though both actors may seem like easy scapegoats, there is no correlation between blaming landlords and blaming developers. Blame is not associated with directional price or rent predictions, and it is only very weakly associated with policy preferences (e.g. there is a slight positive correlation between blaming landlords and support for land banking).

Renters and homeowners generally held the same actors responsible for high housing prices, though homeowners are somewhat more likely to blame developers. The same pattern holds across both surveys on which we included the blame question.

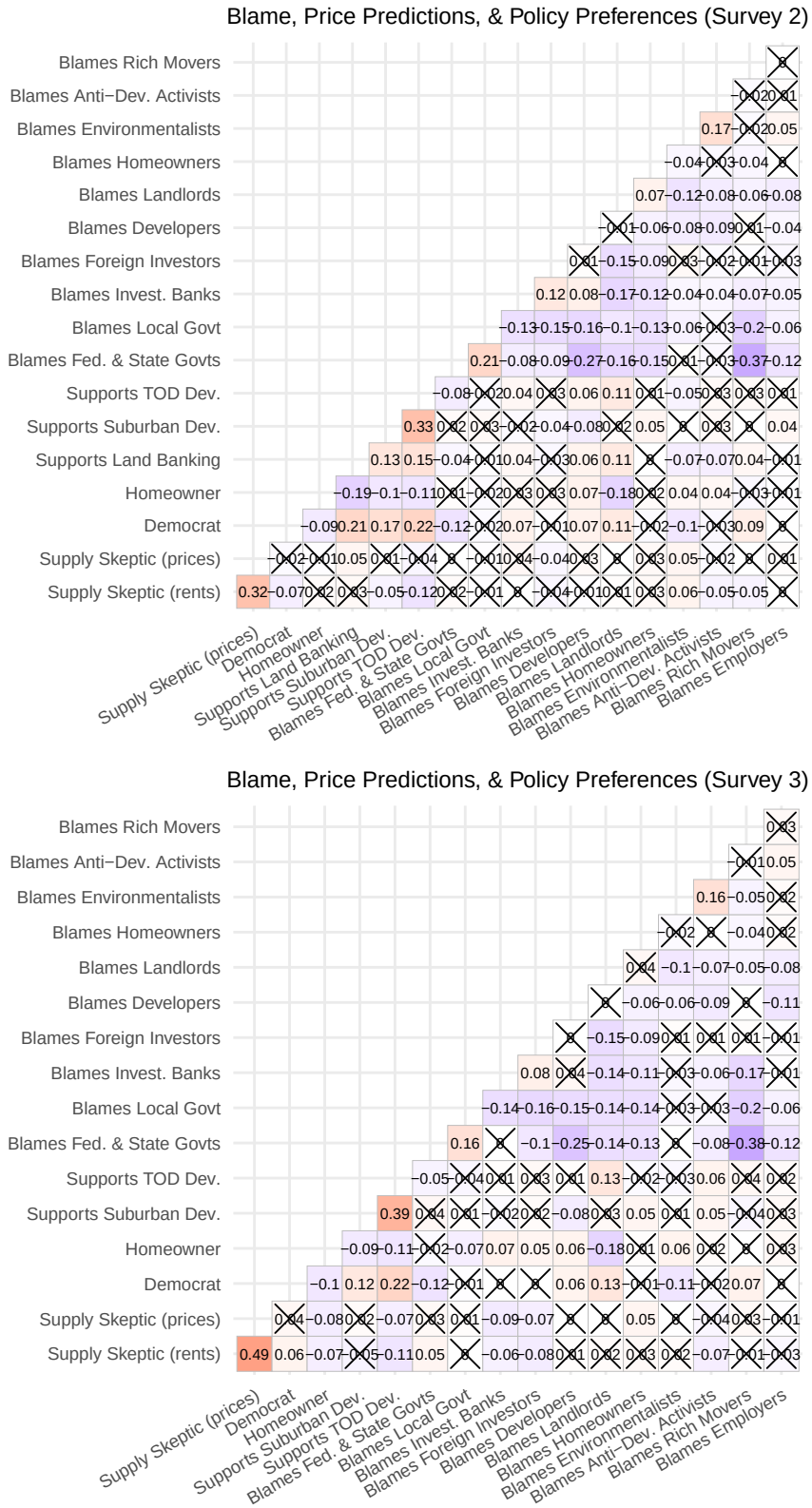

Figure 7.6: Bivariate correlations among answers to the "blame" questions, homeownership, party identification, elicited price and rent effects of large regional housing supply shock, and support for land-use policies. Surveys 2 and 3. An X through a correlation denotes that it is not statistically different from zero at the 95% confidence level.

7.5 Natural Language Analysis (Survey 1)

Near the beginning of Survey 1—before the zoning-change vignettes, and before providing respondents with any descriptive information about land-use regulation—we presented the following free-text questions:

- "When you think about regulation of land use and housing development by local governments, what are the main considerations that come to your mind?"
- "What would be the goals of a good policy about land use and housing development, in your view?"
- "What do you think are the problems with the current land-use and housing policies of local governments in the United States?"

Figure 7.7 displays word clouds of responses to all three questions, subset by tenure (owners on top, renters on the bottom). Both owners and renters emphasize affordability as a goal, and quantity as a problem. There are, however, some subtle differences between owner and renter responses, illustrated by the keyness plot in Figure 7.8. Renters were more likely to express concern about rents and prices; homeowners were distinctly concerned about family, infrastructure, and neighborhood amenities like schools and open space.

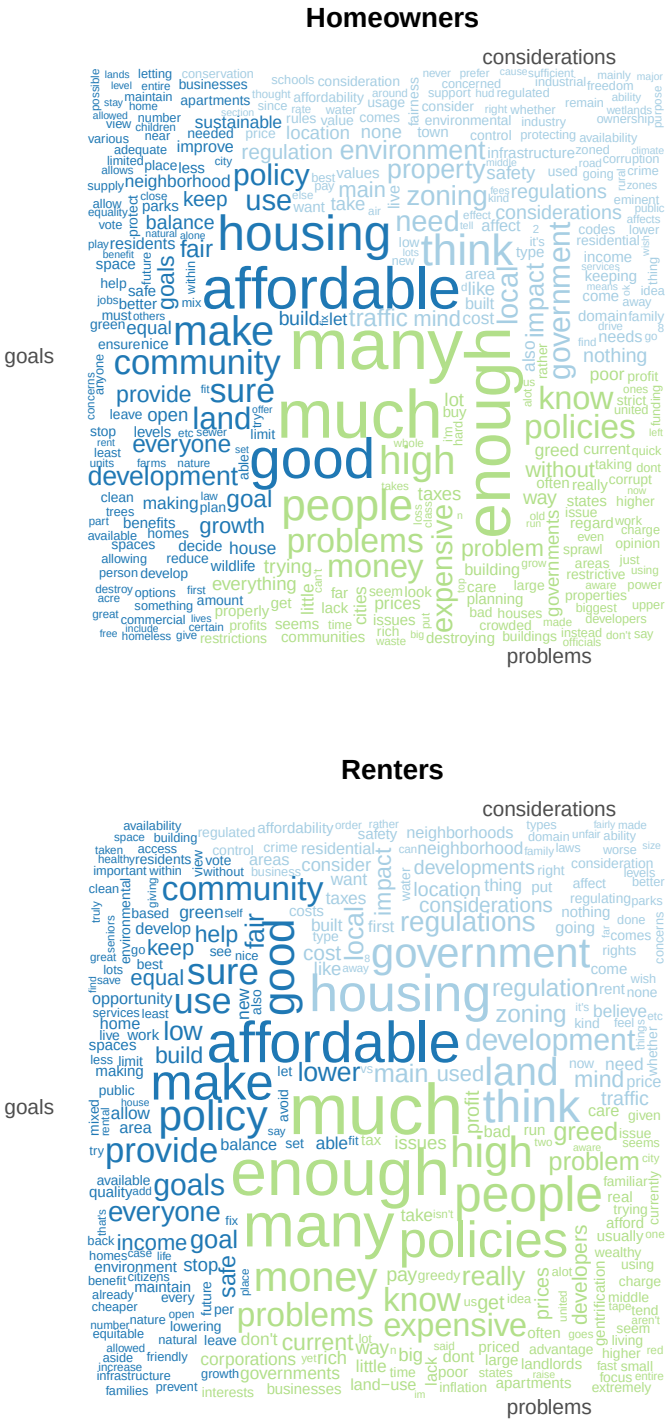

Figure 7.7: Word clouds of owner (top) and renter (bottom) responses to free-text questions about "main considerations," "goals of good policy," and "problems with current policies" in the domain of land-use regulation by local governments. Survey 1.

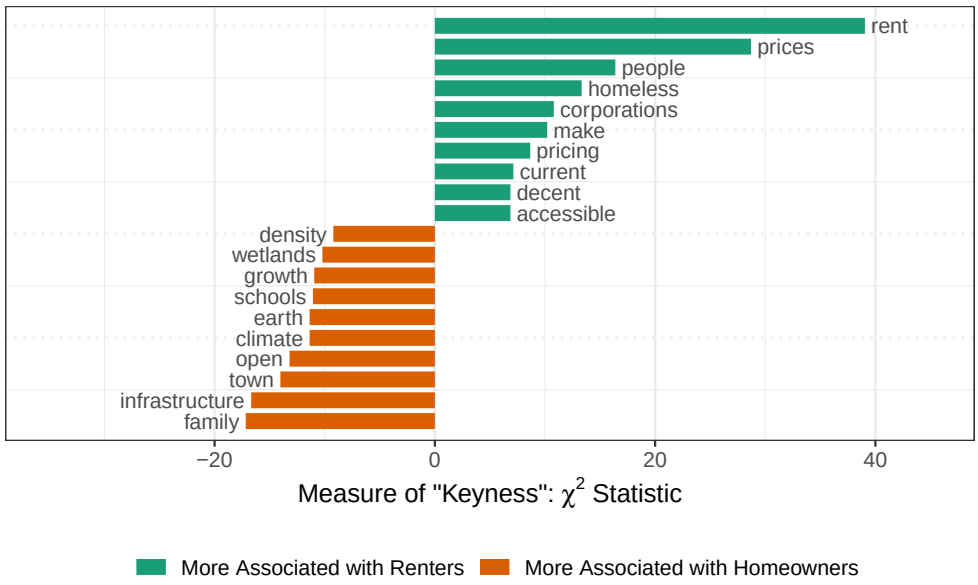

Figure 7.8: Keyness analysis comparing renter and homeowner responses to free-text questions about land-use regulation. Survey 1.

8 Respondent Demographics (Surveys 1 - 3)

Table 18 benchmarks the demographics of our survey samples against the U.S. population in the zip codes that comprise our sampling frame. We aimed to sample equal numbers of renters and howeowners, so renters are over-represented in our sample. As is often the case with online surveys, Latinos are somewhat under-represented, as are people with high household incomes and high monthly housing costs.

Our online quota sampling deliberately screened out potential respondents in low-density zip codes. For each zip code, we used ACS 2015-2019 five-year estimates to calculate the population-weighted average density of block groups whose centroids fell inside each zip code tabulation area (ZCTA). We sampled respondents only from ZCTAs with weighted population densities of over 500 persons per square mile (0.78 persons per acre). The total population in the included zip codes, calculated using 5-year estimates from the ACS 2015-2019 for each ZCTA, was 283.3 million. The total population in the excluded zip codes was 41.3 million. Our list of excluded rural zip codes was used in all four surveys cited in our study, and is provided in the replication archive.

Our code for calculating the weighted population densities was written in March 2022 and includes several R geospatial packages that have since been discontinued. Our original code and the complete list of zip codes used in sampling has been provided in the replication archive. Rewritten code using current R spatial packages does not replicate our zip code list exactly, though we've been unable to diagnose the cause. In the replication archive, we provide code comparing the list of zip codes that we used in sampling with the list generated using the new code. Our original code created a sampling frame of 13,228 zip codes containing 283.3 million persons. The updated code includes 12,277 zip codes with 280.6 million persons, a difference in sample size of less than 1 percent. Zip codes that appear in both data sets have a population of 276.8 million (97.7 percent of the original total). Zip codes identified as non-rural in the new code but as rural in our original code contain 3.8 million persons. Zip codes identified as rural in the new code but non-rural in the original code contain 4.4 million persons. The population densities calculated in the old and new

code are correlated at r=0.96 (after log transformation, r=0.87).

Table 18: Respondents demographics vs. U.S. Census benchmark. Pilot, main and follow-up surveys. Census information is for zip codes in sampling frame (2020 ACS 5-Year Estimates).

		Survey 1	Survey 2	Survey 3	U.S. Census		
		Percent	Percent	Percent	Census Category	Percent	SD
	Male	52.00	49.00	49.00		49.07	4.62
	Homeowner	46.00	47.00	46.00		62.54	18.71
	Has B.A. or Above	74.00	35.00	36.00		34.43	18.38
Age	18-29	15.83	13.06	17.17		16.88	10.58
	30-44	28.31	30.25	30.14		19.82	4.92
	45-64	38.73	37.97	35.52		25.24	5.87
	65 plus	17.14	18.72	17.07		15.56	7.61
Race/Ethnicity	Asian	3.42	3.15	4.79		6.34	7.90
	Black	13.00	13.12	14.75		13.42	17.69
	Hispanic	10.89	11.12	11.54		20.91	20.43
	Multi/Other	4.61	4.70	6.36		12.23	9.98
	White	68.07	67.91	62.56		56.15	26.98
Yearly Income	Less Than $30,000	28.91	26.88	25.26		22.37	12.73
	$30,000 – 39,999	12.17	12.46	11.59		8.27	4.16
	$40,000 – 49,999	10.06	11.50	9.82		7.77	3.61
	$50,000 – 59,999	10.50	9.50	11.20		7.31	3.31
	$60,000 – 69,999	6.76	7.34	6.86	$60,000 - $74,000	9.57	3.73
	$70,000 – 79,999	7.55	8.01	8.53			
	$80,000 – 89,999	4.61	4.42	4.49	$75,000 - $99,000	12.64	4.38
	$90,000 – 99,999	4.53	4.26	5.03			
	$100,000 – 109,999	5.17	5.34	5.53	$100,000 - $124,000	9.43	4.11
	$110,000 – 119,999	4.45	5.37	5.18			
	More than $120,000	5.17	4.83	6.36	$124,000 or more	22.65	15.38
	NA	0.12	0.10	0.15			
Monthly Housing Costs	Less than $250	17.18	13.66	14.06	Less than $300	4.98	7.36
	$500	15.03	15.06	11.94	$300 - $499	8.45	7.64
	$750	16.38	15.51	15.10	$500 - $999	26.20	13.39
	$1,000	18.05	18.46	16.08	$1,000 - $1,499	23.71	9.19
	$1,500	15.75	16.78	19.24	$1,500 - $1,999	15.05	8.12
	$2,000	7.95	9.50	10.36	$2,000 - $2,499	8.29	6.39
	$2,500	3.98	4.42	5.33	$2,500 - $2,999	4.72	4.86
	$3,000	2.70	3.11	3.60	$3,000 or more	6.99	10.95
	$4,000	1.31	1.53	1.68			
	$5,000	0.87	0.89	0.89			
	$7,500	0.28	0.29	0.39			
	$10,000	0.20	0.19	0.59			
	$15,000	0.00	0.22	0.15			
	More than $20,000	0.16	0.25	0.35			
	NA	0.16	0.13	0.25	No cash rent	1.61	3.11

References

Azen, Razia and David V. Budescu. 2003. "The Dominance Analysis Approach for Comparing Predictors in Multiple Regression." *Psychological Methods* 8(2):129.

Been, Vicki, Ingrid Gould Ellen and Katherine O'Regan. 2019. "Supply Skepticism: Housing Supply and Affordability." *Housing Policy Debate* 29(1):25–40.

Campbell, Angus, Philip E Converse, Warren E Miller and Donald E Stokes. 1960. *The American Voter*. University of Chicago Press.

Fagerlin, Angela, Brian J. Zikmund-Fisher, Peter A. Ubel, Aleksandra Jankovic, Holly A. Derry and Dylan M. Smith. 2007. "Measuring Numeracy Without a Math Test: Development of the Subjective Numeracy Scale." *Medical Decision Making* 27(5):672–680.

Fischel, William A. 2001. *The Homevoter Hypothesis: How Home Values Influence Local Government Taxation, School Finance, and Land-Use Policies*. Cambridge, MA: Harvard University Press.

Grömping, Ulrike. 2009. "Variable Importance Assessment in Regression: Linear Regression versus Random Forest." *The American Statistician* 63(4):308–319.

Gyourko, Joseph and Sean E McCulloch. 2024. "The Distaste for Housing Density." *NBER Working Paper 33078* .

URL: *https://www.nber.org/papers/w33078*

Hainmueller, Jens, Daniel J. Hopkins and Teppei Yamamoto. 2014. "Causal Inference in Conjoint Analysis: Understanding Multi-Dimensional Choices via Stated Preference Experiments." *Political Analysis* 22:1–30.

Hankinson, Michael. 2018. "When Do Renters Behave Like Homeowners? High Rent, Price Anxiety, and NIMBYism." *American Political Science Review* 112(3):473–493.

Hansena, James and Alicia Rambaldib. 2022. "How Do Homes Transfer Across the Income Distribution? The Role of Supply Constraints.".

Hastie, Trevor, Robert Tibshirani and Jerome H. Friedman. 2009. *The Elements of Statistical Learning: Data mining, Inference, and Prediction.* Vol. 2 Springer.

Hoover Institution. 2015. "Hoover Institution Golden State Poll, April 2015 [dataset].". Accessed January 24, 2017.

URL: *http://hvr.co/2pRFK8y*

Krstajic, Damjan, Ljubomir J Buturovic, David E Leahy and Simon Thomas. 2014. "Cross-validation pitfalls when selecting and assessing regression and classification models." *Journal of cheminformatics* 6(1):1–15.

Lim, Michael and Trevor Hastie. 2015. "Learning Interactions via Hierarchical Group-Lasso Regularization." *Journal of Computational and Graphical Statistics* 24(3):627–654.

Mast, Evan. 2021. "The Effect of New Market-Rate Housing Construction on the Low-Income Housing Market." *Journal of Urban Economics* p. 103383.

Tibshirani, Robert. 1996. "Regression Shrinkage and Selection via the Lasso." *Journal of the Royal Statistical Society: Series B (Methodological)* 58(1):267–288.