Framing Affordable Housing: Experimental Evidence from New Hampshire

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Abstract

Is it possible to persuade voters to support more housing in their communities and affordable housing policies at the state and local levels? A major cause of restrictive local zoning rules for home-building and of the attendant escalation of housing costs in many desirable locations in the United States is the disproportionate participation of residents opposed to new housing in municipal elections and public hearings. Generally, residents living close to proposed developments are more likely to oppose them, giving rise to the "NIMBY" ("Not in My Back Yard") label. Previous research suggests institutional context rather than attitudes explains most of the geographic variation in regulatory barriers to new housing. This study investigates the possibility of changing voter attitudes toward housing and housing policies with a pair of preregistered survey experiments conducted on adult residents of New Hampshire, one of the most tightly regulated states for new housing.

Keywords: housing; zoning; land use; public opinion; political psychology

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1 Introduction

Many of the most productive metropolitan areas around the world suffered from a major housing crunch in the 2010s (Cox & Pavletich 2020). In the United States, broadly speaking, markets in California and the Northeast have failed to expand housing supply to match growing demand, due in part to local planning and zoning restrictions, causing prices to rise substantially (Gyourko & Molloy 2014, Ganong & Shoag 2017, Molloy 2020). The resulting spatial misallocation of labor may be a substantial drag on the U.S. economy (Hsieh & Moretti 2015, Duranton & Puga 2019).

What makes voters support or oppose housing construction and those planning and zoning policies that permit affordable housing? Much of the existing literature implicitly assumes that homeowners, at any rate, *always* oppose new housing supply, and that the driving cause of variation in residential land-use regulation across jurisdictions is therefore political institutions. Since planning and zoning are typically functions of local government in the United States, it is thought that those forms of local government that are more sensitive to homeowner capture tend to yield more restrictive policies for home-building (Fischel 2001, Einstein, Glick & Palmer 2019).

Since political institutions are difficult to change, it is worth considering, however, whether voters can be persuaded to support affordable housing in their own neighborhoods and local planning and zoning policies that allow such development. This paper addresses this gap in our knowledge through two survey experiments of New Hampshire residents. We focus on New Hampshire residents because New Hampshire is both one of the most decentralized states in the country, with primarily local responsibility for both land-use regulation and primary and secondary education funding, and one of the most regulated states for residential land use (Gyourko, Saiz & Summers 2008, Ganong & Shoag 2017). New Hampshire residents therefore represent a particularly "hard case" for persuasion. The first experiment is a fully randomized conjoint analysis asking respondents to choose between hypothetical developments in their own neighborhood with different features. We test hypotheses about which types of developments respondents are most willing to accept. The results have implications for which types of projects developers can offer in order to win local support for more housing units. In general, we find evidence of classic "NIMBY" preferences among homeowners, though not across the board, while non-homeowners have "YIMBY" ("Yes in My Back Yard") attitudes on several dimensions.

The second experiment tests the extent to which simple, randomized messages affect respondents' support for relaxing or tightening local planning and zoning regulations. We test archetypal economic growth, property rights, and fairness messages against a control. The results have implications for which messages, if any, can persuade local voters to support more housing. We find surprisingly broad effectiveness for the property rights and fairness messages across partisan and ideological groups.

2 The Politics of Land-Use Regulation

What explains the prevalence of local land-use regulation and, more pertinently for this paper, who tends to support limits on housing development? We explore these questions under the headings of "Economic Factors and Self-Interest," "Political Institutions," and "Social Psychology and Public Opinion."

2.1 Economic Factors and Self-Interest

The economic incentives or disincentives regarding land-use regulation and the local supply of housing vary for each potentially impacted group (Glaeser & Gyourko 2018). Existing homeowners may benefit from an increase in land-use regulation due to an increase in existing housing prices. Potential new home-owners may be negatively impacted by an increase in regulation due to higher prices and the lack of housing availability in desirable locations. Landowners who are prevented from developing new housing may be negatively impacted by an increase in regulation due to a lack of building opportunities. Finally, the impact felt by renters depends on the net result regulation has on the trade-off between an increase in the supply of housing and an increase in the amenities or quality of any new or renovated housing (Glaeser & Gyourko 2018). Overall, the net welfare effects of regulation have been shown to be negative, so the costs of regulation outweigh the potential benefits (Molloy 2020).

Given the costs, why does local government regulate housing and what are the effects on the local housing market? An increase in regulation increases housing prices and rental rates, and decreases homeownership rates (Malpezzi 1996). The net result on housing quantity and price depends whether or not a positive demand shock to housing and population occurs in an elastic or inelastic supply environment, and hence a more lightly or highly regulated housing market (Glaeser, Gyourko & Saks 2006, Sorens 2020). Sorens (2020) outlines the theory of how and why land-use regulation only raises prices and increases the welfare of existing homeowners in places that are experiencing an increase in housing demand. There is not a strong economic incentive for local homeowners to restrict new housing in places where demand for new housing is low (Saiz 2010). Additionally, region-wide increases in housing supply may be beneficial, but that new construction could come with damaging neighborhood-level consequences (Einstein, Glick & Palmer 2019).

Empirical evidence regarding the consequences of land-use regulation on local communities has historically been difficult to capture, but recently there has been an increase in quality empirical research (Gyourko & Molloy 2015). For example, research has shown that regulation can increase home prices and reduce the elasticity of housing supply (Gyourko & Molloy 2015). One common concern has been determining the causal impact regulation has on housing supply. Does regulation decrease the amount of new housing, or do richer neighborhoods with less housing enact more land-use regulation? Einstein, Glick & Palmer (2019) examine Catholic Church redevelopment in the Boston area as a natural experiment and show that zoning and land-use regulation reduce new multi-

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family housing. Sorens (2020) develops a new measure of excess house price given observed quantity demanded growth, which acts as a proxy for regulation, in each New Hampshire town and shows that richer towns are likely to increase regulation, and that tighter regulation causes out-migration of lower income households, making the town appear richer.

Increasing land-use regulation reduces construction of new housing and increases local housing prices, but the impact on housing prices has been shown to disappear once town demographics and density are accounted for, implying land-use restrictions affect price by changing local housing density and demographics (Glaeser & Ward 2009). This is consistent with the idea that many who live in the United States have Tiebout-type choices and are able to "vote with their feet" (Fischel 1981). Increasing house prices in places with higher levels of regulation can also lead to out-migration of workers to locations with lower prices and land-use regulation (Glaeser, Gyourko & Saks 2006, Glaeser & Tobio 2007, Saks 2008, Ganong & Shoag 2017).

The production of affordable housing and the production of market-rate housing are not the same policy goal. A link between reducing the shortage of market-rate housing and greater lower-income housing availability has not been established empirically (Einstein, Glick & Palmer 2019). Molloy (2020) summarizes the literature on land-use regulation and affordability, specifically addressing the varying effects regulation can have on affordability across the distribution of house prices and rents. Increasing regulation can raise the price for, and restrict the amount of, low-cost housing (Malpezzi & Green 1996). The availability of local affordable housing may also be dependent on the type of urban environment, and whether or not the city has been experiencing long-run economic success and population decline or expansion (Metcalf 2018). The impact of specific affordable housing policies, like the Low Income Housing Tax Credit (LIHTC), has shown to be dependent on the income level of the surrounding area. Higher income areas may experience declines in home prices due to the policy attracting lower-income households to the area. In contrast, low-income neighborhoods can be revitalized and experience an increase in home prices and lower crime rates (Diamond & McQuade 2019).

2.2   Political Institutions

Institutions designed to encourage local participation in land-use decisions were created to combat excessive developer influence in the mid-twentieth century. While noble in principle, these forums and institutions are being used more frequently and effectively by an unrepresentative sample of the local population (Einstein, Glick & Palmer 2019). Glaeser & Ward (2009) find that in eastern Massachusetts there has been a large increase in land-use regulation since 1980, and that there is an abundant amount of variety in the regulations. The evidence regarding the determinants of specific land-use regulations is less clear, and the regulations are hard to predict, except that historical housing density is a determinant of minimum lot size (Glaeser & Ward 2009). Land-use regulations are more prevalent and stronger in highly advantaged areas due to the increased

participation of the socioeconomically advantaged in local land-use institutions (Einstein, Glick & Palmer 2019).

Regulation not only provides the opportunity to block new projects outright, the rules and procedures of local planning and zoning boards provide neighbors the opportunity to significantly delay projects they oppose. This power of delay significantly biases outcomes toward keeping things the way they are. Those that stand to benefit from new housing may also currently be living outside the area of potential development, further biasing the outcome toward the status quo (Einstein, Glick & Palmer 2019). Both the regulations and the venues for local participation allow motivated individuals to block and delay housing development. It also isn't just the regulations that pertain specifically to multi-family housing that reduce housing, any regulation that requires participatory engagement in local planning or zoning institutions (like a special permit or variance) can reduce the supply of housing by allowing citizens to voice their concerns on issues beyond those that prompted the public forum in the first place (Einstein, Glick & Palmer 2019).

Since regulation of new housing is strongest where local institutions are highly participatory (yet for that very reason skewed toward housing opponents), changing the opinions of local voters and the willingness of pro-housing residents to turn out to hearings and local elections could have a huge impact on the production of housing. But any such effort will have to overcome the powerful effects of homeowner self-interest already described.

2.3 Social Psychology and Public Opinion

Attitudes toward the regulation of local land use are likely shaped by factors, like ideology, stereotyping, and prejudice, that influence other social policies (Tighe 2010, Einstein, Glick & Palmer 2019). Opposition to housing development can be driven by selfish concerns about housing prices or the perceived benefits and costs of local public goods (Hamilton 1975, Fischel 2001, Marble & Nall 2020), but many who engage in opposition to increases in local housing supply may do so out of a belief they are helping others in their neighborhood (Einstein, Glick & Palmer 2019). Community perception of affordable housing development can be based on the interaction between individual attitudes, local official concerns, local market conditions, and heterogeneous exclusionary regulation within the region (Scally 2013). As mentioned previously, those that engage in local housing debates are unrepresentative and privileged relative to the local population. They are older, whiter, longer-term residents, who are also more likely to own a home, and most likely oppose the development of new housing (Einstein, Glick & Palmer 2019). NIMBY attitudes and actions are strongest in a public with similar characteristics, such as suburbs with high numbers of wealthy, white households, which can lead to a consensus of public opinion (Tighe 2010).

The number of opponents to housing development who are willing to make their opinion heard outnumber the same type of proponents because the costs of housing are very concentrated, and the benefits are spread out such that few proponents are motivated enough to zealously support new housing development.

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Some may decide not to participate in local housing meetings due to costly barriers such as lack of time or knowledge. Supporters have little incentive to show up at local meetings because the marginal benefits of additional housing are very small compared to the concentrated costs imposed on neighbors (Einstein, Glick & Palmer 2019). Support for new housing has also been shown to be scale dependent, meaning that an individual may support an increase in housing at the city level, but oppose housing in their neighborhood due to beliefs regarding neighborhood gentrification and prices rising (Hankinson 2018). This may be useful when analyzing if housing legislation can be passed at the the city or state level.

The local defender behavior described previously is likely to be even more severe for affordable housing development (Einstein, Glick & Palmer 2019). Affordable housing proposals can also elicit strong local opposition due to racial and income prejudice (Tighe 2010), and opinions may even depend on the framing of the development as "affordable" (Goetz 2008). Increased supply can reduce housing prices and rents, but if the new housing replaces older housing, in many cases it could be part of a different market that does not serve the existing local population. In cities with high housing demand, lower-income and less participatory areas will be more likely to experience gentrification (Einstein, Glick & Palmer 2019). Voters may support affordable housing in general, but a majority who attend local development meetings are likely to oppose these projects (Einstein, Glick & Palmer 2019). Changes to institution structure and geographic engagement could improve the production of market-rate housing, but state and federal government involvement may be required to improve access to affordable housing (Einstein, Glick & Palmer 2019, Scally & Koenig 2012).

3   Research Design

3.1   Are Housing Opinions Malleable?

This paper tries to answer two questions. First, can new housing developments be planned or framed in such a way as to gain greater local support? Second, can messaging about housing affect public opinion toward housing policy at the state and local level?

There is a gap in the literature on the relative impact of different features of a housing development, such as the inclusion of low-income units versus potential increases in taxes to fund infrastructure, on public support for the project. An experimental study of attitudes toward hypothetical housing developments could tell us more about the motivations behind NIMBYism: exclusion, fiscal impact, density as such, or subjective aspects such as fitting in with neighborhood character.

A survey experiment of attitudes toward hypothetical housing developments is most naturally approached through the tool of conjoint analysis, which permits a factorial design in which many different features of choice alternatives are randomly manipulated at once to see how each feature affects respondent

preference. The limitation of the survey experimental method is here is that a hypothetical development in one's neighborhood is not an *actual* development in one's neighborhood. There is therefore a well-known problem of attenuation bias when experimental treatments in surveys are insufficiently strong. For the purposes of this study, however, we are not interested in the *absolute* impact of each feature of a proposed development, but in their *relative* and *directional* impact. A moderately strong experimental treatment combined with large sample size, achievable through multiple choice tasks per respondent, can help to identify these relative and directional impacts precisely.

Thus, the conjoint analysis of attitudes toward housing development attributes is largely exploratory, but we do develop some hypotheses. Assuming NIMBYism is strong, we expect to see respondents prioritize smaller, traditional, single-family and mixed-use developments with developer-paid infrastructure in their own neighborhoods. These tendencies should be stronger for homeowners.

On housing *policy*, some consulting firms have conducted proprietary research to determine the types of messages that work for housing advocates, but none of it has been published or peer reviewed to our knowledge. Would greater public awareness of economists' findings on the negative welfare impact of housing regulation change minds? What about more philosophical private property rights arguments or fairness to low-income strivers arguments?

We conduct a messaging survey experiment to answer these questions. In the messaging experiment, we expect to see all respondents become more pro-housing after reading the *economic expertise* frame, Republicans, conservatives, and libertarians to become more pro-housing after reading the *property rights* frame, and liberals and Democrats to become more pro-housing after reading the *fairness* frame, relative to the control. We also investigate the effect of political engagement on sensitivity to framing. The politically engaged may be less persuadable, or they may be more attentive to messaging. We have no prior expectation here. In the next section we operationalize these hypotheses as expectations on coefficient estimates. Our data-gathering and analysis methods and hypotheses were preregistered on osf.io prior to downloading the raw survey responses.

3.2 Experimental Design

3.2.1 Conjoint Analysis

Conjoint analysis, long used in market research, has gained new popularity in social science for its attractive identification and efficiency properties. A conjoint experiment randomly shows varying attribute levels of choice alternatives to respondents and offers multiple choice or rating tasks to each respondent. As a result, we can use conjoint data to analyze the effects of several different causal treatments simultaneously without the expense of an enormous survey with a single treatment per respondent. In addition, exploiting within-respondent variation helps to eliminate potentially important sources of noise, boosting the power of the statistical estimates (Mutz 2011, 93). Finally, conjoint analysis is particularly

suited to investigating the determinants of choice between multidimensional alternatives, like housing developments. In the social sciences, conjoint analysis has been used in studies of choice of political candidates (Carlson 2015, Horiuchi, Smith & Yamamoto 2020), judicial nominees (Sen 2017), public policies (Bechtel & Scheve 2013), immigrants (Hainmueller & Hopkins 2015), and teammates (Caruso, Rahnev & Banaji 2009).

In this paper, we follow the recommendations of Hainmueller, Hopkins & Yamamoto (2014) to estimate the average marginal component effect (AMCE) and give respondents both choice and rating tasks.[1] The AMCE is identified so long as the attribute levels are independently, randomly assigned in the survey.

We are interested in the choice between and ratings of housing developments in a respondent's neighborhood as functions of the attributes of those developments. Letting $i \in \{1, \ldots, N\}$ index the respondents, $k \in \{1, \ldots, K\}$ the choice tasks, $l \in \{1, \ldots, L\}$ the number of attributes, and $d_l \in \{1, \ldots, D_l\}$ the number of levels of attribute l, we wish to estimate

$$y_{ik} = \alpha + \sum_{dl}^{DL} \beta_{dl} D_{ik} \times L_{ik}. \tag{1}$$

In other words, the estimation model includes as independent variables dummy variables for each level of each attribute of the two profiles. Hainmueller, Hopkins & Yamamoto (2014) show that under a spare set of assumptions, the multiple regression model parameters properly identify causal quantities. In particular, the study design needs to randomize the profiles shown to respondents, that is, which attribute levels are displayed. In our study, we are able to display each attribute level with equal probability, simplifying the math to estimate causal quantities of interest.

Table 1 displays the attributes and attribute levels tested; respondents are shown a side-by-side comparison of two potential housing developments (a screenshot of an actual conjoint task in the survey is available in the Appendix). In addition to these attributes and levels for each of two profiles, respondents are shown a "Pricing/quality" line with "includes some workforce units." This is not an experimentally treated attribute level, because all profiles are shown possessing it.

We explore whether NIMBYism is universal or concentrated among homeowners. Table 2 lays out the expected relationships between attribute levels and project preference in survey respondents. We investigate whether respondents prefer single-family homes, smaller projects, brownfield developments, seniors-only, and luxury residences and disfavor apartments, low-income developments, and city-provided infrastructure. Favoring seniors-only and luxury residences and

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[1]We anticipate some respondents' ratings and binary choices on particular profiles to be contradictory due to inattention. We will estimate models dropping these observations (not all choice tasks for each respondent that does this for any choice task, but only that particular choice task). If these observations are more than 20% of the total, we will also report results including those observations. We will also report estimates that drop any observations for the rating models from any respondent that simply rated all projects in all profiles "5" (the default rating), with the same caveat.

Attribute	Levels
Type of project	Apartments / Condominiums / Mixed-use (commercial below, apartments above) / Single-family houses
Size of project	Ten residences / 50 residences / 200 residences
Type of property	New build / Tear down and rebuild
Infrastructure	No new infrastructure / City-provided infrastructure / Developer-provided infrastructure
Age restriction?	Seniors only / No age restriction
Architectural style	Modern / Traditional
Pricing/quality I	Includes some low-income units / Does not include low-income units
Pricing/quality II	Includes some luxury units / Does not include luxury units

Table 1: Attributes and Levels

opposing city funding of infrastructure could well reflect "fiscal zoning" concerns, that is, the tax impact of allowing new development. We follow standard practice by testing these expectations with independent dummy variables in a multiple regression equation.

Label	Expectation
TYPE	Negative: Apartments, positive: Single-Family (relative to Condominiums baseline)
SIZE	Neg.: '200', pos.: Ten (rel. to '50' baseline)
PROPERTY	Pos: Tear-down (rel. to New Build)
INFRASTRUCTURE	Neg.: City-provided (rel. to None)
AGE	Pos: Seniors (rel. to All Ages)
PRICING	Pos: Luxury Incl., Neg: Low-Income Incl.
HOMEOWNER	Strengthening interactive effect on above

Table 2: Conjoint Analysis Expectations

One of the potential pitfalls in interpreting the results of a conjoint experiment is the possibility of "masking," that is, that respondents will infer from a displayed attribute some other attribute that is not meant to be directly tested (Hainmueller, Hopkins & Yamamoto 2014, p. 5). For instance, respondents could infer something about the quality of a house's construction from its price, making it difficult to infer causal quantities from a price manipulation if construction quality is not also explicitly displayed. For our experiment, we have tried to ensure that the most significant attributes that could affect respondents' choices are displayed, either as manipulations or a constant attribute ("includes workforce units"), even if we have no theoretical expectations about their impact

(e.g., architectural style).

While our experiment is meant to assess the role of NIMBYism in judgments about hypothetical housing developments, we do not use that term or any like it that could give away the purpose of the survey or prime respondents to focus on any particular attribute. The survey introduction simply mentions that the survey is part of research conducted by Saint Anselm College and gives the names of the researchers (see Appendix). Respondents are not asked about their views on housing prior to these choice tasks.

3.2.2 Messaging Experiment

Following the conjoint tasks is a messaging experiment. In this experiment, we randomly present each respondent with one of three experimental vignette treatments or a control vignette (equal probability of each). The treatment vignettes represent Economic Expertise, Property Rights, and Fairness arguments. After reading the treatment, respondents answer a reading comprehension check and then, if answered correctly, respond to four questions assessing their attitudes toward planning and zoning regulations and affordable housing. We also test the effect of general political engagement, the measurement of which is described below, on sensitivity to all treatment messages.

The Economic Expertise treatment reads as follows:

> Economists say New Hampshire's planning and zoning regulations are too strict, keeping out productive workers by limiting housing. Both Harvard and University of Pennsylvania economists have separately discovered that New Hampshire is one of the five most regulated states for building housing. A recent National Bureau of Economic Research paper found that eliminating planning and zoning regulations in the Boston metropolitan area, which includes part of New Hampshire, would boost the income of the average resident by 13%. A study by University of Chicago and Berkeley economists found that relaxing zoning regulations around the U.S. to an average level would boost the economy by nearly 10%.

The statements found in this message are true summaries of recent research findings. Since this message focuses on economic growth, which we assume all respondents value to some extent, we expect exposure to it to have positive effects across partisan and ideological categories.

The Property Rights treatment reads as follows:

> Planning and zoning regulations prevent property owners from doing what they wish with the land they own. If landowners want to build housing, they have to face virtually endless red tape from local bureaucrats and delays that can make the process unaffordable. Some local regulations even make building on your own land completely illegal! We could abolish land-use regulations and still keep building codes that protect safety and health. Nothing prevents neighbors

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> from signing contracts to limit what they can do with their land if they want to, but government should stay out.

This treatment presents a forthrightly libertarian defense of private property rights against zoning. It is expected to have pro-housing effects on the attitudes only of conservatives, libertarians, and Republicans. It is even possible that it creates a backlash effect in Democrats and liberals toward favoring more regulation of new home-building. We investigate, alternately, the effects of conservative or libertarian ideological self-description and Republican partisanship, defined as party lean, on pro-housing attitudes, conditional on exposure to the Property Rights treatment. We also investigate whether this treatment is particularly effective for those who are both Republican and either conservative or libertarian, and whether there is a backlash effect among liberal Democrats.

The Fairness treatment reads as follows:

> New Hampshire's planning and zoning regulations are unfair to working families struggling to make ends meet. By limiting the new housing that can be built, these restrictions drive up rents and house prices, making housing completely unaffordable for more and more Granite Staters. Everyone knows that some towns in New Hampshire are much more expensive to buy in than others, and they tend to be the places with better schools. So poor families in New Hampshire get stuck in poverty, because they cannot afford to live where they can get a better education for their kids.

We expect this treatment to be particularly effective for liberals and Democrats and possibly strongest for liberal Democrats. We do not expect a backlash among conservatives and Republicans, because previous research has found that fairness, especially understood as proportionality or desert, is an important moral foundation for conservatives as well as liberals (Graham, Haidt & Nosek 2009, Skurka, Winett, Jarman-Miller & Niederdeppe 2019).

Finally, there is a control prompt that some respondents see:

> Form-based zoning is a new approach in New Hampshire. In contrast with conventional zoning that emphasizes the separation of uses, a form-based code instead uses character — the look and feel of a place — as the primary organizing principle. Form-based codes take the approach that most uses, which fall into the broad categories of retail, residential, office, civic uses, even light industrial activities, are compatible, having traditionally co-existed happily in traditional communities for centuries. Given appropriate standards, all of these uses can be located close to each other, except for in unique cases where smells or extreme noise are an issue, in which case the conventional approach of separating uses is appropriate.

The housing attitudes of respondents who see the control prompt constitute the baseline against which we expect to see the experimental treatments work.

The control prompt is a similar-length message about zoning regulations, but it does not make an argument for or against loosening zoning regulations, nor draw any connection between zoning and housing affordability. If anything, it could be seen as a kind of argument in favor of mixed-use zoning, but we do not test attitudes toward this. The dependent variable is an index of pro-housing attitudes drawn from reactions to four statements. Respondents are asked to give their agreement or disagreement with each of the following statements on a traditional, five-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree."

1. New Hampshire should reduce planning and zoning regulations in order to allow more housing to be built.

2. I would be willing to support more affordable housing in my own community.

3. New Hampshire should do more to prevent development and keep the state the way it is.

4. The state of New Hampshire should set a hard limit on how long local planning and zoning boards can hold up a permit to build housing.

We choose these four statements to represent different aspects of housing policy: local land-use ordinances and regulations, the decisions that happen in local communities about particular developments, and state policies to limit local regulatory discretion. We also made sure to have one statement with an opposed orientation to the others, such that agreement would indicate support for more restriction of home-building.

We construct the dependent variable as the first, unrotated principal component of responses to these four statements, coded on a zero to four scale, with zero corresponding to "Strongly Disagree" and four to "Strongly Agree." We expect attitudes toward the first, second, and fourth statements to correlate negatively with attitudes toward the third statement. Using multiple measures of the dependent variable to minimize measurement error is gold-standard practice in survey experimental research (Mutz 2011, p. 100).

The independent variables are dummies for exposure to the three experimental treatments, interactions between the treatment dummies and dummies for ideological self-description and (in alternate models) party lean, and interactions between the treatment dummies and an ordinal measure of political engagement. It would be inappropriate to include standalone variables for ideology, partisanship, and political engagement because these variables are not randomly assigned, unlike the experimental treatments. They could be posttreatment colliders.

Political engagement is measured as an ordinal variable ranging from zero to two. Respondents receive one point for being registered to vote and half a point each for not answering "I don't know" to the ideological self-description and partisan lean questions. We have no particular expectation about the effect of political engagement on sensitivity to the experimental treatments. On the one hand, those who are not politically engaged may be more persuadable and

thus more sensitive to the treatments. On the other hand, they may be less interested in policy issues altogether and thus less sensitive to the treatments.

Both experiments, the conjoint analysis and the messaging experiment, are part of the same questionnaire. Respondents encounter the conjoint analysis prior to the vignette on land-use regulation. We chose this order because we did not believe questions about hypothetical housing developments would inappropriately frame later questions about zoning regulations. To the contrary, getting respondents to start thinking about housing in general first might be a particularly useful tactic in an Internet survey to focus their attention on properly reporting their attitudes about housing *policy*.

3.3 Survey Design and Weights

We fielded a statewide Internet survey of New Hampshire residents aged 18 and over on an opt-in but roughly representative sample obtained via commercial survey company Centiment Research, 505 of whom completed the survey.[2] Centiment provides cash bonuses to survey participants and allows them to raise money for nonprofits and schools. Centiment claims to be able to secure "balanced and representative" samples of large populations with its approach (*Centiment: Consumer Research Through Online Surveys* N.d.).

Questions of representativeness in Internet surveys are common. Nonrandom convenience samples are common in experimental research, since OLS estimates of treatment effects are unbiased under nonrandom sampling provided that effects are homogeneous across subpopulations (Winship & Radbill 1994). Mullinix, Leeper, Druckman & Freese (2015) show on the basis of 20 experiments that Mechanical Turk opt-in surveys and randomly sampled, population-based surveys yield similar results. Still, some research suggests that effect heterogeneity is plausible in social science applications, and therefore weighting survey respondents to match the population surveyed may be a necessary if imperfect step in order to derive a population average treatment effect (PATE) (Franco, Malhotra, Simonovits & Zigerell 2017). The strategy is imperfect for two reasons. First, weighting only makes a sample representative conditional on observables, but respondents could select into the survey for reasons that are not observable, such as political interest. Second, weighting observations in a regression generates inefficient estimates with larger standard errors. Our strategy is therefore to report both weighted and unweighted estimates and allow readers to draw their own inferences, as Franco et al. (2017) recommend.

For purposes of weighting, we asked some standard demographic questions at the beginning of the questionnaire: zip code (which we aggregate up to county for weighting), voter registration, household income, age, sex, and highest level of education completed. We also asked ideological self-description, two-party lean, and homeownership in order to test substantive hypotheses about the effects of these variables on sensitivity to experimental treatments. We do not weight

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[2]Using demographic indicators captured at the start of the survey, we constructed Heckman selection models of survey attrition for the messaging experiment and found no substantive differences in results, which are available in the appendix.

by race, because we feared alienating some respondents, and New Hampshire is fairly homogeneous on this dimension in any case.

4   Results

4.1   Housing Development Characteristics

Table 3 shows the results of the analysis of the conjoint selection model, where the dependent variable is represented by respondent profile selection and the independent variables are dummy variables for each level of each attribute of the two profiles. The first column provides results for the unweighted analysis, with robust standard errors for the coefficients provided in parentheses and reference categories omitted due to space considerations. The statistically significant coefficient estimates show the respondents were six percentage points (plus or minus four) more likely to choose a profile with single-family housing, four percentage points (plus or minus four) more likely to choose a profile with developer-provided infrastructure, and nine percentage points (plus or minus three) more likely to choose a profile without age-restricted housing. Positive attitudes towards single-family housing and developer-provided infrastructure are consistent with Table 2 expectations, but the positive coefficient for no age restriction provides evidence that survey respondents as a whole were not exhibiting "fiscal zoning" concerns. Respondents were less likely by four percentage points, plus or minus four, to choose a profile if it contained two hundred residences, three percentage points (plus or minus three) less likely to choose a tear down and rebuild, and five percentage points (plus or minus three) less likely to choose a profile without low-income units. Negative attitudes towards large developments are consistent with Table 2 expectations, but negative attitudes towards tear-downs and not having low-income units are not consistent with expectations. Column two of Table 3 provides the results of the conjoint selection model weighted by voter registration, two-party lean, household income, homeownership, age, gender, and education attainment.[3] The weighted coefficients are similar in sign, magnitude, and statistical significance to the unweighted coefficients, except single-family housing, two hundred residences, and developer-provided infrastructure are no longer statistically significant. It is most surprising that not including low-income units makes it less likely the profile was selected in both the unweighted and weighted results. It may be expected that non-homeowners would exhibit this preference for low-income housing, but it seems our survey respondents are exhibiting a preference for the inclusion of low-income units more generally given that the result is still valid after weighting on observables.

Table 4 shows the results of the analysis of the conjoint rating model, where the dependent variable is represented by respondent rating of each selection from zero to ten and the independent variables are dummy variables for each level of each attribute of the two profiles. Respondent ratings were dropped if the respondent rated all eight profiles a five or rated selected profiles lower

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[3]Additional information on weights provided in Appendix.

Table 3: Conjoint Selection vs. Profile Characteristics

	Unweighted	Weighted
Condominiums	-0.00521 (0.0218)	-0.000281 (0.0328)
Mixed-use	0.0195 (0.0221)	0.0231 (0.0332)
Single-family	0.0588*** (0.0220)	0.0500 (0.0335)
50 residences	-0.0123 (0.0192)	-0.00251 (0.0291)
200 residences	-0.0418** (0.0193)	-0.0216 (0.0290)
Tear down	-0.0297* (0.0157)	-0.0417* (0.0235)
City-provided infra.	0.0218 (0.0192)	0.0527* (0.0289)
Developer-provided	0.0409** (0.0191)	0.0437 (0.0287)
No age restriction	0.0852*** (0.0157)	0.0877*** (0.0235)
Traditional	0.0173 (0.0156)	0.0231 (0.0235)
No low-income units	-0.0500*** (0.0157)	-0.0627*** (0.0235)
No luxury units	0.00224 (0.0156)	-0.00804 (0.0235)
Constant	0.468*** (0.0284)	0.459*** (0.0429)
Observations	4040	4040

Robust standard errors in parentheses

Dependent variable - respondent selected profile 0-no 1-yes

Reference categories omitted: Apartments, 10 residences, New build, No new infrastructure, Seniors only, Modern, Includes low-income, Includes luxury

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

than non-selected profiles. The statistically significant coefficient estimates show respondents rated profiles higher that contained single-family houses and had no age restrictions, and rated profiles lower if profiles did not include low-income units. The coefficient estimate for no age restriction was the only statistically significant result for both the unweighted and weighted analyses. The signs of the coefficients are consistent with those in the choice model results described previously, which is expected given responses were dropped if ratings were inconsistent with profile selection.

Table 4: Conjoint Rating vs. Profile Characteristics

	Unweighted	Weighted
Condominiums	-0.0179 (0.105)	0.0258 (0.119)
Mixed-use	0.0594 (0.107)	0.154 (0.119)
Single-family	0.157 (0.106)	0.251** (0.118)
50 residences	0.0326 (0.0891)	0.0218 (0.0975)
200 residences	-0.0486 (0.0929)	-0.108 (0.104)
Tear down	-0.0732 (0.0750)	-0.0988 (0.0841)
City-provided infra.	-0.0610 (0.0921)	-0.150 (0.104)
Developer-provided	0.119 (0.0896)	0.0788 (0.0995)
No age restriction	0.248*** (0.0749)	0.204** (0.0837)
Traditional	0.0631 (0.0748)	0.0700 (0.0837)
No low-income units	-0.191** (0.0747)	-0.126 (0.0838)
No luxury units	0.0117 (0.0749)	0.111 (0.0840)
Constant	6.110*** (0.133)	6.147*** (0.148)
Observations	3642	3642

Robust standard errors in parentheses

Dependent variable - respondent rating of profile 0-10

Reference categories omitted: Apartments, 10 residences, New build, No new infrastructure, Seniors only, Modern, Includes low-income, Includes luxury

Observations dropped if respondent rated all 8 profiles 5 or rated selected profile lower than non-selected

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.1.1 Homeowner Impacts

Table 5 shows the results of the analysis of the conjoint selection model that uses profile attribute dummy variables interacted with homeowner and non-homeowner status as independent variables. Reference categories have been omitted and only statistically significant results are included due to space concerns.[4] The expectation provided in Table 2 is that homeowners would exhibit stronger preferences for the profile characteristics. This expectation is met in the coefficient estimates for the inclusion of single-family houses and the exclusion of two hundred residence developments, both of which increased in magnitude and are statistically significant for homeowners in the unweighted and weighted analyses. Those who do not own their own home seem to prefer new builds and the inclusion of low-income units, and strongly disprefer seniors-only development. These results provide evidence that the positive coefficient for no age restriction and the negative coefficient for not including low-income units shown in Table 3 may be due to the responses of those who do not own their own home.

Table 5: Homeowner (Yes/No) Conjoint Selection vs. Profile Characteristics

	Unweighted	Weighted
Single-family × Yes	0.0660** (0.0298)	0.0629* (0.0351)
200 residences × Yes	-0.0887*** (0.0256)	-0.134*** (0.0302)
New build × No	0.0443* (0.0236)	0.0521* (0.0314)
No new infrastructure built × No	-0.0568* (0.0290)	-0.0474 (0.0385)
Seniors only × No	-0.132*** (0.0236)	-0.113*** (0.0315)
No age restriction × Yes	0.0459** (0.0209)	0.0174 (0.0246)
Includes low-income units × No	0.0801*** (0.0235)	0.0792** (0.0314)
Includes luxury units × No	0.0390* (0.0235)	0.0215 (0.0314)
Constant	0.480*** (0.0379)	0.508*** (0.0448)
Observations	4040	4040

Robust standard errors in parentheses

Dependent variable - respondent selected profile 0-no 1-yes

Statistically significant results included. Full results available upon request

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 shows the results of the analysis of the conjoint rating model that

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[4]Seven of the interactions were omitted in the empirical analysis due to collinearity. More information is available upon request.

uses profile attribute dummy variables interacted with homeowner and non-homeowner status as independent variables. Respondent ratings were dropped if the respondent rated all eight profiles a five or rated selected profiles lower than non-selected profiles. Homeowners again showed a strong preference for single-family housing and a preference against two hundred residence development. Homeowners also showed a preference against city-provided infrastructure, which provides evidence of "fiscal zoning" concerns from homeowners. Non-homeowners again showed a preference for the inclusion of low-income units and the exclusion of seniors-only development, which are consistent with previous results.

Table 6: Homeowner (Yes/No) Conjoint Rating vs. Profile Characteristics

	Unweighted	Weighted
Apartments $\times$ No	0.302 (0.265)	0.740** (0.300)
Condominiums $\times$ No	0.286 (0.267)	0.569* (0.309)
Mixed-use $\times$ Yes	0.217 (0.142)	0.292** (0.146)
Mixed-use $\times$ No	0.172 (0.267)	0.604* (0.315)
Single-family $\times$ Yes	0.400*** (0.142)	0.513*** (0.146)
Ten residences $\times$ No	-0.213 (0.138)	-0.426** (0.167)
200 residences $\times$ Yes	-0.246** (0.125)	-0.343*** (0.127)
City-provided infra. $\times$ Yes	-0.261** (0.124)	-0.255** (0.127)
Seniors only $\times$ No	-0.409*** (0.111)	-0.506*** (0.135)
Includes low-income units $\times$ No	0.285** (0.111)	0.246* (0.133)
Constant	6.092*** (0.176)	6.149*** (0.181)
Observations	3642	3642

Robust standard errors in parentheses

Dependent variable - respondent rating of profile 0-10

Observations dropped if respondent rated all 8 profiles 5 or rated selected profile lower than non-selected

Statistically significant results included. Full results available upon request

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.2 Housing Policy Rationales

4.2.1 Creating the Dependent Variable

The dependent variable in this set of analyses is an index of pro-housing attitudes constructed through principal component analysis (PCA) of the four Likert scale responses to housing policy statements. The PCA supports the hypothesis that all four responses contribute meaningfully and in the expected direction to an underlying index of pro-housing attitudes (Table 7). The most important contributor to the index is agreement or disagreement with the statement that New Hampshire should reduce planning and zoning regulations to allow more housing to be built. Respondents who agreed were also more likely to agree that they would support more affordable housing in their own communities and that the state should set a hard limit on how long local boards may take to review permits to build housing, but they were less likely to agree that New Hampshire should do more to "prevent development and keep the state the way it is." The extracted component ranges from -4.4 to 2.9 with a mean of zero and a standard deviation of 1.3.

Variable	Loading
Reduce regulation	0.59
More affordable housing	0.57
Prevent development	-0.54
Hard limit on review	0.20

Table 7: Loadings of Variables Contributing to Pro-Housing Attitudes Index

4.2.2 Regression Results

A first look at the experimental effects ignores all conditioning variables. The results of a regression of pro-housing attitudes on the three experimental treatments, with the control prompt as baseline, are in Table 8. The results differ between weighted and unweighted observations. Once weighting is introduced, standard errors rise and coefficient estimates fall slightly. Again, the purpose of weighting is to try to generalize from the sample to the population of interest, New Hampshire adults. The sample average treatment effects of both the Property Rights and Fairness prompts are positive and nontrivial, suggesting that exposure to one of these vignettes increases expressed pro-housing attitudes by about a third of a standard deviation. The effect of exposure to the Economic Expertise paragraph is estimated to be around zero and is certainly not large.

We now turn to the full results with conditioning variables, political disengagement and measures of partisanship and ideology. (Again, these are pretreatment conditioners because they were captured at the beginning of the survey.) Table 9 shows the results of four models, the unweighted and weighted versions of the models with conditioning by partisanship and by ideological self-description, in turn. In the weighted models only, political disengagement, as captured

| | (1) | (2) |
	Unweighted	Weighted
Economic expertise	-0.0329 (0.192)	-0.232 (0.273)
Property rights	0.363** (0.166)	0.260 (0.240)
Fairness	0.419** (0.169)	0.363 (0.248)
Constant	-0.194 (0.130)	0.161 (0.197)
Observations	505	505

Robust standard errors in parentheses

Dependent variable - index of pro-housing attitudes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Preview of Messaging Experiment Results

by lack of voter registration and "don't know" responses to partisanship and ideology questions, does reduce (or indeed eliminate) sensitivity to the Property Rights and Fairness prompts. The standalone coefficients on the experimental prompts in these models represent, by turns, the effects of these prompts on the attitudes of moderate and independent registered voters, because these models also include interactions for other ideological and partisan groups, respectively, which would equal zero when and only when a respondent is a moderate or an independent. We see then that the Property Rights treatment makes moderate and independent voters in the sample, and possibly in the population, more pro-housing, while the Economic Expertise treatment might actually make them less pro-housing (not statistically significant). Liberals and Democrats are more sensitive to both the Economic Expertise and Fairness prompts than moderates and independents. To gauge the *total* impact of each prompt on liberals and Democrats, however, we need to add together the coefficients on *Economic expertise* or *Fairness* and, respectively, *Economic*Liberal* or *Fairness*Liberal* and *Economic*Democrat* and *Fairness*Democrat.* Once we do this (Table 10), we see that Fairness has a statistically significant from zero, positive impact on the pro-housing attitudes of liberals and Democrats, Economic Expertise also may work on liberals (unweighted model only), and Property Rights may also work on Democrats (unweighted model only). Moreover, in the unweighted estimates only, the sum of the coefficients on *Fairness* and *Fairness*Conservative* is statistically significant from zero and positive, suggesting that the fairness prompt also makes conservatives and libertarians in the sample more pro-housing, even though we cannot be confident that conservatives and libertarians are more sensitive to the Fairness message than moderates are. Finally, there is uncertain evidence of a substantively large backlash effect against Economic Expertise among Republicans.

	(1) Unweighted	(2) Unweighted	(3) Weighted	(4) Weighted
Economic expertise	-0.309 (0.258)	-0.447 (0.392)	-0.523 (0.339)	-0.421 (0.404)
Property rights	0.444** (0.206)	0.581** (0.238)	0.425 (0.296)	0.495 (0.305)
Fairness	0.0802 (0.228)	0.0587 (0.318)	0.249 (0.387)	0.0727 (0.450)
Economic*Disengagement	0.290 (0.281)	0.318 (0.278)	0.474 (0.328)	0.400 (0.298)
Property*Disengagement	-0.0720 (0.211)	-0.136 (0.207)	-0.496* (0.268)	-0.540** (0.262)
Fairness*Disengagement	-0.0957 (0.171)	-0.123 (0.192)	-0.616* (0.333)	-0.551* (0.289)
Economic*Conservative	-0.100 (0.425)		0.0438 (0.507)	
Property*Conservative	-0.222 (0.263)		-0.340 (0.263)	
Fairness*Conservative	0.396 (0.244)		0.161 (0.358)	
Economic*Liberal	0.845*** (0.278)		0.897** (0.367)	
Property*Liberal	-0.0469 (0.313)		-0.0841 (0.390)	
Fairness*Liberal	1.042*** (0.261)		0.628 (0.413)	
Economic*Democrat		0.799** (0.387)		0.531 (0.421)
Property*Democrat		-0.157 (0.245)		-0.0949 (0.299)
Fairness*Democrat		0.788*** (0.303)		0.795* (0.439)
Economic*Republican		-0.106 (0.424)		-0.205 (0.454)
Property*Republican		-0.378 (0.277)		-0.368 (0.348)
Fairness*Republican		0.130 (0.330)		0.0471 (0.413)
Constant	-0.194 (0.131)	-0.194 (0.131)	0.161 (0.199)	0.161 (0.199)
Observations	505	505	505	505

Robust standard errors in parentheses

Dependent variable - index of pro-housing attitudes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Full Messaging Experiment Results

	Economic Expertise		Property Rights		Fairness	
	Unwgtd.	Wgtd.	Unwgtd.	Wgtd.	Unwgtd.	Wgtd.
Conservatives	-0.41	-0.48	0.22	0.08	0.48	0.41
	(0.41)	(0.49)	(0.27)	(0.26)	(0.23)	(0.27)
Liberals	0.54	0.37	0.40	0.34	1.12	0.88
	(0.23)	(0.32)	(0.29)	(0.38)	(0.23)	(0.33)
Republicans	-0.55	-0.63	0.20	0.13	0.19	0.12
	(0.31)	(0.38)	(0.25)	(0.34)	(0.23)	(0.26)
Democrats	0.35	0.11	0.42	0.40	0.85	0.87
	(0.23)	(0.32)	(0.21)	(0.29)	(0.20)	(0.30)

Robust standard errors in parentheses

Table 10: Total Effects by Party and Ideology: Tests of Summed Coefficients

4.2.3 Weighted or Unweighted?

The results of the messaging experiments differ between unweighted and weighted estimates, with the latter generally being null due to higher standard errors and slightly smaller coefficient estimates. Which results can we trust more, the weighted or unweighted? If the respondents are in fact representative of New Hampshire public opinion on housing issues, then the unweighted estimates are more efficient and are valid for the purpose of inference to New Hampshire adults.

Fortunately, we have an opportunity to compare our survey respondents directly to a random sample of New Hampshire registered voters on housing policy opinion. A recent statewide poll included three questions identical or nearly identical to the ones we used in our survey (Saint Anselm College 2020). We can compare the results for New Hampshire registered voters in general to registered voters in our survey who received the control prompt to see whether the latter are "similar enough" to the former to give us reasonable confidence that the results on our survey respondents generalize to New Hampshire adults.

Table 11 shows how New Hampshire registered voters in the poll and New Hampshire registered voters who received the control prompt in our survey answered the three questions that are very similar. There are 99 registered voters in our survey who received the control prompt and correctly answered the attention question, making for a survey margin of error of 10% (95% confidence level).

Despite slightly different wording, the respondents to our survey who were registered voters and received the control prompt answered these housing policy questions similarly to respondents to a random poll of New Hampshire registered voters. None of the agree-disagree percentages lie outside the margin of error. The only response category to any of these questions that does lie outside the margin of error is the "neither agree nor disagree" option to the "prevent development" question, chosen by 37% of the control-prompt registered voters in our survey and only 20% of the registered voters in the statewide poll. More importantly,

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Question	Random Sample % agree % disagree	This Survey % agree % disagree
"New Hampshire towns and cities should relax their planning and zoning regulations in order to allow more housing to be built." (poll) vs. "New Hampshire should reduce planning and zoning regulations in order to allow more housing to be built." (this survey)	29% 42%	36% 38%
"New Hampshire communities should do more to prevent development and keep the state the way it is." (poll) vs. "New Hampshire should do more to prevent development and keep the state the way it is." (this survey)	31% 46%	21% 41%
"The New Hampshire legislature should set a hard limit on how long planning and zoning boards can take to review permits to build housing." (poll) vs. "The state of New Hampshire should set a hard limit on how long local planning and zoning boards can hold up a permit to build housing." (this survey)	58% 18%	49% 18%

Table 11: Representativeness of Survey Respondents

our respondents do not seem to be consistently more pro- or anti-housing than the population to which we wish to generalize. These considerations give us some confidence that the unweighted estimates represent not just sample average treatment effects, but population average treatment effects.

4.2.4 Individual Questions

As a further investigation of the messaging experiment results, we drilled down on treatment effects on individual questions, not just the latent component of pro-housing attitudes. (Results are in the appendix. This part of the analysis was not preregistered, because in advance of the analysis we did not have any expectations that the experimental frames would have stronger or weaker effects on responses to certain questions.) When we do this, we see that not just moderates and independents, but conservatives and Republicans as well, respond to the Property Rights treatment on the "reduce planning and zoning regulation" question, while liberals and Democrats do not. Conservatives, liberals, and Democrats (but not Republicans) strongly respond to the Fairness treatment on this question as well.

On the "more affordable housing in my community" question, only the Fairness treatment worked, and only on liberals and Democrats, suggesting perhaps that many respondents see "affordable housing" as a subsidy rather than a regulation issue. Meanwhile, the Economic Expertise prompt generated a large backlash effect among moderates, independents, conservatives, and Republicans *against* affordable housing. This was the only question on which any of the treatments seemed to generate a substantively and statistically significant backlash effect against pro-housing policies.

On the "prevent development to keep the state the way it is," very little had an effect, except that the Fairness prompt made liberals and independents (but not Democrats) less likely to favor stopping development.

Finally, on the question of whether the state should set a hard limit on local building permit review time, the Property Rights prompt caused conservatives and Republicans to favor the policy, while liberals, Democrats, moderates, and independents were essentially immovable.

In conclusion, the biggest effects of messaging were found on the question of reducing land-use regulation, which was addressed explicitly in the vignettes, and on this question the expected relationships with conservatives/Republicans and Property Rights and liberals/Democrats and Fairness were found. In retrospect, it is logical that the experimental frames that explicitly addressed land-use regulation would have their biggest impact on the question that was explicitly about land-use regulation.

5 Discussion and Policy Implications

5.1 Effects of Housing Development Characteristics on Respondent Preference

We hypothesized that we would see NIMBY attitudes among New Hampshire respondents asked to select and rate hypothetical housing developments in their own neighborhoods, and we expected that these attitudes would be more intense among homeowners. These attitudes would be reflected in preferring single-family houses to condominiums to apartments, in preferring smaller developments, in preferring tear-downs to new builds, in dispreferring city-provided infrastructure, in preferring age-restricted housing, and in preferring luxury units and dispreferring low-income units.

In fact, we found more widely spread YIMBY attitudes than we expected, but only among renters. Respondents in general did prefer single-family houses, smaller developments, and developer-provided infrastructure, but they also preferred new builds to tear-downs, no age restriction, and developments with low-income units. Once we drilled down on homeowners and non-homeowners, however, we found that only homeowners preferred single-family homes and dispreferred large developments. Meanwhile, only non-homeowners preferred new builds and inclusion of low-income units. There is less robust evidence that both groups like mixed-use developments. Both groups also tended to disprefer seniors-only developments.

In general, then, homeowners are expectedly more NIMBY than those who do not own their home. The result on new builds and its interaction with non-homeowner status suggests that non-homeowners may worry about gentrification and displacement with redevelopment projects. The genuinely surprising result is that homeowners and non-homeowners agree in preferring non-age-restricted to seniors-only developments. This suggests that fiscal zoning considerations were not foremost in the minds of respondents, as it is generally thought that seniors-only developments add to the tax base without incurring a substantial fiscal cost from schoolchildren.

Overall, the results suggest that to gain the support of influential homeowners in a neighborhood, developers should try to build fewer, single-family homes. Unfortunately, this advice does not do anything to solve the affordable housing shortage or afford developers a clear strategy for building cost-effectively at scale. The more useful implication, then, from this research is that developers should try to engage non-homeowners in any community outreach strategy involving larger, condo- or apartment-based developments. Moreover, planning boards that are trying to tread carefully around NIMBY opposition should think carefully about offering incentives to age-restricted developments, which our evidence suggests do not garner much more, if any, support. There is also some evidence that using impact fees or other strategies to make developments "pay their own way" for infrastructure could increase community support.

5.2 Effects of Messaging on Housing Policy Attitudes

Turning now to housing policy, we hypothesized that all of the treatment messages would make respondents more pro-housing than the control prompt describing form-based zoning. That expectation was incorrect about the Economic Expertise frame, which had no statistically significant effects on any partisan or ideological group – and the coefficient estimates on the variable were consistent with substantively large backlash effects among moderates, independents, Republicans, and conservatives. The Property Rights and Fairness frames did work on respondents in general, but unexpectedly, conservatives and Republicans were not more sensitive to the Property Rights frame for general pro-housing attitudes. In fact, moderates and independents were most likely to respond to the Property Rights treatment. As we expected, liberals or progressives and Democrats were most likely to respond to the Fairness treatment, and it had a substantively very large effect on them. However, other ideological and partisan groups also responded positively to the Fairness treatment.

Future research could investigate why Economic Expertise did not have the hypothesized effects, and why conservatives do not respond as expected to the Property Rights message on two or three of the policy questions. In drilling down to individual questions, we found that conservatives and Republicans were especially sensitive to the Property Rights message on explicitly regulatory questions, but not on questions of supporting affordable housing in their own communities or preventing development to keep the state the way it is.

When it comes to Economic Expertise, a number of possible explanations are in order. Marble & Nall (2020) find that self-interest is a stronger indicator of homeowner views toward housing development than ideological commitment. The economic prompt may be encouraging respondents to think about the direct economic self-interest of lower housing values due to increased development, instead of any potential positive impact due to economic growth.[5] Respondents could also simply value economic growth less than expected. Perhaps they understand that economic growth comes with population growth in the region, which they disvalue. Finally, some respondents could simply be skeptical of expertise or believe that the studies mentioned were cherry-picked in some way.

6   Conclusion

Can framing effects play a role in solving the housing shortage in coastal markets in the U.S.? The evidence suggests that they can.

First, we find definite evidence of NIMBYism among homeowners when it comes to evaluating hypothetical housing developments in their own neighborhood, as they tend to oppose apartments and condominiums and large developments in general. However, non-homeowners have actively YIMBY attitudes, except when it comes to redevelopments, which they tend to oppose.

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[5]We are indebted to a comment by Michael Hankinson on this point.

Fiscal zoning concerns in general mattered less than we supposed, though respondents tended not to like tax-funded infrastructure upgrades. It is difficult for developers to appeal to incumbent homeowners with the kinds of developments that are the most cost-effective and profitable.

However, we also see evidence that respondents can be swayed by pro-housing messaging to support policies that make building homes easier. Fairness and property rights messages seem to appeal to all ideological and partisan camps, or at least not to actively offend any of them. Appealing to economic expertise, by contrast, looks risky. The fact that certain messages worked much more effectively in getting respondents to favor changes to land-use ordinances than in getting them to support more affordable housing or oppose "preventing development" reinforces that voters tend not to see the connections between land-use regulation, housing supply, and housing affordability. Indeed, drawing those links explicitly for them might even be counterproductive.

In general, the more housing advocates can do to pinpoint particular groups disadvantaged or harmed by restrictions on home-building – less well-off families seeking good education for their children, landowners seeking to subdivide and sell their own land – the more voters seem to respond. Perhaps arguments about solving big social problems using economic logic and statistics are simply too dry and abstract to move hearts and minds in the desired direction.

7   Acknowledgments

References

Bechtel, Michael M. & Kenneth F. Scheve. 2013. "Mass Support for Global Climate Agreements Depends on Institutional Design." *Proceedings of the National Academy of Sciences of the United States of America* 110(34):13763–13768.

Carlson, Elizabeth. 2015. "Ethnic Voting and Accountability in Africa: A Choice Experiment in Uganda." *World Politics* 67(2):353–385.

Caruso, Eugene M., Dobromir A. Rahnev & Mahzarin R. Banaji. 2009. "Using Conjoint Analysis to Detect Discrimination: Revealing Covert Preferences from Overt Choices." *Social Cognition* 27(1):128–137.

Centiment: Consumer Research Through Online Surveys. N.d. `https://www.centiment.co`, accessed April 28, 2020.

Cox, Wendell & Hugh Pavletich. 2020. "16th Annual Demographia International Housing Affordability Survey: Rating Middle-Income Housing Affordability.". https://apo.org.au/node/72427.

Diamond, Rebecca & Tim McQuade. 2019. "Who Wants Affordable Housing in Their Backyard? An Equilibrium Analysis of Low-Income Property Development." *Journal of Political Economy* 127(3):1063–1117.

Duranton, Gilles & Diego Puga. 2019. "Urban Growth and Its Aggregate Implications." NBER Working Paper 26591, http://www.nber.org/papers/w26591.

Einstein, Katherine Levine, David M. Glick & Maxwell Palmer. 2019. *Neighborhood Defenders: Participatory Politics and America's Housing Crisis.* New York: Cambridge University Press.

Fischel, William A. 1981. "Is Local Government Structure in Large Urbanized Areas Monopolistic or Competitive?" *National Tax Journal* 34(1):95–104.

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

Franco, Annie, Neil Malhotra, Gabor Simonovits & L.J. Zigerell. 2017. "Developing Standards for Post-Hoc Weighting in Population-Based Survey Experiments." *Journal of Experimental Political Science* 4:161–172.

Ganong, Peter & Daniel Shoag. 2017. "Why Has Regional Income Convergence in the U.S. Declined?" *Journal of Urban Economics* 102(1):76–90.

Glaeser, Edward & Joseph Gyourko. 2018. "The Economic Implications of Housing Supply." *Journal of Economic Perspectives* 32(1):3–30.

Glaeser, Edward L & Bryce A Ward. 2009. "The causes and consequences of land use regulation: Evidence from Greater Boston." *Journal of Urban Economics* 65:265–278.

Glaeser, Edward L., Joseph Gyourko & Raven E. Saks. 2006. "Urban Growth and Housing Supply." *Journal of Economic Geography* 6:71–89.

Glaeser, Edward L. & Kristina Tobio. 2007. "The Rise of the Sunbelt." Harvard Institute of Economic Research, Discussion Paper No. 2135.

Goetz, Edward G. 2008. "Words matter: The importance of issue framing and the case of affordable housing." *Journal of the American Planning Association* 74(2):222–229.

Graham, Jesse, Jonathan Haidt & Brian A. Nosek. 2009. "Liberals and Conservatives Rely on Different Sets of Moral Foundations." *Journal of Personality and Social Psychology* 96(5):1029–1046.

Gyourko, Joseph, Albert Saiz & Anita Summers. 2008. "A New Measure of the Local Regulatory Environment for Housing Markets: The Wharton Residential Land-Use Regulatory Index." *Urban Studies* 45(3):693–729.

Gyourko, Joseph & Raven Molloy. 2014. "Regulation and Housing Supply." July 18, Wharton School & Federal Reserve Board of Governors.

Gyourko, Joseph & Raven Molloy. 2015. Regulation and Housing Supply. In *Handbook of Regional and Urban Economics.* Vol. 5 Elsevier pp. 1289–1337.

Hainmueller, Jens & Daniel J. Hopkins. 2015. "The Hidden American Immigration Consensus: A Conjoint Analysis of Attitudes Toward Immigrants." *American Journal of Political Science* 59(3):529–548.

Hainmueller, Jens, Daniel J. Hopkins & Teppei Yamamoto. 2014. "Causal Inference in Conjoint Analysis: Understanding Multidimensional Choices via Stated Preference Experiments." *Political Analysis* 22(1):1–30.

Hamilton, Bruce W. 1975. "Zoning and Property Taxation in a System of Local Governments." *Urban Studies* 12:205–211.

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

Horiuchi, Yusaku, Daniel M. Smith & Teppei Yamamoto. 2020. "Identifying Voter Preferences for Politicians' Personal Attributes: A Conjoint Experiment in Japan." *Political Science Research and Methods* 8(1):75–91.

Hsieh, Chang-Tai & Enrico Moretti. 2015. "Why Do Cities Matter? Local Growth and Aggregate Growth." University of Chicago, April.

Malpezzi, Stephen. 1996. "Housing Prices, Externalities, and Regulation in U.S. Metropolitan Areas." *Journal of Housing Research* 7(2):209–241.

Malpezzi, Stephen & Richard K Green. 1996. "What has Happened to the Bottom of the US Housing Market?" *Urban Studies* 33(10):1807–1820.

Marble, William & Clayton Nall. 2020. "Where Self-Interest Trumps Ideology: Liberal Homeowners and Local Opposition to Housing Development." Forthcoming, The Journal of Politics.

Metcalf, Gabriel. 2018. "Sand Castles Before the Tide? Affordable Housing in Expensive Cities." *Journal of Economic Perspectives* 32(1):59–80.

Molloy, Raven. 2020. "The Effect of Housing Supply Regulation on Housing Affordability: A Review." *Regional Science and Urban Economics* 80.

Mullinix, Kevin J., Thomas J. Leeper, James N. Druckman & Jeremy Freese. 2015. "The Generalizability of Survey Experiments." *Journal of Experimental Political Science* 2(2):109–138.

Mutz, Diana C. 2011. *Population-Based Survey Experiments.* Princeton, N.J.: Princeton University Press.

Saint Anselm College. 2020. "Saint Anselm Center for Ethics Releases First NH Housing Poll.". `https://www.anselm.edu/ethics-governance/blog/saint-anselm-center-ethics-releases-first-nh-housing-poll`, accessed June 10, 2020.

Saiz, Albert. 2010. "The Geographic Determinants of Housing Supply." *Quarterly Journal of Economics* 125(3):1253–1296.

Saks, Raven E. 2008. "Job Creation and Housing Construction: Constraints on Metropolitan Area Employment Growth." *Journal of Urban Economics* 64:178–195.

Scally, Corianne Payton. 2013. "The nuances of NIMBY: Context and perceptions of affordable rental housing development." *Urban Affairs Review* 49(5):718–747.

Scally, Corianne Payton & Richard Koenig. 2012. "Beyond NIMBY and poverty deconcentration: Reframing the outcomes of affordable rental housing development." *Housing Policy Debate* 22(3):435–461.

Sen, Maya. 2017. "How Political Signals Affect Public Support for Judicial Nominations: Evidence from a Conjoint Experiment." *Political Research Quarterly* 70(2):374–393.

Skurka, Chris, Liana B. Winett, Hannah Jarman-Miller & Jeff Niederdeppe. 2019. "All Things Being Equal: Distinguishing Proportionality and Equity in Moral Reasoning." *Social Psychological and Personality Science* 11(3):374–387.

Sorens, Jason. 2020. "Residential Building Regulations in New Hampshire: Causes and Consequences." Forthcoming, Josiah Bartlett Center for Public Policy.

Tighe, J Rosie. 2010. "Public Opinion and Affordable Housing: A Review of the Literature." *Journal of Planning Literature* 25(1):3–17.

Winship, Christopher & Larry Radbill. 1994. "Sampling Weights and Regression Analysis." *Sociological Methods and Research* 23(2):230–257.

8 Appendix

Table 12: Messaging Effects: Individual Questions; By Ideology

	(1) Reduce reg	(2) Affordable	(3) Prevent dev	(4) Hard limit
Economic expertise	-0.0723 (0.187)	-0.359* (0.189)	0.121 (0.176)	-0.0421 (0.186)
Property rights	0.439** (0.175)	0.108 (0.151)	-0.182 (0.159)	0.245 (0.154)
Fairness	0.0714 (0.187)	0.0283 (0.176)	-0.0745 (0.179)	-0.0668 (0.176)
Economic*Disengagement	0.365* (0.202)	0.0925 (0.213)	-0.000370 (0.194)	0.196 (0.172)
Property*Disengagement	-0.0242 (0.183)	-0.0604 (0.147)	0.0111 (0.178)	-0.0982 (0.122)
Fairness*Disengagement	0.0490 (0.148)	-0.0287 (0.147)	0.144 (0.149)	-0.152 (0.149)
Economic*Conservative	0.148 (0.298)	-0.253 (0.322)	0.0606 (0.298)	-0.0494 (0.282)
Property*Conservative	0.158 (0.218)	-0.251 (0.194)	0.394* (0.230)	0.185 (0.183)
Fairness*Conservative	0.528*** (0.193)	-0.0747 (0.197)	-0.294 (0.188)	-0.0282 (0.207)
Economic*Liberal	0.470** (0.232)	0.586*** (0.206)	-0.456** (0.200)	0.136 (0.227)
Property*Liberal	-0.0217 (0.282)	0.108 (0.216)	0.184 (0.259)	0.0118 (0.223)
Fairness*Liberal	0.706*** (0.222)	0.700*** (0.168)	-0.480** (0.235)	0.0970 (0.208)
Constant	-0.0579 (0.0993)	0.826*** (0.102)	-0.182* (0.0962)	0.397*** (0.0890)
Observations	505	505	505	505

Robust standard errors in parentheses. Dependent variable: Likert scale. Unweighted observations.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Messaging Effects: Individual Questions; By Partisanship

	(1)	(2)	(3)	(4)
	Reduce reg	Affordable	Prevent dev	Hard limit
Economic expertise	-0.124 (0.314)	-0.714** (0.283)	0.0523 (0.262)	0.201 (0.249)
Property rights	0.551** (0.214)	0.285* (0.170)	-0.205 (0.191)	0.0801 (0.220)
Fairness	-0.0778 (0.256)	-0.181 (0.272)	-0.446* (0.266)	-0.169 (0.277)
Economic*Disengagement	0.364* (0.207)	0.175 (0.200)	0.0190 (0.199)	0.166 (0.169)
Property*Disengagement	-0.0526 (0.179)	-0.152 (0.159)	0.0365 (0.181)	-0.0233 (0.134)
Fairness*Disengagement	0.0876 (0.151)	0.0305 (0.164)	0.313* (0.165)	-0.113 (0.153)
Economic*Democrat	0.374 (0.308)	0.894*** (0.275)	-0.237 (0.265)	-0.0985 (0.253)
Property*Democrat	-0.168 (0.229)	-0.116 (0.178)	0.0642 (0.214)	0.158 (0.213)
Fairness*Democrat	0.748*** (0.252)	0.743*** (0.256)	0.137 (0.262)	0.217 (0.269)
Economic*Republican	0.0974 (0.321)	0.0735 (0.317)	0.195 (0.281)	-0.480* (0.277)
Property*Republican	-0.0211 (0.241)	-0.452** (0.197)	0.381* (0.221)	0.405* (0.228)
Fairness*Republican	0.399 (0.261)	0.000653 (0.280)	0.178 (0.265)	0.0246 (0.281)
Constant	-0.0579 (0.0993)	0.826*** (0.102)	-0.182* (0.0962)	0.397*** (0.0890)
Observations	505	505	505	505

Robust standard errors in parentheses. Dependent variable: Likert scale. Unweighted observations.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Heckman Selection Models

	(1) Ideology	(2) Partisanship
Main Equation		
Economic expertise	-0.263 (0.254)	-0.379 (0.378)
Property rights	0.497** (0.207)	0.637*** (0.235)
Fairness	0.123 (0.225)	0.0970 (0.305)
Economic*Disengagement	0.238 (0.267)	0.267 (0.269)
Property*Disengagement	-0.140 (0.214)	-0.204 (0.209)
Fairness*Disengagement	-0.160 (0.173)	-0.184 (0.192)
Economic*Conservative	-0.157 (0.416)	
Property*Conservative	-0.225 (0.260)	
Fairness*Conservative	0.380 (0.241)	
Economic*Liberal	0.835*** (0.272)	
Property*Liberal	-0.0945 (0.311)	
Fairness*Liberal	1.036*** (0.252)	
Economic*Democrat		0.764** (0.372)
Property*Democrat		-0.164 (0.240)
Fairness*Democrat		0.790*** (0.290)
Economic*Republican		-0.159 (0.410)
Property*Republican		-0.406 (0.273)
Fairness*Republican		0.121 (0.316)
Constant	-0.525*** (0.157)	-0.527*** (0.157)
Selection Model		
Political Disengagement	0.0272 (0.104)	0.0297 (0.104)
High school grad	-0.403*** (0.114)	-0.394*** (0.115)
Less than high school	-0.683*** (0.241)	-0.692*** (0.239)
Income under $20,000	-0.161 (0.159)	-0.172 (0.158)
Homeowner	0.333** (0.139)	0.334** (0.140)
Age	0.0268 (0.0517)	0.0336 (0.0519)
Constant	0.274 (0.237)	0.254 (0.241)
$\arctan \rho$	0.631*** (0.125)	0.635*** (0.126)
$\ln \sigma$	0.350*** (0.0461)	0.349*** (0.0462)
Observations	670	670

Robust standard errors in parentheses

Dependent variable - index of pro-housing attitudes

Unweighted observations

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$