Paying Your Fair Share

Perceived Fairness and Tax Compliance

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Abstract

We provide evidence on the role of fairness for tax compliance: households are willing to pay more in taxes if they believe that other households are contributing their fair share. We conducted an information-disclosure natural field experiment in the context of property taxes in the United States. We induced exogenous shocks to households' perceptions about the average tax rate paid by other households. We find that a higher perceived average tax rate decreases the probability of filing a tax appeal. Translating our estimates into a money metric, we find that for each additional $1 contributed by the average household, a taxpayer is willing to pay an extra $0.43 in his or her own taxes.

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*This Draft: May 22, 2024. Nathan: brad.nathan@business.rutgers.edu. Perez-Truglia: ricardotruglia@berkeley.edu. Zentner: azentner@utdallas.edu. Part of this paper belonged to a longer paper that included analyses from other treatment arms, and which was first posted on September 2020 as NBER Working Paper No. 27816. Since the paper became too long, the original paper was split into this paper and Nathan et al. (2023). We are thankful for excellent comments from Raj Chetty, Julio Elias, Austan Goolsbee, Justin Holz, Steve Levitt, John List, Erzo Luttmer, James Poterba, Sutirtha Bagchi and seminar participants at the NBER-Public Economics, Stanford University, University of Chicago, Yale University, Universidad de San Andres, the American Economic Association, NTA, ZEW, Journees LAGV, LMU, RIDGE, and AEI. We will make all the code and data publicly available. This project was reviewed and approved in advance by the Institutional Review Board at The University of Texas at Dallas. The experiments were registered in the AEA RCT Registry (#0005992). The original pre-registration was posted on May 24, 2020. However, after receiving interview requests from the media, we removed the pre-registration (we were concerned that the media would divulge the hypotheses listed in the pre-registration and thus contaminate the study). We re-posted the pre-registration on June 16, 2020, after the deadline to file an appeal had passed (and before the data to conduct the analysis became available). Adrian Cadena Medina, Luisa Cefala, Dongwook Chun, Karl Dill, Santiago De Martini, and Xinmei Yang provided superb research assistance.

1 Introduction

Why do individuals and firms pay their taxes? One natural explanation is that the decision to pay taxes is the result of self-interest: subjects conduct rational cost-benefit calculations. For example, taxpayers can weigh the savings from under-reporting income against the expected punishment if caught cheating (Becker, 1968; Allingham and Sandmo, 1972). Beyond self-interest, individuals may pay their taxes because they believe it is the fair thing to do.[1] This paper examines the role of fairness considerations in tax compliance. Specifically, we test the hypothesis that households are more willing to pay their taxes when they believe that other households are paying their fair share.

We designed and implemented a pre-registered, natural field experiment in the context of property taxes in the United States. This is an important context, as property taxes are a significant source of revenue for governments around the world. In 2018, property taxes were the second largest source of tax revenue in the United States, at an estimated $547 billion.[2] This setting offers several key advantages for studying fairness considerations as a driver of the decision to pay taxes. First, there is significant variation across households in effective property tax rates (hereafter, we use the term "tax rate" to refer to a household's effective tax rate, calculated as the total property tax amount divided by the home's market value). While the tax schedule is proportional to the home value, different districts have different tax rates, and there is a large number of exemptions and caps that make some households pay effective tax rates that are much lower or higher than the average. Second, many households have large misperceptions about whether their tax rate is below or above the average. These misperceptions allow us to induce exogenous information shocks through an information-disclosure experiment. Last, our setting allows us to study the willingness to pay taxes via revealed preferences even in a high enforcement context, via the decision to file

[1] This mechanism belongs to a set of motives referred to as "tax morale" (Luttmer and Singhal, 2014; Slemrod, 2019), which embraces a variety of non-deterrence motives such as altruism or civic duty.

[2] For reference, this is more than twice the revenue generated by the corporate income tax at about $230 billion, while the federal income tax generated $1.7 trillion (Tax Policy Center, 2021).

a tax appeal.[3]

To test our fairness hypothesis, an ideal experiment would be to randomize the average tax rate paid by others while holding constant the household's own tax rate. According to our fairness hypothesis, we would expect that, conditional on the household's own tax rate, a higher average tax rate would increase the household's willingness to pay taxes.[4] That is, while households would always have the temptation to free-ride on the taxes paid by others, they may feel a stronger moral obligation to pay their own taxes if they believe that other households are contributing their fair share.

However, the ideal experiment would not be feasible because randomizing tax rates would be impractical, potentially illegal, and possibly unethical. Our research design does the next best thing, by disclosing information aimed at inducing exogenous shocks to households' *perceptions* of the average tax rate. As part of the research design, we pre-registered a complementary survey experiment, with subjects recruited via an online platform (hereafter, we refer to this survey as the "Survey Experiment"). We elicit beliefs about the average tax rate both before and after we disclose information on the average tax rate. The main goal of this survey is to validate the design of our information-disclosure field experiment. We show that homeowners have large misperceptions about the average tax rate that other households pay, and that households update their priors when provided with accurate information.

In the field experiment, we provide misinformed households with accurate information on the average tax rate.[5] Specifically, we sent letters to a sample of homeowners in Dallas County and randomly varied whether the letters included information on the average tax rate or not. Because the information on property tax appeals is public, we can then observe in the administrative data how homeowners' behavior is affected in response to the treatment

[3] For other studies that leverage the context of property tax appeals, see Jones (2019), Nathan et al. (2023) and Giaccobasso et al. (2023). For more examples of studies in accounting and economics that use field experiments, see Floyd and List (2016).

[4] Our hypothesis is related to what in other settings has been called "reciprocal fairness" (Luttmer and Singhal, 2014) and also "conditional cooperation" (Fischbacher et al., 2001; Gachter, 2007).

[5] The field experiment included an additional treatment arm, designed to study the role of filing frictions, which is reported in a different paper (Nathan et al., 2023).

in the letter. Furthermore, we conducted a complementary field survey to which subjects could respond by visiting a URL contained in the letters (hereafter, the "Field Survey"). We leverage these survey data in multiple ways. For instance, we included a specific question to provide direct survey evidence on the "proportionality norm:" i.e., that most taxpayers prefer a proportional tax schedule.[6]

The field experiment took place in Dallas County, which is the second largest county in Texas with 2.6 million inhabitants, making it larger than 15 of the 50 U.S. states (U.S. Census Bureau, 2021). Property taxes work almost identically in all 241 counties in Texas and work similarly in other states and countries (Dobay et al., 2019; World Bank, 2019; Nathan et al., 2023). The average household in Dallas County pays about $5,916 in property taxes, which corresponds to an effective tax rate of 2.01% of its home value. This average tax rate masks substantial heterogeneity between households: for example, a household in the 10th percentile pays a tax rate of 1.33%, while a household in the 90th percentile pays a tax rate of 2.73%.[7]

The main outcome of interest is whether a household files a tax appeal. Filing an appeal is a consequential action that households can take to legally reduce their tax burden. The tax appeal process works as follows. Each year, the Dallas Central Appraisal District (DCAD) determines a proposed assessment of the market value of the property, which we refer to as the "proposed value." Property taxes are calculated based on this value. Given that the appraisal process involves significant ambiguity and subjectivity, households have the opportunity to contest the counties' assessed value of their homes by filing property tax appeals, also known as tax protests. Many households file tax appeals, which often result in a significant reduction in their tax burden. For example, in the control group of our experiment, 11.08% of the households filed an appeal.[8] Around 76.6% of these appeals resulted in a lower

[6] While some taxpayers prefer either progressive or regressive taxes in our context, the preference for tax progressivity may be stronger in other contexts, such as the income tax (e.g., Ballard-Rosa et al., 2017).

[7] This variability is driven by a number of factors, such as special exemptions, a homestead cap, and variation in tax rates across within-county geographical jurisdictions.

[8] Households in the control group are those who received a letter but for whom the letter did not include information on the proposed value and tax amount for the average household in Dallas County.

assessed value of the home. Among these successful appeals, tax savings were on average $446 in the first year alone.

We sent letters to a sample of 50,394 households. All letters included information on the household's own taxes. Furthermore, we randomly chose whether the letter also disclosed information on the taxes paid by the average household in the county. This additional information was provided to induce an information shock. We show that the information shocks do have a significant effect on real-world behavior and in the expected direction. When a household learns that the average tax rate is higher (lower) than it thought, that causes a reduction (increase) in the probability of filing a tax appeal as measured via the administrative records.

This intention-to-treat effect estimate that we find in the field experiment, however, suffers from severe attenuation bias due to multiple forms of non-compliance. For example, a large fraction of households may not have opened the letter or may not have paid close attention to the information contained in the letter. To address non-compliance, we leverage the responses from 1,888 subjects who participated in the Field Survey. We have strong confirmation that survey respondents paid close attention to the content of the letter, otherwise they could not have known about the personalized survey code needed to complete the survey. As expected, information shocks have substantially larger effects in the sample of survey respondents. In addition, we need to scale up the estimates, since typically subjects do not fully update their prior beliefs when provided with new information. Our specification that corrects for these two forms of non-compliance indicates that a 0.1 pp increase in the perceived average tax rate decreases the probability of an appeal by 2.75 pp.

Our interpretation is that the effects of the information shocks on tax appeals operate through the fairness channel. The Field Survey included a question on whether the respondent feels that his or her property taxes are fair. Using these data, we show that after households learn that the average tax rate is higher (lower) than they initially thought, they are more likely to perceive their own taxes as fairer (less fair). In addition, we show

that households who perceive their own taxes as fairer are less likely to protest. Last, we find evidence that our results are not driven by the information shock affecting households' monetary incentives.

We can translate our estimated fairness effect into a money metric. To do this, we take advantage of quasi-experimental evidence from Nathan et al. (2023), which estimates the effect of expected tax savings on the probability of filing a tax appeal. Our findings suggest that a 0.1 pp increase in the perceived average tax rate (equivalent to an increase of $295 in the average tax amount) increases a household's willingness to pay taxes by about $128. In other words, for each additional $1 contributed by the average household, a household, on average, is willing to pay an additional $0.43 in his or her own taxes. The magnitude of this effect is consistent with the results of laboratory experiments in the public goods game, according to which an additional $1 in average contributions increases the individual's own contribution by $0.45 (e.g., Fischbacher et al., 2001).

Our study contributes to the literature on tax morale (Luttmer and Singhal, 2014). The literature on accounting and economics has documented that taxpayer behavior aligns with the predictions of cost-benefit analysis, such as research showing that higher audit rates or harsher penalties reduce evasion (Hoopes, Robinson, and Slemrod, 2018; Baugh, Ben-David, and Park, 2018; Belnap, Welsch, and Williams, 2023).[9] However, there is limited compelling evidence to support the role of tax morale (Slemrod, 2019; Giaccobasso et al., 2023).[10] There are a few exceptions. Most related to our experiment, Hallsworth et al. (2017), Del Carpio (2022), and Tanner and Manwaring (2023) provide evidence suggesting that providing information on descriptive norms (e.g., a message that "9 out of 10 households pay their taxes on time") can reduce late payments and tax delinquency. We contribute to this literature by providing novel evidence on the role of fairness concerns in tax compliance.

[9] More broadly, this study is related to an accounting literature on tax planning decisions (Hanlon et al., 2022).

[10] For example, Antinyan and Asatryan (2019) compared the role of institutions and tax morale using a meta-analysis of approximately 1,000 treatment effects from 45 randomized control trials. They conclude that "interventions pointing to elements of individual tax morale (...) are on average ineffective in curbing tax evasion, while deterrence nudges (...) are potent catalysts of compliance."

In addition, we are the first to document evidence on a "proportionality norm." Our findings are also consistent with, and complementary to, evidence on other normative considerations such as benefit-based taxation or tax-public goods reciprocity (Giaccobasso et al., 2023; Chow et al., 2023).[11]

Our study also contributes to the broader literature on the role of fairness considerations for economic decision-making (see e.g., Andreoni, 1995; Fehr and Schmidt, 1999; Fehr and Schurtenberger, 2018).[12] In the context of laboratory games, multiple studies document conditional cooperation: i.e., despite individuals' incentives to free-ride and the absence of apparent private benefits from cooperation, individuals want to contribute more to public goods when they believe others are contributing too (Andreoni, 1995; Fehr and Schmidt, 1999; Gachter, 2007; Cappelen et al., 2013; Fehr and Schurtenberger, 2018). There is also survey evidence that fairness considerations may play an important role in stated preferences for redistribution (e.g., Alesina and Angeletos, 2005; Kuziemko et al., 2015; Hvidberg et al., 2020). We contribute to this literature by providing evidence that fairness considerations are significant in the natural, real-world context of property taxes and based on revealed preferences with high-stakes behavior. We find evidence that fairness plays a role in households' tax compliance. Moreover, we provide a measurement of fairness concerns using a money metric.

Lastly, our study also contributes to a small but growing literature on normative considerations in taxation. Although normative considerations played a key role among the first tax theorists (e.g., Seligman, 1908; Musgrave, 1959), the modern literature has largely ignored normative considerations to focus solely on efficiency (Weinzierl, 2018; Scherf and Weinzierl, 2020). More recently, some studies have tried to incorporate normative consider-

[11] Giaccobasso et al. (2023) use experimental data to show that households are more willing to pay property taxes if they perceive that the government uses their tax dollars to provide government services that benefit them. Furthermore, using data from companies' 10-K statements, Chow, Fan, Huang, Li, and Li (2023) demonstrate companies' tax planning is negatively related to the amount of ground-level ozone pollution, suggesting a tax-public goods reciprocity between firms and the government.

[12] Anthropologists often consider fairness, cooperation, and reciprocity as features that are present among all people, or "human universals" (Brown, 1991).

ations into the design of tax policy (Mankiw and Weinzierl, 2010; Weinzierl, 2014; Saez and Stantcheva, 2016; Weinzierl, 2017). The existing studies are mostly theoretical, and empirical evidence is limited to survey data, for example, on stated preferences over hypothetical tax policies. We fill this gap in the literature by providing evidence of normative considerations via revealed-preferences and in a natural, high-stakes context.

The remainder of the paper proceeds as follows. Section 2 presents the Survey Experiment. Section 3 discusses the design of the field experiment, while Section 4 presents its results. The last section concludes.

2 Survey Experiment

In this section, we discuss the complementary Survey Experiment, which we created to validate the design of the information-disclosure mailing intervention and the econometric model that we use in the field experiment. Specifically, we use the Survey Experiment to measure misperceptions about the average tax rate and study how subjects update their beliefs when provided with accurate information.

2.1 Survey Design

The full survey instrument used in the Survey Experiment is provided in Appendix G. We first elicit prior beliefs about the market value and property taxes of the average home in subjects' county of residence in 2018. Then we inform all subjects that they will be randomly selected to receive or not receive accurate feedback about these variables. Next, we share the feedback with those randomly selected to receive the feedback (i.e., treatment group) and we do not share this information with the rest of the subjects (control group). Finally, we elicit posterior beliefs about both variables from the treatment and control groups. To avoid asking the same question twice, and following the design from other information-disclosure experiments (e.g., Cavallo et al. (2017)), we elicit posterior beliefs and prior beliefs using

slightly different questions: we elicit priors about 2020 and posteriors about 2021.[13]

2.2 Implementation

We conducted the Survey Experiment on around the same dates as the field experiment, from June 5th to June 15th, 2020. We pre-registered this complementary survey as part of the same AEA RCT registration as the field experiment. We recruited participants on Amazon Mechanical Turk, following the best practices for recruiting individuals from online platforms.[14] We restricted participation in the Survey Experiment to respondents located within the United States. In the survey announcement, we explicitly noted that the survey was restricted to homeowners. Furthermore, we included screening questions at the beginning of the survey.[15]

We collected responses from 2,065 U.S. homeowners. The median respondent took about 7 minutes to complete the survey. At the end of the survey, we included an attention check, as used in previous studies (e.g., Bottan and Perez-Truglia (2022, 2020)). A total of 99% of the respondents passed the attention check. According to their self-reports, the respondents did not find the survey difficult: 87% said that it was "easy to understand", 12% said that it was "neither easy nor difficult," and the remaining 1% found it "difficult to understand."

[13] We also include other questions in the Survey Experiment to evaluate norms about the fair distribution of taxes and to obtain information on subjects' characteristics.

[14] We created a restriction so that each Mturk worker ID could only complete the survey once. We filter out respondents who did not complete the entire survey. To address potential concerns with outliers, we followed the standard practice of filtering out the upper and lower 0.1 percentiles in prior beliefs as well as winsorizing the upper and lower 0.1 percentiles in posterior beliefs (Fuster et al., 2022).

[15] Using these filters, we exclude respondents who are not homeowners, respondents under the age of 18 and respondents who live with their parents. For these respondents, as well as those who lived in counties for which we did not have data from the American Community Survey (ACS), the survey ended immediately after the screening questions. Respondents who passed these filters were allowed to continue with the rest of the survey.

2.3 Misperceptions about the Average Tax Rate

In this section, we define the learning model we use in the Survey Experiment and present the results. Let $\overline{\tau}_i^{prior}$ and $\overline{\tau}_i^{post}$ represent subject i's prior and posterior beliefs about the average tax rate, before and after the information-provision stage, respectively. We elicit $\overline{\tau}_i^{prior}$ and provide the actual average tax rate $\overline{\tau}^{feed}$ as feedback. Subjects' responses allow us to learn about the degree of households' misconceptions about the average tax rate, as represented below:

$$\overline{\tau}^{feed} - \overline{\tau}^{prior} \tag{1}$$

The information from the Survey Experiment also allows us to study how subjects learn when given feedback. Specifically, we use a simple learning model:

$$\overline{\tau}^{post} - \overline{\tau}^{prior} = \alpha \cdot \left(\overline{\tau}^{feed} - \overline{\tau}^{prior}\right) \tag{2}$$

where α captures the degree of learning. The parameter α captures how much individuals ignore or adjust to the feedback given.

Figure 1 shows how the information treatment affected the posterior beliefs in the Survey Experiment. In panel (a), the x-axis represents the respondent's *actual* relative tax rate: i.e., the difference between the *actual* average tax rate in the county and the household's own tax rate. In turn, the y-axis represents the respondent's *perceived* relative tax rate at the start of the survey: i.e., the difference between the *perceived* average tax rate and the household's own tax rate. In a world of perfectly accurate perceptions, we would expect the observations to align precisely along the 45-degree line, corresponding to a slope of 1. On the opposite end of the spectrum, if subjects have no idea about the county's *actual* average tax rate to be able to compare their own tax rate, we would expect a slope of 0. We find that households' perceptions are further from the extreme of being accurate: the coefficient estimate (0.237) falls significantly short of 1. More precisely, Figure 1.a shows that misperceptions are systematically skewed toward the middle: individuals who pay more than

average tend to underestimate how much they pay relative to others, and individuals who pay less than average tend to overestimate how much they pay. As a result, when accurate information is provided, we expect individuals toward the left end of the x-axis in Figure 1.a to update their beliefs downward and individuals toward the right end of the x-axis to update their beliefs upward.

This type of systematic bias is expected if individuals have little or no information about the average rate, so they use their own tax rate as their best guess for what others pay. In fact, this systematic bias has been found in other contexts. For example, when employees must guess the average salary of their peers, they typically use their own salary as their best guess (Cullen et al., 2020). Additionally, when guessing their position in the income distribution, people have a systematic tendency to believe that they are in the middle of the distribution (Cruces et al., 2013).

Figure 1.b shows how subjects in the treatment and control groups update their beliefs. Just as in panel (a), the x-axis in panel (b) is the respondent's *actual* relative position with respect to the average tax rate. However, the y-axis in panel (b) is different from that in panel (a): instead of showing the prior beliefs, panel (b) presents the posterior beliefs. In other words, the y-axis represents the respondent's *perceived* relative tax rate at the end of the survey (i.e., after the information-provision experiment). The blue dots correspond to subjects in the control group (i.e., subjects who were not shown feedback about the actual average tax rate). For this group, the relationship between perceptions and reality continues to be weak, just as in panel (a). This is to be expected: since these respondents did not receive any new information, we would not expect their posterior beliefs to become any more accurate. In contrast, the red diamonds correspond to the treatment group (i.e., subjects who were shown the feedback). These red diamonds show that the correlation between perceptions and truth becomes markedly stronger when individuals are provided with accurate feedback. For a more formal test, we compare the slope between perceptions and truth in the control group (0.154) versus the corresponding slope in the treatment group (0.609). Consistent with

significant learning, the difference between the two is not only large (0.455) but also highly statistically significant (p-value<0.001).

Figure 1.b illustrates a key fact that motivates the experimental design for the field experiment. When individuals receive accurate information on the average tax rate, their reaction depends on their prior beliefs. For individuals with accurate prior beliefs, they should not react to the information because it does not contain any news. For individuals whose prior beliefs under-estimate the average tax rate, they should react to the information by increasing their posterior beliefs. For individuals whose prior beliefs over-estimate the average tax rate, they should react to the information by lowering their posterior beliefs. In the field experiment, we do not observe the prior beliefs of the subjects. However, we can still capture the heterogeneous effects of the information, by leveraging whether the individuals have tax rates that are above or below the county average (i.e., whether the observation falls toward the left or right on the x-axis). On the one hand, individuals with tax rates above the average tend to systematically underestimate the average tax rate and, when shown the information, they update their perceptions upward. On the other hand, individuals with tax rates below the average tend to overestimate the average tax rate, so when shown the information, they will systematically update their perceptions downward. In sum, in the field experiment we can capture the heterogeneous effects of the information shock even though we do not observe prior beliefs.

3 Field Experiment

3.1 Institutional Context

We conducted our field experiment in Dallas County, a large county with a population of approximately 2.6 million as of 2020 (U.S. Census Bureau, 2021). The county is diverse along various dimensions, including ethnicity and representation of political parties. For example, in the 2012 presidential election, Barack Obama received 57% of the votes, while

Mitt Romney received 42% (Ansolabehere et al., 2014). In Dallas County, property taxes are collected to fund a variety of services such as schools, parks, roads, and the police and fire departments. Although the county collects property taxes for residential and business properties, our study focuses specifically on single-family residential homes.

To conduct our research, we use publicly available administrative data provided by the Dallas Central Appraisal District (DCAD, 2020). These data include information on the names and mailing address of the property owners, property address (which may not coincide with the mailing address of the owners), and details about the properties, such as their characteristics (e.g., number of bedrooms, square footage), taxable values, tax rates, and history of property tax appeals. We use the administrative data to include a rich set of control variables in the regression analysis.

Tax appeals in Dallas County operate in a similar manner as in all 241 counties in Texas. Although there may be some variations, there are many similarities in how tax appeals work in other states within the United States and even in other countries (Dobay et al., 2019; World Bank, 2019). Each year, homeowners have the opportunity to appeal their taxes if they disagree with their home's market value as proposed by the DCAD. Homeowners are notified of their proposed values through the DCAD's website, and some may also receive a notification by mail.[16] Homeowners can challenge the tax assessment if there are errors in the public records (e.g., incorrect square footage), if they believe that the market value of their property is lower than the proposed value, or if they believe similar households in terms of market value received lower proposed values than their own. It is worth noting that home market values are subjective, except perhaps for homes that have recently been sold and thus have a recent transaction price. For example, a quick search on websites such as Zillow.com and Redfin.com shows wide discrepancies in market values for the same home.[17]

Homeowners have the option of filing a tax appeal on their own, either online or

[16] The DCAD mails notifications to households with increased appraised values or those meeting certain criteria (for more details, refer to Nathan et al. (2023)). See Appendix F for a sample notification.

[17] This issue recently caused financial problems for Zillow (Parker and Friedman, 2021).

by mail, which we refer to as "direct protests" following previous research (Nathan et al., 2023; Giaccobasso et al., 2023). As in Nathan et al. (2023) and Giaccobasso et al. (2023), direct protests are the main outcome of interest in our study. However, homeowners can also choose to hire an agent to file a protest on their behalf. These agents typically charge a combination of a flat fee and a percentage of tax savings, sometimes reaching up to 50% of the savings. However, protests conducted through agents are less relevant to our study for several reasons. First, since we mailed the letters directly to the homeowners, it is unlikely that the information provided to the homeowners would influence the decisions of the agents. Furthermore, the timing of our intervention and the setting make it more difficult for protests through agents to be affected. According to anecdotal accounts, households often enter into contracts with agents months before the proposed values are announced. Agents would have an incentive to mechanically protest, especially if their cost of protesting is low. It is worth noting that the decision to protest through an agent may have been made years ago, since agents offer long-term contracts to automatically protest on the owner's behalf every year. In addition, homeowners in all counties in Texas are required to complete and submit a form to their appraisal district to discontinue the services of an agent. This creates a stickiness for households, which implies that agents often handle protests on behalf of owners every year. For these reasons, we focus on direct protests.

Homeowners have a one-month window from the notification date to protest their taxes. In 2020, the DCAD notified the proposed values on May 15$^{\text{th}}$, and the deadline to file a protest was June 15$^{\text{th}}$. Once protests are initiated, they go through a resolution process that may involve a proposed settlement by the DCAD, informal negotiations between the owner and the DCAD typically conducted online, via email, or by phone, or a formal hearing with a quasi-judicial entity known as the Appraisal Review Board. As a result of this process, the taxable value of the property becomes final (known as the "certified value"), unless it is further challenged in court.

As our experiment took place in 2020, it is important to assess the impact of the

COVID-19 emergency on the external validity of our findings. It should be noted that the emergency did not alter the procedure for households to protest their property taxes. For example, the uFile tool that the DCAD uses for online tax protests had been in use for several years prior to our intervention in 2020. Furthermore, the emergency did not affect the way informal settlements were conducted, as they had already been offered by email or telephone prior to 2020. The only change implemented in response to the emergency was that formal hearings were conducted over the phone with a single board member. However, it is worth mentioning that even after 2020, the DCAD continued to provide homeowners with the option to conduct Appraisal Review Board (ARB) hearings over the phone. The Field Survey in our letters included an open-ended question that asked respondents to explain why they decided to protest or not to protest. Only a small minority (3.9%) of the respondents mentioned the pandemic as a factor influencing their decision. Taken together, these factors indicate that while the COVID-19 emergency presented unique circumstances in 2020, it did not significantly alter the core processes of property tax protests.

3.2 Main Hypothesis

Our research question can be summarized in a simple equation. Let WTP_i be household i's willingness to pay taxes – in the field experiment, we use the the decision to file a tax appeal as a proxy for the (un)willingness to pay taxes. Let $\hat{\bar{\tau}}_i$ be household i's perception about the average tax rate paid by other households in the county. We are interested in the following relationship:

$$WTP_i = \mu_0 + \mu_1 \cdot \hat{\bar{\tau}}_i \tag{3}$$

The key hypothesis is that $\mu_1 > 0$: i.e., when a household believes that other households pay a higher tax rate, the household's own willingness to pay taxes goes up. In the context of property taxes, households will always have the temptation to free-ride on the taxes paid by their neighbors. In other words, completely selfish households should be will-

ing to pay $0 in taxes and not be affected by how much other households pay (i.e., $\mu_1 = 0$). If fairness considerations matter, households may still want to pay taxes; for example, they may consider it the right thing to do. More precisely, our hypothesis is that households feel a heightened moral obligation to pay their own taxes when they perceive that other households also contribute their fair share.[18]

3.3 Experimental Design

We sent letters to a sample of Dallas County homeowners and randomized some of the information contained in the letter. See a sample of the first page of the letter in Figure 2. We included attributes in the design of the letters to ensure recipients of its legitimacy. For example, the letters were signed by a professor from The University of Texas at Dallas and the letters and envelopes included the official logo of The University of Texas at Dallas, a well-known institution in Dallas County.[19] We tailored the letters to each recipient, using their names and addresses.[20] The letters also included contact information.[21]

All letters included information to help subjects with the process of filing a tax appeal, such as a link to step-by-step instructions on how to file a property tax online or by mail. This aid leveled the playing field for all individuals, providing them with the necessary tools to file a protest if they choose to do so. In fact, a portion of this aid was part of another treatment arm, designed to study the role of filing frictions. The results of this second treatment arm are reported in Nathan et al. (2023), which documents that the aid had a significant and

[18] This hypothesis is based on the implicit assumption that households care about the average tax *rate* paid by other households. In theory, households could care about the average tax *amount* paid by other households. In Section 4.3 below, we provide direct evidence in support of our implicit assumption.

[19] See Appendix C and D for a sample of the entire letter and of the envelope.

[20] For properties owned by multiple individuals (typically, husband and wife), we listed all owners.

[21] The letter included a physical address that recipients could contact and a URL of the study's website. This website provided basic information about the study (without discussing the study's hypotheses), step-by-step instructions on how to file a protest online and by mail, and contact information for both the Institutional Review Board and the researchers. Appendix E shows screenshots of the entire website.

positive effect on the probability of filing a tax appeal.[22]

All of our letters include a table in the middle of the first page, as shown in Figure 2. In Figure 2, this table is highlighted inside a red box with dashed lines (the box is for explanatory purposes and was not included in the actual letters sent to subjects).[23] In all letters, the table includes the new information released by the DCAD on the household's own proposed value and estimated taxes for 2020 (i.e., the information in the second column of the table). The key randomization is whether the table also includes a third column with information about the proposed value and estimated taxes for the average household in Dallas County.

More precisely, we randomized (with a $\frac{2}{3}$ chance) whether the table includes a column that shows these figures for the average home in Dallas. This column allows recipients to compare whether their households' tax rates are above or below the average Dallas home and by how much. Randomly including this additional column is meant to provide a shock to households' perceptions of the tax rate that other households pay. We also cross-randomized an additional row that makes the tax rates explicit.[24]

We created the letters as soon as administrative data became available (on May 16$^{\text{th}}$, 2020), mailed them on May 20$^{\text{th}}$, and started receiving responses to the Field Survey on May 21$^{\text{st}}$.[25] The post office scanned more than 90% of our letters by Friday, May 22$^{\text{nd}}$, 2020, indicating that they reached the last mile before delivery by then. From analyzing data from previous years, we know that most subjects file their protests near the deadline. Therefore, there was sufficient time between receipt of the letter and the protest deadline for the letter

[22] As part of that treatment arm which is the focus in Nathan et al. (2023), we cross-randomized whether the letter included an "extra aid message" with additional information on how to file a tax appeal. The "extra aid message" was included in the second page of the letter. Because this intervention was cross-randomized, our regressions include an indicator variable for the extra aid message among the control variables.

[23] See Appendix C for a sample of the letter without the red boxes added.

[24] Since we cross-randomized two aspects of the tables, in total there were four possible types of tables, which are summarized in Appendix Figure B.1.

[25] In terms of execution, to swiftly create and mail the letters using the newly-released data is a challenging step.

to influence most recipients' decisions to protest.[26]

When our letters inform subjects that the average tax rate in Dallas County is 2.01%, they may update their beliefs upward or downward based on whether their prior beliefs about the average tax rate were higher or lower than 2.01%. Given that in the field experiment we do not observe subjects' prior beliefs about the average tax rate, we leverage the systematic misperceptions documented in the Survey Experiment. Specifically, we use the fact that homeowners who pay below-average tax rates tend to underestimate the average tax rate and those who pay above-average tax rates tend to overestimate the average tax rate.

3.4 Econometric Model

In this section, we discuss the econometric model we use to assess the impact of the average tax rate information that we delivered to subjects, through letters mailed to their homes as part of the field experiment. Let Y_i^{post} be the outcome of interest. For example, this outcome could be an indicator variable that takes the value 100 if the household protested directly in 2020 (the post-treatment period). Let τ_i be the household's own tax rate and $\overline{\tau}^{feed}$ be the *actual* average tax rate in the county. Let D_i be an indicator variable that takes the value 1 if the information on the average tax rate was shown to the subject in the experiment. The regression of interest is as follows:

$$Y_i^{post} = \nu_0 + \nu_1 \cdot D_i \cdot (\overline{\tau}^{feed} - \tau_i) + \nu_2 \cdot (\overline{\tau}^{feed} - \tau_i) + \nu_3 \cdot D_i + X_i^{pre} \nu_X + \varepsilon_i \tag{4}$$

The variable X_i^{pre} corresponds to the vector of additional control variables. Unless stated otherwise, we use the following set of control variables in all regressions: the proposed value, dummies for multiple owners, school districts and special districts, the number of years since the household's last property tax appeal, a dummy for homestead status, a dummy for the extra aid message treatment,[27] growth in the proposed value relative to the previous year

[26] Figure A.10 in Nathan et al. (2023) shows the timing of the survey responses, of the visits to the study's website, and of the protests.

[27] We study the effect of the extra aid treatment in Nathan et al. (2023).

and, for each year from 2015 to 2020, dummies indicating whether the household appealed in each year and the outcome of the appeal. We note that since this is an experiment, the goal of using controls is to gain statistical power by reducing the variance of the error term (McKenzie, 2012). The coefficient ν_2 measures the relationship between the outcome and the potential information shock (i.e., $\overline{\tau}^{feed} - \tau_i$) when the information is not disclosed. The key coefficient, ν_1, measures the effects of the information shock: i.e., how much stronger the relationship is due to the disclosure of feedback.

3.5 Subject Pool

Our subject pool of interest is composed of a sample of 50,394 subjects to whom we sent a letter as part of the mailing intervention.[28] The main outcome of interest in the field experiment is whether the household filed a tax protest in 2020. Among households in the control group (i.e., those who received a letter that did not include information on the average household in Dallas County), 11.08% filed a direct protest. An additional 5.85% protested using an agent.

Column (1) of Table 1 presents average pre-treatment characteristics of the subject pool. The average subject owns a home worth $343,000 and pays an effective tax rate of 2.10%. Columns (2) and (3) show that, consistent with successful random assignment, the pre-treatment characteristics are mainly balanced between the treatment and control groups.[29] In Appendix B.1 we further show that although the subject pool is not completely representative of the universe of 423,607 single-family residential properties in Dallas County, it is close to being so.

[28] See Appendix B.1 for the sample selection criteria. We sent letters to 50,983 households. However, 589 households had to be removed from the sample because they had already protested by the time we sent the letters. This leaves us with the final sample of 50,394 households.

[29] The difference is statistically significant for one the pre-treatment variables: the home value. However, while the difference is statistically different due to the large sample size, the difference is small in magnitude. Moreover, we report 10 tests in column (4) – by chance, one of them is likely to be statistically significant at the 10% level.

3.6 Complementary Field Survey

The letters in the field experiment include a URL to an online survey with a unique five-letter code for access to our Field Survey. This code ensures that only letter recipients can answer the survey and allows us to match the survey responses to the administrative records.

The Field Survey instrument is provided in Appendix H. The Field Survey has multiple goals. For instance, it allows us to deal with non-compliance. Many subjects may not have paid attention to the unsolicited mail that we sent to them or may not have opened the letter. We can use the response to the survey as a proxy for the households that paid close attention to the content of the letter. Lastly, we included some questions in the Field Survey that could be used as outcome variables. Specifically, we asked a question about the likelihood that respondents will protest in 2020, on a scale from 1 (very likely) to 4 (very unlikely). The purpose of this question is to measure the "immediate" effects of the information in the letter on the intention to protest, shortly after the information is provided. Another question asks whether the respondent feels that his or her own taxes are unfair on a 1-10 scale: "Relative to the other households in the county, do you think your household pays a fair amount in property taxes?" This question is designed to provide a test of the fairness mechanism. The hypothesis is that someone who finds out that the average tax rate is higher than he or she believed is more likely to think that his or her own taxes are fair.

We received responses to the Field Survey from 1,888 households. The median respondent took about 6.3 minutes to complete the survey. Approximately 88.3% of the respondents said that they found the survey "easy to understand," 10.3% found that it was "neither easy nor difficult" and the remaining 1.4% found it "difficult to understand." We included a question about the household's own tax amount, to serve as an attention check since we share this information in the letter we mailed. The responses confirm that the respondents were paying close attention to the survey. The vast majority of respondents (80.8%) provided an answer that is very close (within 5%) to their true tax amount. Regarding the rest of the

responses, they were off primarily because they were rounded up or down, or because the respondent confused the assessed home value amount and the tax amount.[30]

The implied response rate is 3.7%. This response rate is of the same order of magnitude as the rate in other studies using a similar delivery method (a survey link through letters): for example, 3.6% in Giaccobasso et al. (2023) and an average of 4.7% in the meta-study by Sinclair et al. (2012). When looking at the results for the subsample of respondents to the Field Survey, it is important to keep in mind that they are not a random sample. In terms of household characteristics, such as home value, number of bedrooms, and tax rate, the differences between survey respondents and non-respondents are statistically significant but small in magnitude.[31] However, there is a substantial difference in the share of subjects who protested in 2020: 50.52% in the subsample of survey respondents versus 11.08% in the overall sample of the field experiment. This difference has a natural interpretation: the subjects who paid the most attention to our letter were very likely those who were on the margin regarding whether to protest in 2020 or not.[32]

Column (5) of Table 1 shows the average pre-treatment characteristics for the Field Survey sub-sample. The survey respondents own more expensive homes than the owners in the entire subject pool. The tax rates are similar across these two groups. Importantly, in the treatment year the differences in the protest rate for the Field Survey sample will be about five times as high compared to the protest rate for the full subject pool (we discuss this difference in more detail in Section 4.1 below). Since subjects self-select to answer the survey, it is important to look at the balance test within the subsample of survey respondents. The results are presented in columns (6) and (7) of Table 1. Consistent with successful random assignment, the pre-treatment characteristics are mostly balanced between the treatment and

[30] More precisely, among the 1,885 respondents who answered this question, 173 provided a value for the tax amount value that was within 10% of the assessed home value instead of their tax amount.

[31] Results reported in Appendix B.2.

[32] Our letter makes it explicit from the start that it is about tax protesting, so individuals who were considering filing a tax protest are more likely to keep reading. Additionally, subjects who paid attention to our letter may have found the information provided in our letter helpful in submitting a protest.

control groups.[33]

4 Results from the Field Experiment

4.1 Main Results

Table 2 presents the results of the field experiment from estimating equation (4). In column (1), the dependent variable uses the administrative data and takes the value 100 if the household protested directly in 2020 and 0 otherwise. This analysis is based on the sample of 50,394 subjects in the field experiment who were randomly selected to receive a letter. The coefficient on the *Information Shock* (the term $D_i \cdot (\overline{\tau}^{feed} - \tau_i)$ from equation (4)) indicates that finding that the average tax rate ($\overline{\tau}$) is 0.1 pp higher causes a decrease in the probability of protest of 0.093 pp. This effect is statistically significant (p-value=0.066). Next, we present checks to assess whether this effect is robust.

One basic concern with experimental studies is that the effects may be spurious. That is, maybe the treatment group happened to include people who are generally more prone to protesting, by sheer chance, despite randomization. To address this concern directly, we performed an event study analysis. Intuitively, if we happened to select individuals more prone to protesting into the treatment group to receive the information shock compared to the control group who received the letter but not the information shock, we should observe differences in protest rates not only in the post-treatment period, but in the pre-treatment years as well. The results are presented in Figure 3.a. The rightmost coefficient in this figure shows the effect of the information shock on the probability of protesting in 2020, corresponding to the coefficient reported in column (1) of Table 2. The rest of the coefficients in Figure 3.a are estimated with the same regression specification, but instead of using protests in 2020 as the dependent variable, they use protests in the pre-treatment years

[33] The difference is statistically significant for one the pre-treatment variables: the property tax rate. However, while the difference is statistically significant due to the large sample size, the difference is rather small in magnitude. Moreover, we report 10 tests in column (8) – by chance, one of them is bound to be statistically significant at the 10% level.

2015–2019.[34] Since our letters had not been sent yet, the information shocks could not have an effect on protests in any of the years before 2020. As expected, the coefficient in each pre-treatment year is close to 0, statistically insignificant, and precisely estimated.

Another potential concern with the results from column (1) of Table 2 is that they may be driven by non-linearities or by outliers. To address this concern, Figure 4.a presents the results in binned scatterplot form. This figure shows that the linear specification is a reasonable approximation and also that the results do not seem to be driven by outliers.

One challenge in interpreting the magnitude of the coefficient on *Information Shock* is that it is an intention-to-treat effect, due to multiple sources of non-compliance. An important source of non-compliance is that a significant share of households may not have read our piece of unsolicited mail, which is a common concern for mailing interventions more generally (e.g., see Perez-Truglia and Cruces, 2017; Gerber et al., 2020; Bottan and Perez-Truglia, 2020). Furthermore, even for households who opened the letters on time, many may have skimmed through them without paying attention to the information on average taxes listed in the table. To illustrate how significant this concern can be, some studies have attempted to calculate the share of subjects who paid attention to the information included in mailing interventions. Using data from a follow-up survey, Perez-Truglia and Cruces (2017) estimates that only 21.5% of the subjects who received a letter actually learned the relevant information contained in it. Gerber et al. (2020) study readership from various sources, including results from the USPS Household Diary Survey and a study conducted by the U.S. Environmental Protection Agency, and argue that 50% of the recipients in their mailing experiment may have read the relevant information.[35] Nathan et al. (2023) estimates that around 26% of subjects may have not received the letter, not opened it, or opened it after

[34] The regressions in this figure use data from rolling periods as controls. For example, when the dependent variable is the decision to protest in 2019, we control for a set of indicator variables corresponding to the history of protests between 2015–2018. We included controls on protest history up to 2015, because at the time we ran the field experiment the DCAD provided protest data on its website from 2015 onwards.

[35] For more details, see Appendix A.5 of Gerber et al. (2020).

the deadline to submit a protest had passed.[36].

We use two approaches to account for non-compliance that leverage the responses to the Field Survey. The first strategy consists of focusing on the type of individuals who are more likely to respond to the Field Survey. Intuitively, since the invitation to the Field Survey is at the bottom of the letter, individuals who respond to the survey are likely the ones who paid the closest attention to the letter. This strategy consists of two steps. In the first step, we use a simple probit model to estimate the ex-ante probability that a household responds to the Field Survey based on a host of pre-treatment characteristics such as the household's protest history, proposed value, tax rate, and homestead status.[37] This model has decent predictive power: the out-of-sample area under the receiver operating characteristic (AUC) is 0.66.[38] In the second step, we split the sample based on whether the ex-ante probability of responding to the survey is above or below the median value, and estimate the same model as in column (1) of Table 2 separately for each half of the sample. Table 2 presents the results from this first approach, with column (2) corresponding to subjects with an above-median probability of response, and column (3) corresponding to subjects with below-median probability. Subjects in column (2) are two times more likely to end up responding to the survey relative to subjects in column (3) (their response probabilities are 5.6% and 1.9%, respectively). We also observe that households who are more likely to respond to the survey are more likely to end up protesting: the average protest probability is 15.6% in column (2) versus 6.5% in column (3). This is natural, as individuals who were more interested in our letter were probably the ones who were contemplating protesting. The comparison between the results from columns (2) and (3) of Table 2 suggests that, as expected, the effects of the

[36] The estimates in Nathan et al. (2023) are based on Mazzone and Rehman (2019) and Bottan and Perez-Truglia (2020).

[37] Specifically, this list of variables includes all of the control variables used in column (1), as well as race dummies (White, Black, Asian dummies), the actual difference between the average tax rate in the county and the household's own tax rate (both in the level and using twenty quintile dummies), the difference between the household's 2020 proposed value and the potential homestead cap, this difference interacted with a dummy for a homestead in 2020, and the history of protests by type (direct and agent protests).

[38] Intuitively, this value of the AUC means that if you were to randomly select a subject who responded to the letter and a subject who did not respond to the survey, the model has a 66% probability of guessing which of the two individuals responded to the survey.

information shock are stronger for individuals who are more likely to pay attention to the letter. More precisely, the coefficient is -2.131 (p-value=0.082) in column (2) versus -0.528 (p-value=0.313) in column (3). However, this result must be taken with a grain of salt, as the coefficients are not very precisely estimated and thus their difference is statistically insignificant (p-value=0.228).

As a second (and more direct) approach, we can focus on the subjects who responded to the Field Survey. The advantage of this approach is that for these households we have confirmation that they paid attention to the letter; otherwise they could not know about the survey link and code needed to complete the survey, as that information was only available in their personalized letter. Indeed, assuming that subjects read the letter from top to bottom, these subjects probably noticed the information about the average tax rate, since the survey link was shown below the table that contained the information shock about the average tax rate. However, there is one disadvantage of this approach: since the decision to respond to the survey is made in the post-treatment period, conditioning on this post-treatment variable may contaminate the experimental variation. For this reason, when restricting to the sample of survey respondents, it is important to conduct proper falsification tests, such as the event-study analysis.

Column (4) of Table 2 uses the same specification as column (1), except that column (4) is restricted to the sub-sample of 1,888 households who responded to the Field Survey. The coefficient from column (2) is negative (-12.566) and statistically significant (p-value=0.021). This coefficient is much larger in magnitude than the corresponding coefficient reported in column (1). This difference is to some extent mechanical. Since the baseline protest rate is much higher for the survey respondents (50.52% in column (4) versus 11.08% in column (1)), it is natural that the effect sizes are also higher. However, this mechanical difference is far from being the only factor at play: while the average outcome is 4.5 times as large (50.52 vs. 11.08), the effect of information is 13.4 times as large (-12.566 vs. -0.937). Thus, our preferred interpretation is that, to a large extent, the effects are stronger in column (4)

because those households paid more attention to the information included in the letter.

4.2 Additional Robustness Checks

One potential concern with the results from column (4) of Table 2 for the Field Survey sample is that, despite the random assignment, the endogenous nature of the selection into the survey may introduce an endogeneity bias. To address this concern, Figure 3.b presents the event-study analysis. More precisely, we estimate the same regression as in column (4), but the dependent variables are indicator variables for whether the respondent protested in each of the pre-treatment years. Reassuringly, the effects on the pre-treatment years are close to 0, statistically insignificant, and precisely estimated. A second concern with the results from column (4) of Table 2 is that the larger effects for the Field Survey sample compared to those for the full sample could be driven by non-linearities or outliers. Figure 4.b, which presents the results in binned scatterplot form, rules out non-linearity and outliers as drivers for the differences.

With the subsample of respondents to the Field Survey, we can estimate the effects of the information shock on the survey outcomes. Column (5) of Table 2, which is identical to column (4) except that the dependent variable takes the value 100 if the household reports that it is likely or very likely to protest in 2020, and takes the value 0 if the household reports that it is unlikely or very unlikely to protest. There are reasons why the effects on stated intentions may be different from the effects on actual protests. For example, some individuals may care about the information provided to them, but may forget about it by the time they have to choose whether to protest or not. In addition, the information may increase the desire to file a protest, but the individual may later not act as planned due to the difficulty of the process or other filing frictions (Nathan et al., 2023). In fact, we do not expect the effects on intended protests and actual protests to be mechanically the same, as their correlation is statistically significant (p-value$<$0.001) but far from perfect (correlation coefficient of 0.398). We find that the effects on the intention to protest closely

mirror the effects on actual protests: the coefficient from column (5) is negative (-11.919) and highly statistically significant (p-value=0.008). This coefficient is close in magnitude to (and statistically indistinguishable from) the corresponding coefficient of -12.566 from column (4).

In Appendix B.3, we present additional robustness checks and results. We show that the effects of the information shock on protest choices were consequential for the households' assessed values and tax amounts. In addition, we show that our results are very similar in terms of both magnitude and statistical significance when we restrict the sample to the subjects who answered on the Field Survey that they considered fair for everyone to pay exactly the same tax rate (i.e., the "proportionality norm").[39]

4.3 Causal Mechanisms: Fairness

The evidence presented above suggests that the information about the average tax rate had a significant effect on the decision to protest. Next, we provide evidence and discuss some of the potential mechanisms at play. We interpret the effect of the information shocks on protests to be due to households changing their perceptions of the average tax rate and, subsequently, the taxes that they deem fair to pay.

We can use the data from the Field Survey to provide direct evidence for the fairness channel. Specifically, we included a question to measure households' feelings of fairness about their own taxes on a scale from 1 (very unfair) to 10 (very fair). Figure 5.a summarizes the distribution of responses to this question. The evidence suggests that most households feel that their taxes are unfair compared to others, but there is substantial variation between households in their feelings of unfairness. In this sample, households lean towards believing that their taxes are unfair: e.g., in the control group, the average fairness score is 4.02, which is closer to the unfair end of the scale.

According to the fairness channel, we would expect that an information shock that increases the perceived average tax rate would have a positive effect on perceived fairness.

[39] In this appendix, we also show that we do not find any significant differences between effects when the tax rate was made explicit versus not made explicit in an additional row to the table contained in the letter.

That is, if you find out that others are contributing their share, it should be fair for you to contribute your part too. The relevant results are presented in column (6) of Table 2, which is identical to column (4) except that the dependent variable is how fair the household perceives its own taxes. As expected, the coefficient on *Information Shock* from column (6) is positive (0.459) and statistically significant (p-value=0.060). Indeed, the effects on perceived fairness are comparable in magnitude to the effects on the probability of protest. For example, the results from column (6) indicate that an information shock of 0.1 pp causes a change in perceived unfairness that is equivalent to 2.15% ($= \frac{0.1 \cdot (-0.459)}{2.13}$) of a standard deviation. In comparison, the results from column (4) indicate that an information shock of 0.1 pp causes an increase in the probability of protest equivalent to 2 48% ($= \frac{0.1 \cdot (-12.566)}{50.52}$) of a standard deviation.

To complement the above evidence on the role of the fairness mechanism, we provide additional, non-experimental evidence. First, by linking the survey responses to the administrative records, we can measure whether the feeling of fairness is correlated with the probability of filing a tax protest. The results are presented in Figure 5.b. The figure shows a negative, strong and statistically significant (p-value<0.001) association between the perceived fairness and the probability of filing a tax appeal. Increasing perceptions of fairness from very unfair (1) to very fair (10) is associated with a 23.40 pp decrease in the probability of protesting.

Second, we exploit a question from the Field Survey designed specifically to explore what households consider fair when it comes to distributing the property tax burden across taxpayers. Specifically, we asked respondents to distribute a property tax burden of $10,000 between Household A, whose home is worth $100,000, and Household B, whose home is worth $400,000. To make it easy for respondents, we provided a menu of seven options to choose from: Household A pays $0 (and thus Household B pays $10,000), $1,000 ($9,000), $2,000 ($8,000), $5,000 ($5,000), $8,000 ($2,000), $9,000 ($1,000) or $10,000 ($0). Respondents were asked to report the allocation they would consider the most fair. For instance, if a

respondent thinks that the fair allocation is that everyone pays the same tax *rate*, then he or she would choose the third option in which Household A pays $2,000 and household B pays $8,000 (which implies a tax rate of 2% for both households). In comparison, if a respondent thinks it is fair for everyone to pay the same tax *amount*, then he or she should choose the middle option in which both households pay $5,000 (implying a tax rate of 5% for Household A and a tax rate of 1.25% for Household B). The responses to this survey question are reported in Figure 6. These results provide evidence supporting what we call the "proportionality norm". Specifically, a strong majority of households (76.5%) choose the option that equalizes the tax rates. In contrast, only a minority of the respondents (5.47%) choose the option that equalizes the tax amounts.[40]

4.4 Alternative Mechanisms

The fairness channel constitutes our preferred interpretation of the effects of the information shock. Next, we provide evidence against a potential alternative channel: subjects might have reacted to the information on the average tax rate because they inferred from that information whether their own protests would likely be successful.

First, a household that receives information indicating that the average household pays a lower tax rate cannot rationally infer that the other households are paying a lower tax rate because those households protested successfully in the past. This is because the average tax rate does not provide any information about whether a household protested in the past or whether a household's protest was successful. Specifically, the tax rate is calculated by dividing the tax amount by the proposed value of the property. A successful protest reduces the value of both the numerator and the denominator, thus leaving the tax rate roughly unchanged.[41] Therefore, if a household learns that the average household pays a tax rate

[40] We asked a similar question to subjects across the entire United States in the Survey Experiment and the results from this question also support that the majority of the households chose an allocation of taxes supporting the "property tax's proportionality norm." We present these results in Appendix A.3.

[41] In fact, a successful protest can lead to a small *increase* in the tax rate if a household has a binding homestead cap, because the denominator would decrease while the numerator would not change. Appendix Figure B.2.b shows that most successful protests actually lead to a slight increase in the tax rate.

that is 1 pp higher than its own, it would be irrational for the household to infer anything about its odds of a successful protest. We further show in the appendix that there is no relationship between the protest success rate and the households' tax rates proposed by the DCAD.[42]

Moreover, the magnitude of the alternative channel is at most small and cannot come close to explaining the effect sizes that we document for the information shock. Changes in both individuals' own tax rates and the average tax rate due to protests are limited because, in addition to the fact that tax rates remain (mechanically) roughly unchanged following successful protests as explained before, only a minority of households protest. In contrast, information shocks are often large: households can discover that they pay a tax rate that is 1pp lower or higher than the average.[43]

Columns (7) and (8) of Table 2 present a test of the alternative channel. If individuals make irrational inferences from the information about the average tax rate, we should expect heterogeneous effects on households who are more familiar with and educated about how property taxes and protests operate versus those who are less familiar. Intuitively, households who protested before should have a greater understanding of how property taxes work and have more information about the odds of a successful protest from their past experience, so they should be less prone to making any irrational inference. Columns (7) and (8) of Table 2 divide the sample into subjects who have not protested in the past five years (column (7)) versus subjects who protested at least once in the past five years (column (8)). We do not find evidence of the type of heterogeneity predicted by this alternative mechanism: the coefficients from columns (7) and (8) are similar in magnitude (-13.56 vs. -12.09) and their difference is statistically insignificant (p-value=0.880).

[42] If a higher tax rate indicates that a household has higher odds of success if it protests, then we would expect a positive relation between tax rates and the odds of a successful protest. Instead, we find that there is no significant association between the proposed tax rate and the odds of a successful protest. For more details, see Appendix Figure B.3.

[43] A household in the 10th percentile pays a tax rate of 1.33%, while a household in the 90th percentile pays a tax rate of 2.73%. For a more quantitative comparison, see Appendix Figure B.2 which shows that the magnitude of the changes in the tax rates due to successful protests (panel (b)) is small relative to the overall differences in tax rates between households (panel (a)).

4.5 Magnitude of the Effects

One challenge for assessing the magnitude of fairness concerns is the need to account for two forms of non-compliance. The first form of non-compliance is that some recipients may not have read the letter. As previously explained, we can address this form of non-compliance by focusing on the results from column (4) of Table 2, for the sample of recipients who must have read the letter in order to answer the Field Survey. However, a second form of noncompliance remains: even if they read the letter, subjects may not fully incorporate the feedback into their beliefs. We use the results on pass-through belief updating from the Survey Experiment to correct for this additional form of non-compliance. Because each additional 1 pp in the information shock increased the perceived average tax rate by 0.455 pp (from comparing the slopes in Figure 1.b), we use a scaling factor of 2.19 ($= \frac{1}{0.455}$). Scaling up the coefficient on *Information Shock* from column (4) of Table 2 implies that increasing recipients' perception of the average tax rate paid in the county by 0.1 pp would decrease their protest probability by 2.75 pp ($= 0.1 \cdot 12.566 \cdot 2.19$).

As complementary evidence of the magnitude of the effects, we provide a back-of-the-envelope calculation of the willingness to pay for fairness in dollar terms. To compute this value, we combine the results from this paper with the results in Nathan et al. (2023), which uses a quasi-experiment to measure the effect of monetary incentives on the probability of protest. Specifically, Nathan et al. (2023) leverages a kink in the marginal benefits from protesting that results from the Texas Property Code's homestead cap, which imposes a 10% cap in the annual increase in assessed values. Nathan et al. (2023) shows that a reduction in expected tax savings of \$100 causes a decrease in the probability of protest of 2.14 pp.[44]. Combining this result with our finding indicating that a 0.1 pp increase in the perceived average tax rate would decrease the protest probability by 2.75 pp, we estimate that a 0.1 pp increase in the perceived average tax rate (equivalent to an increase of \$295 in the average

[44] This result is presented in Figure 1 of Nathan et al. (2023).

tax amount) increases the willingness to pay taxes by about \$128 ($= \frac{2.75 \cdot 100}{2.14}$).[45]

The evidence discussed above suggests that for each additional \$1 in taxes contributed by the average household, a homeowner is willing to pay an additional \$0.43 ($= \frac{128.00}{295}$) in his or her own taxes. This magnitude suggests that fairness concerns are a significant source of tax compliance. Moreover, this magnitude is roughly comparable to the findings from laboratory experiments on the public goods game. Take, for example, Fischbacher et al. (2001), one of the earliest studies on conditional cooperation. According to Figure 1 from that paper, for each additional dollar in the average contribution of others, the average subject contributes an additional \$0.45. We note that it is not obvious that fairness considerations would hold significant weight in the real-world context of tax compliance. For example, the stakes are orders of magnitude higher for property taxes than for laboratory games; and taxpayers may have strong views about the role of government that are absent in the context of laboratory settings (Huet-Vaughn et al., 2019).

5 Conclusions

This paper provides unique causal evidence on the importance of fairness considerations for tax compliance. We conducted a natural field experiment in the context of U.S. property taxes. We mailed letters to households to introduce exogenous variation in homeowners' perceptions of the average tax rate paid by other households in their county. We examined the impact of this information shock on households' high-stakes decisions to file a tax appeal. Our evidence indicates that when households perceive that other households pay a higher (lower) tax rate, that increases (decreases) the households' willingness to pay taxes, as revealed by a decrease (increase) in their probability of filing a tax appeal. Using the responses to a complementary survey included in the letters, we provide evidence about the mechanism driving this result: we find that our treatment affects homeowners' fairness

[45] The average home is worth \$294,846 and pays a tax amount of \$5,916 in Dallas county before any filters. A change in the tax rate by 0.1 pp is equivalent to a change in the average tax amount of \$295 ($= \$294,846 \cdot 0.001$).

perceptions.

An important factor to consider in any empirical study is the generalizability of the findings. Our study focuses on a single county, although our focal location is the second largest county in Texas and, with an estimated population of 2.6 million in 2020, it has a population larger than 15 states in the U.S.[46] We believe that our field experiment results could be replicated in any of the 241 counties in Texas where property taxes work almost identically. Moreover, property tax protests are also consequential and work similarly in many other U.S. counties and even other countries. Thus replicating our field experiment for other U.S. counties would be relatively straightforward. In addition, we focus on a single type of tax in a developed country and, despite the fact that property taxes are the second largest source of tax revenue in the United States, each tax and country or subnational government has unique intricacies.[47]

Finally, studying whether empirical results align across different experimental settings and designs can provide clues about the generalizability of experimental results (Levitt and List, 2007). In our case, there is concordance on how fairness affects the willingness to contribute to the provision of public goods: our estimates from the field experiment and the results from laboratory experiments on the public goods game (e.g., Fischbacher et al. (2001)) are quantitatively similar. Although this concordance may lend support to the generalizability of our empirical estimates, given the scant field experimental evidence on the role of fairness considerations in tax compliance more work on these topics is warranted.

[46] We view our results from the field experiment as a wave-1 insight that establishes initial causality and produces first tests of theory in the field in the language of List (2020).

[47] For example, some taxes are withheld limiting the taxpayer from deciding how much taxes to pay.

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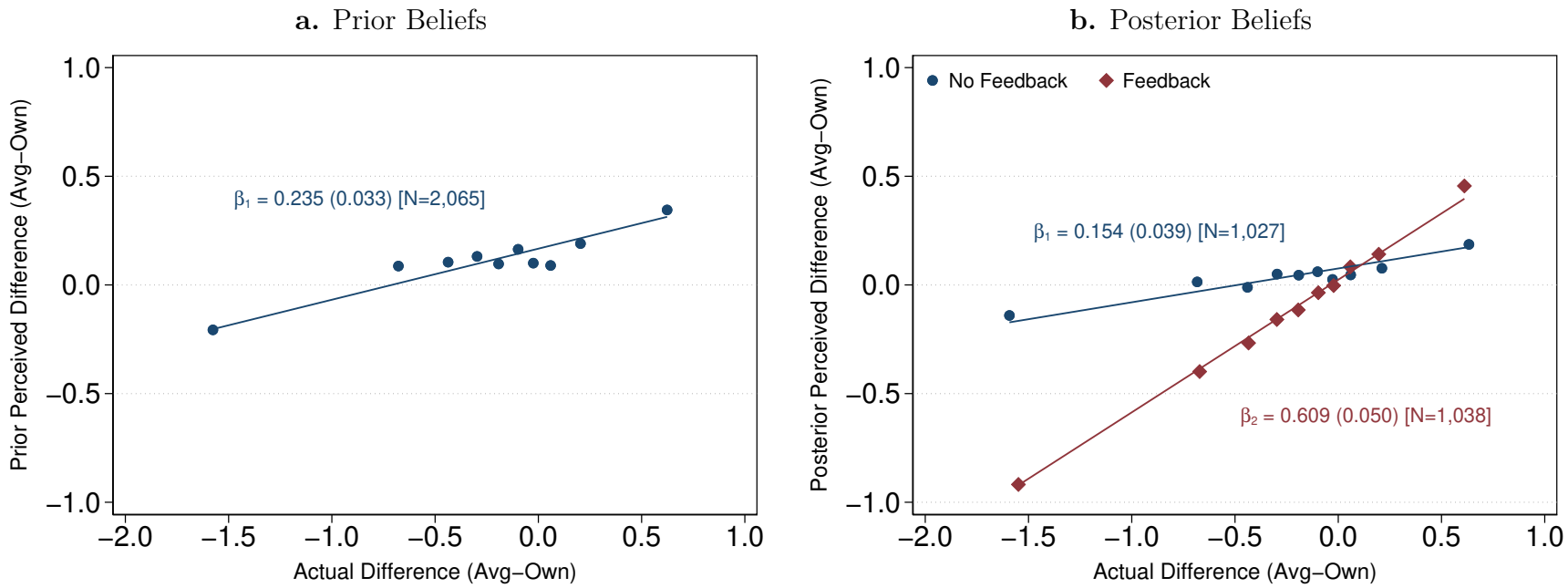
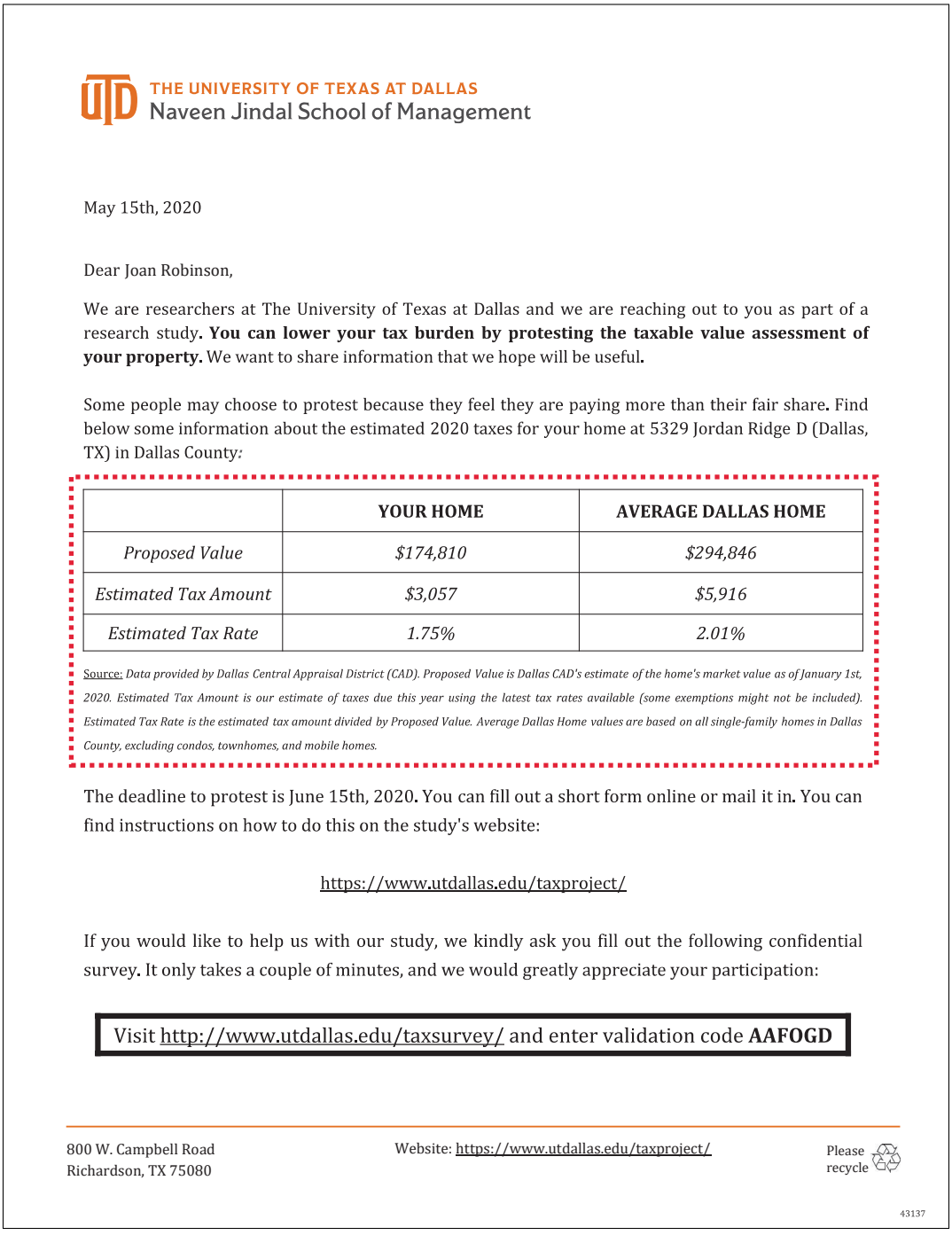
Figure 1: Prior Misperceptions and Belief Updating in the Survey Experiment



Notes: This figure shows how the information treatment in the Survey Experiment affected respondents' perceptions. Each line corresponds to a separate OLS regression, with robust standard errors in parentheses and the number of observations in brackets. The x-axis corresponds with the respondent's *actual* relative position with respect to the county average (i.e., the difference between the actual average tax rate in the respondent's county and the respondent's own tax rate ($\overline{\tau} - \tau_i$). In panel (a) the y-axis corresponds with the difference between the respondent's *perceived* average tax rate in the county and the household's own tax rate prior to the feedback on the actual county average tax rate could be shown. In panel (b) the y-axis is the respondent's corresponding *posterior* belief at the end of the survey (i.e., after the information-provision experiment). The regressions in this figure include the actual average home value and the actual average tax amount in the respondent's county as controls. The results from panel (b) are broken down by treatment group and response decile within the treatment group: the red diamonds (labeled "Feedback") correspond to deciles of respondents who were shown the feedback while the blue circles (labeled "No Feedback") correspond to deciles of those not shown the feedback.

Figure 2: First Page of the Letter from the Field Experiment



THE UNIVERSITY OF TEXAS AT DALLAS
Naveen Jindal School of Management

May 15th, 2020

Dear Joan Robinson,

We are researchers at The University of Texas at Dallas and we are reaching out to you as part of a research study**. You can lower your tax burden by protesting the taxable value assessment of your property.** We want to share information that we hope will be useful**.**

Some people may choose to protest because they feel they are paying more than their fair share**.** Find below some information about the estimated 2020 taxes for your home at 5329 Jordan Ridge D (Dallas, TX) in Dallas County*:*

	YOUR HOME	**AVERAGE DALLAS HOME**
Proposed Value	*$174,810*	*$294,846*
Estimated Tax Amount	*$3,057*	*$5,916*
Estimated Tax Rate	*1.75%*	*2.01%*

Source: *Data provided by Dallas Central Appraisal District (CAD). Proposed Value is Dallas CAD's estimate of the home's market value as of January 1st, 2020. Estimated Tax Amount is our estimate of taxes due this year using the latest tax rates available (some exemptions might not be included). Estimated Tax Rate is the estimated tax amount divided by Proposed Value. Average Dallas Home values are based on all single-family homes in Dallas County, excluding condos, townhomes, and mobile homes.*

The deadline to protest is June 15th, 2020**.** You can fill out a short form online or mail it in**.** You can find instructions on how to do this on the study's website:

https://www.utdallas.edu/taxproject/

If you would like to help us with our study, we kindly ask you fill out the following confidential survey**.** It only takes a couple of minutes, and we would greatly appreciate your participation:

Visit http://www.utdallas.edu/taxsurvey/ and enter validation code **AAFOGD**

800 W. Campbell Road
Richardson, TX 75080

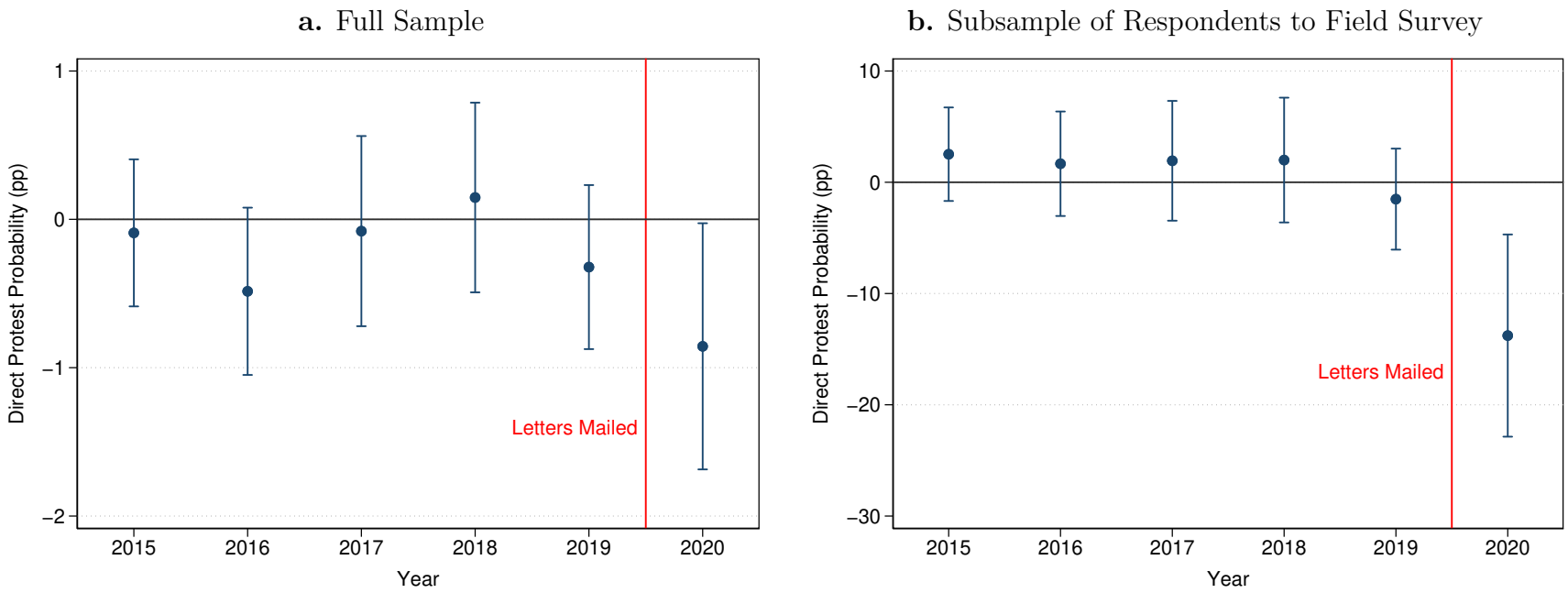
Website: https://www.utdallas.edu/taxproject/

Please recycle

43137

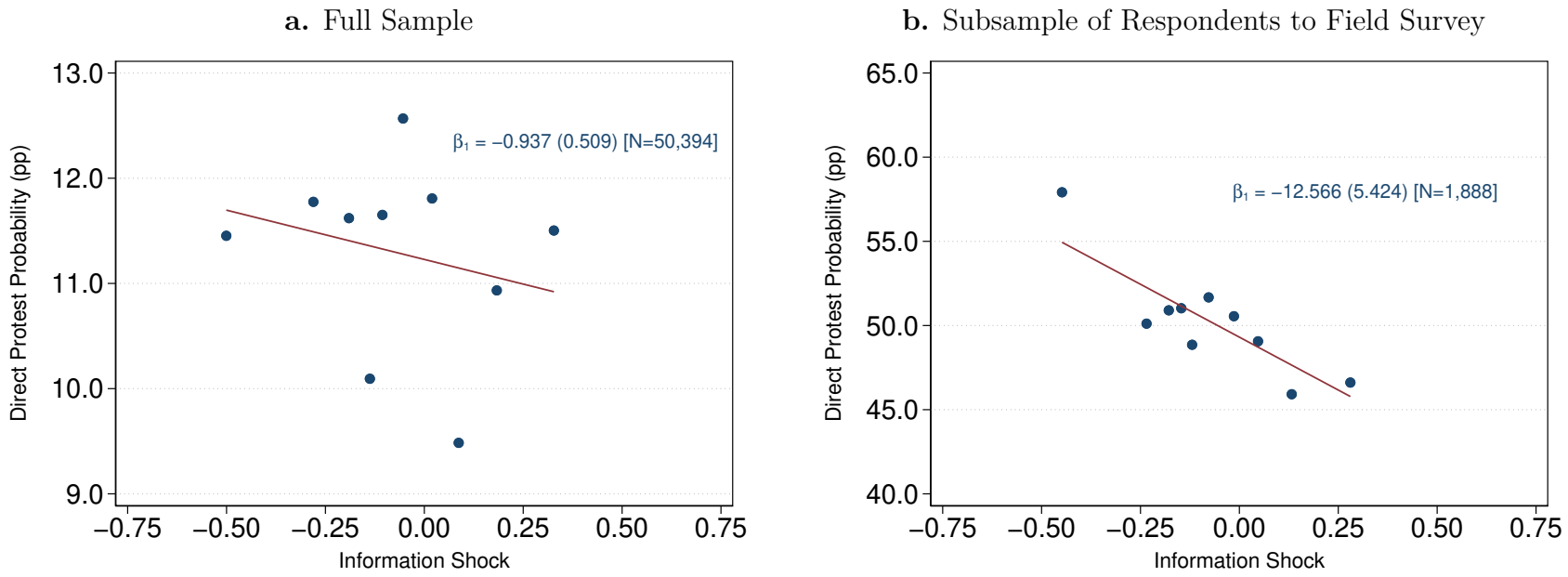
Notes: A sample of the first page of the letter used in the field experiment. The information in the table varied by treatment group. Sample tables for every treatment group are presented in Figure B.1. The table appears inside a red frame with dashed lines (this frame was added to this figure for emphasis but does not appear in the actual letters).

Figure 3: Results from the Field Experiment: Event-Study Falsification Tests



Notes: Point estimates with 90% confidence intervals in brackets, based on robust standard errors. The point estimates are computed in the same way within both panels: the point estimates within each panel only change the focal year. Panel (a): The blue dots represent the coefficient on the information shock ($D_i \cdot (\overline{\tau} - \tau_i)$) based on equation (4) from Section 3.4, with direct protests as the dependent variable. Panel (d): same as panel (b) except that it is based on the subsample of 1,888 subjects who responded to the Field Survey. The regressions in this figure include the following controls: the 2020 proposed value in levels and its annual growth, dummies for multiple owners, school and special districts, number of years since the household's last protest, a dummy for homestead status, a dummy indicating if the household received the extra aid message, and, for each previous year since 2015, a dummy indicating if the household protested in that year and the outcome of the protest (if any) as a percent-reduction in the market value (i.e., the protest history). Control variables for the protest history depend on the year in which the dependent variable is measured. For instance, if the outcome corresponds to direct protests in 2018, the protest history controls include protests in 2015, 2016, and 2017.

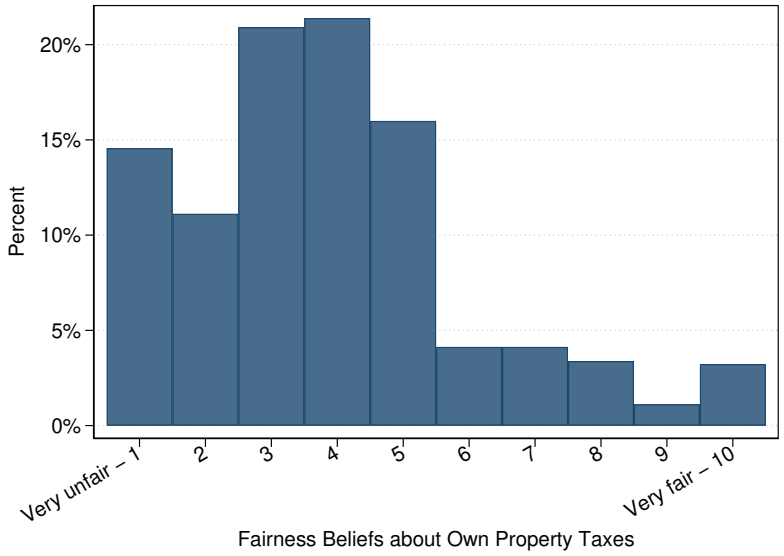
Figure 4: Results from the Field Experiment: Effects of the Average Tax Rate in the County on Direct Protests



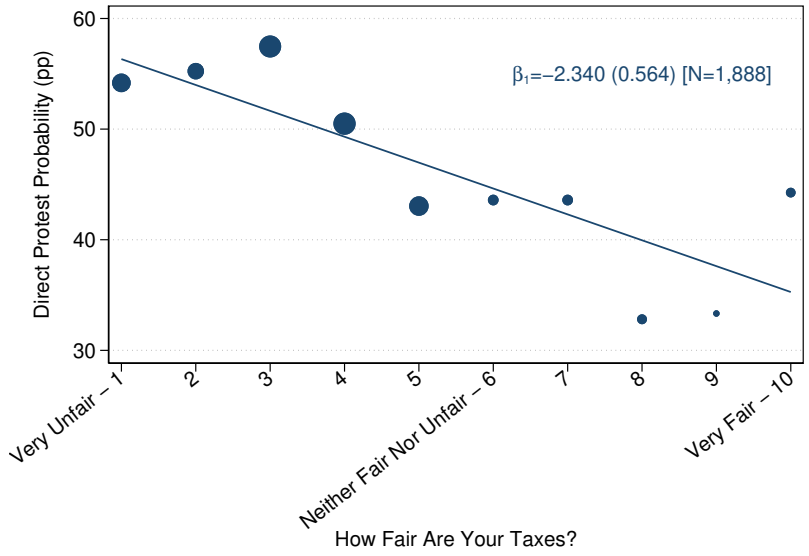
Notes: This figure depicts binned scatterplot representations of the effect of the information on the average tax rate in the county on the probability of protesting directly, for the full field experiment (panel (a)) and the subsample that responded to the Field Survey (panel (b)). Each dot corresponds with a decile of households' prior beliefs of the average tax rate in the county. The x-axis corresponds to the interaction between the respondent's *actual* relative position with respect to the county average (i.e., the difference between the actual average tax rate in the respondent's county and the respondent's own tax rate ($\overline{\tau} - \tau_i$)) and a dummy variable that indicates if the household was selected to receive the information on the average tax rate in the county. The y-axis corresponds to the probability of a direct protest in 2020. The line in each panel corresponds to the linear fit and is shown with the corresponding slope and robust standard error (in parentheses). The regressions in this figure include the following controls: the 2020 proposed value in levels and its annual growth, dummies for multiple owners, school and special districts, number of years since the household's last protest, a dummy for homestead status, a dummy indicating if the household received the extra aid message, and, for each previous year since 2015, a dummy indicating if the household protested in that year and the outcome of the protest (if any) as a percent-reduction in the market value (i.e., the protest history). Control variables for the protest history depend on the year in which the dependent variable is measured. For instance, if the outcome corresponds to direct protests in 2018, the protest history controls include protests in 2015, 2016, and 2017. The x-variable and y-variables are residualized on the control variables and the sample mean of each variable is added back to its residuals before binning and plotting.

Figure 5: Non-Experimental Test of the Fairness Channel

a. Survey Responses about Perceived Fairness of Own Taxes

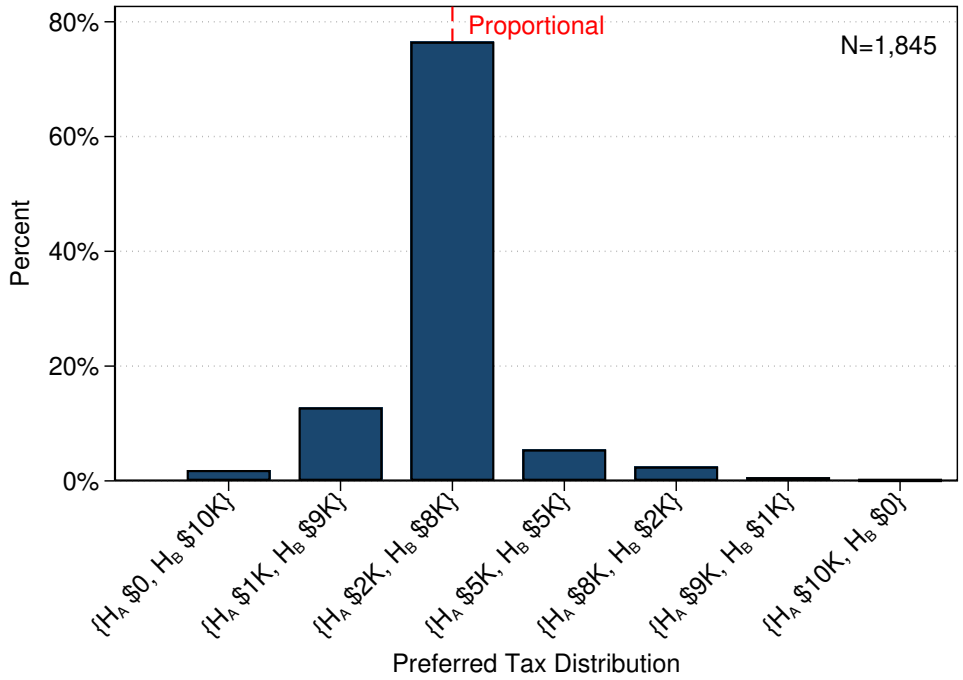


b. Direct Protest Rates and Perceived Fairness



Notes: Non-experimental evidence of the fairness channel based on responses from 1,888 subjects in the Field Survey. Panel (a) features responses from subjects who answered the question, "Relative to the other households in the county, do you think your household pays a fair amount in property taxes?" Subjects could answer on a scale from 1 to 10, with 1 indicating "Very unfair" and 10 indicating "Very fair". Panel (b) presents a binned scatterplot of the association between direct protest rates (observed in the administrative records) and households' perceived fairness of their own property taxes (from a question included in the Field Survey). The size of each circle is proportional to the number of subjects that provided the response indicated. The line corresponds to the linear fit and is shown with the corresponding slope and robust standard error (in parentheses).

Figure 6: Evidence from Field Survey on Social Norms about Fair Tax Rates



Notes: This histogram shows the results of the responses to a question included in the Field Survey in Dallas County regarding the fair distribution of tax burden. The horizontal axis shows the options presented to respondents on how to distribute a total tax burden of $10,000 between Household A (which is worth $100,000) and Household B (which is worth $400,000). The vertical axis presents the share of the responses choosing each of the seven options. The dashed red line indicates the choice that provides the same (proportional) tax rate for both households.

Table 1: Randomization Balance Test: Field Experiment

	Full Sample				Field Survey Subsample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	Treatment	Control	P-value	All	Treatment	Control	P-value
Home Value ($1,000s)	343.162	345.235	339.001	0.034	394.983	395.021	394.916	0.994
	(1.406)	(1.743)	(2.371)		(6.987)	(8.548)	(12.092)	
Property Tax Rate (%)	2.103	2.104	2.100	0.364	2.107	2.125	2.075	0.014
	(0.002)	(0.003)	(0.004)		(0.010)	(0.012)	(0.016)	
Owner-Protest in 2019 (%)	5.854	5.934	5.692	0.273	10.328	10.370	10.253	0.936
	(0.105)	(0.129)	(0.179)		(0.701)	(0.875)	(1.170)	
Agent-Protest in 2019 (%)	4.598	4.543	4.708	0.407	5.667	5.926	5.201	0.507
	(0.093)	(0.114)	(0.164)		(0.532)	(0.678)	(0.857)	
2020 Homestead Exemption (%)	83.760	83.779	83.722	0.871	92.797	92.346	93.611	0.297
	(0.164)	(0.201)	(0.285)		(0.595)	(0.763)	(0.943)	
Number of Bedrooms	3.304	3.303	3.306	0.554	3.410	3.396	3.435	0.197
	(0.003)	(0.003)	(0.005)		(0.015)	(0.018)	(0.025)	
White (%)	44.275	44.412	44.000	0.380	56.568	57.449	54.978	0.301
	(0.221)	(0.271)	(0.383)		(1.141)	(1.419)	(1.919)	
Hispanic (%)	27.321	27.290	27.382	0.827	15.307	15.556	14.859	0.686
	(0.199)	(0.243)	(0.344)		(0.829)	(1.040)	(1.372)	
Black (%)	18.685	18.579	18.897	0.389	17.691	16.626	19.614	0.110
	(0.174)	(0.212)	(0.302)		(0.878)	(1.069)	(1.532)	
Asian (%)	9.719	9.719	9.720	0.997	10.434	10.370	10.550	0.903
	(0.132)	(0.162)	(0.229)		(0.704)	(0.875)	(1.185)	
Observations	50,394	33,635	16,759		1,888	1,215	673	

Notes: Average pre-treatment (i.e., before the start of letter delivery) characteristics of subjects in the field experiment, with standard errors in parentheses. Column (1) corresponds to the entire field experiment sample, column (2) contains subjects in the field experiment that received the average rate treatment, and column (3) contains subjects in the field experiment that did not receive the information on the average rate. Column (4) reports the p-value of the test of equal means across the two groups shown in columns (2) and (3). Column (5) corresponds to the entire Field Survey sample. Column (6) contains respondents to the Field Survey who received the average rate treatment, and column (7) contains respondents of the Field Survey that did not receive the information on the average rate. Column (8) reports the p-value of the test of equal means across the two groups shown in columns (6) and (7). *Home Value* is the proposed assessment value; *Property Tax Rate* is the ratio of the property tax amount over the home value; *Owner-Protest in 2019* and *Agent-Protest in 2019* indicates whether the subject protested directly or through an agent in 2019, respectively; *2020 Homestead Exemption* indicates an effective homestead exemption. *Number of Bedrooms* is the number of bedrooms in the respondent's home. *White*, *Hispanic*, *Black*, and *Asian* are the fraction of homeowners by each imputed race.

Table 2: Results from the Field Experiment: Effects of the Information on the Average Tax Rate in the County

	Full Sample			Field Survey				
	(1) P^d_{2020}	(2) P^d_{2020}	(3) P^d_{2020}	(4) P^d_{2020}	(5) I_{2020}	(6) F_{2020}	(7) P^d_{2020}	(8) P^d_{2020}
Information Shock ($\overline{\tau}$)	-0.937*	-2.131*	-0.528	-12.566**	-11.919***	0.459*	-13.566*	-12.094
	(0.509)	(1.224)	(0.524)	(5.424)	(4.495)	(0.244)	(7.047)	(8.707)
Predicted Probability:		$Q > Q_{50}$	$Q \leq Q_{50}$					
Protested in Recent Past:							No	Yes
Mean Outcome (Control)	11.08	15.67	6.52	50.52	82.86	4.02	46.26	55.08
Std. Dev. Outcome (Control)	31.39	36.35	24.69	50.03	37.72	2.13	49.93	49.82
Observations	50,394	25,197	25,197	1,888	1,867	1,888	1,008	880

Notes: Significant at *10%, **5%, ***1%. Robust standard errors in parentheses. All columns present results from equation (4) in Section 3.4. The variable *Information Shock* ($\overline{\tau}$) corresponds to the information shock term ($D_i \cdot (\overline{\tau} - \tau_i)$). Column (1) reports results for subjects in the field experiment who received a letter. Column (2) shows results for subjects who were predicted by a probit model to have an above-median probability of responding to the Field Survey contained in the mailed letters, while column (3) shows the same for subjects with below-median probability of responding. Columns (4) through (8) report results for subjects who received a letter in the field experiment and responded to the Field Survey. Columns (7) and (8) split the sample used in column (2) in two groups: i) subjects who did not protest during 2015 through 2019 (column (7)) and ii) subjects who protested at least once during 2015 through 2019 (column (8)). The dependent variables are defined as follows: P^d_{2020} is an indicator variable that takes the value 100 if the owner protested directly in 2020 and 0 otherwise; I_{2020} is an indicator variable that takes the value 100 if the household reported to be either likely or very likely to protest in 2020 and zero otherwise; F_{2020} corresponds to a question about whether the taxes of the respondent are fair relative to the taxes of everyone else, on a 1-10 scale. The regressions in this table include the following controls: the 2020 proposed value in levels and its annual growth, dummies for multiple owners, school and special districts, number of years since the household's last protest, a dummy for homestead status, a dummy indicating if the household received the extra aid message, and, for each previous year since 2015, a dummy indicating if the household protested in that year and the outcome of the protest (if any) as a percent-reduction in the market value (i.e., the protest history). Control variables for the protest history depend on the year in which the dependent variable is measured. For instance, if the outcome corresponds to direct protests in 2018, the protest history controls include protests in 2015, 2016, and 2017.

Online Appendix (For Online Publication Only)

Nathan, Perez-Truglia and Zentner, "Paying Your Fair Share: Perceived Fairness and Tax Compliance"

May 22, 2024

A Survey Experiment: Additional Details and Robustness Checks

A.1 Details about the Survey Experiment Design

The complete Survey Experiment instrument is included in Appendix G and is summarized below:

- **Step 1 (Elicit Prior Beliefs):** We elicit respondents' perceptions about the home market value and property taxes for the average household in their county of residence as of January 1st, 2018.

- **Step 2 (Information-Provision Experiment):** On a screen, we inform all survey participants that some of them will be randomly chosen to receive information about average home values and average property taxes in their county. On the next screen, a random half of the respondents discovers whether or not they were assigned to receive the information treatment and, if selected to treatment, provided with accurate information about the average home value and property taxes (in dollars) in their county. We created the feedback for the survey using the latest available data at the time of the intervention from the US Census' 2018 American Community Survey (ACS).[48]

[48] Specifically, we used 2018 ACS's one-year estimates to compute the average home values and property taxes for 3,210 counties across all 50 U.S. states. For counties in which the required data were not available, we used 2018 ACS's five-year estimates instead. The ACS provides numbers of homes in different value ranges, so we used the number of households in each range and the midpoints of the ranges to construct a weighted average home value by county.

- **Step 3 (Elicit Posterior Beliefs):** We re-elicited subjects' guesses about average home market values and average property taxes in their county to assess learning from the treatment. Following the design from other information treatment experiments (e.g., Cavallo et al., 2017; Giaccobasso et al., 2023), we re-elicited posterior beliefs about a different point in time (January 1st, 2020) than for the prior beliefs (January 1st, 2018). This strategy avoids asking the exact same question twice.[49]

Lastly, the Survey Experiment ended with several miscellaneous questions designed to provide descriptive statistics about the sample and to be potentially useful for additional analysis.[50]

A.2 Details about the Survey Experiment Sample

Column 1 of Table B.1 presents summary statistics for subjects in the Survey Experiment. In this sample, the average home value is $294,120 and the average tax rate is 1.28%. The Survey Experiment includes questions on the number of bedrooms in the respondent's home, the respondent's age, and the respondent's race. The average number of bedrooms is 3.08, the average age is 42.6 years and the majority of respondents reported their race to be "White." We can compare the statistics for the Survey Experiment to statistics of a representative sample of the entire United States based on data from the American Community Survey (ACS) 5-Year (2014-2018), reported in column (5). This comparison shows similar statistics for home value, number of bedrooms, and share of White homeowners.[51] Survey respondents are younger compared to the general U.S. population of homeowners.

Table B.2 shows the treatments for the Survey Experiment are well-balanced in terms

[49] Otherwise, respondents in the control group may feel uncomfortable responding to the same question twice even though they did not receive any information. Also, using slightly different questions may put less pressure on respondents to answer exactly with the feedback given to them in Step 2.

[50] More precisely, we included questions on political identification, preferences for the government size, demographic characteristics, household characteristics, knowledge about tax protests, and a set of questions on social norms about the fair distribution of taxes.

[51] It is difficult to compare other races since the race choices that subjects have in our Survey Experiment are different from the race choices in the American Community Survey.

of observable characteristics, which demonstrates that randomization was successful. This table shows the averages of the household characteristics of subjects in each treatment group. Column (1) corresponds to the average characteristics for the subjects in the Survey Experiment. Columns (2) through (5) of Table B.2 present the pre-treatment household characteristics for respondents who were randomly assigned to each of the four treatment group, based on whether they received two types of information. Subjects in columns (2) and (3) received information on the average home value and taxes in their county, and subjects in columns (4) and (5) did not. For respondents in columns (3) and (5), the survey made the tax rate explicit in an additional row in the table that summarized the subject's responses, while respondents in columns (2) and (4) did not receive this additional row. Column (6) reports p-values for the null hypothesis that each average characteristic is equal across these four treatment groups. Consistent with successful random assignment, the results show that the observable characteristics are well-balanced across these treatment groups.

A.3 Survey Experiment: Property Tax's Proportionality Norm

We showed in Section **??** that a majority of the households from Dallas County who answered the Field Survey chose an allocation of the tax burden supporting a "Property Tax's Proportionality Norm." We asked a similar question in the Survey Experiment. Specifically, we asked respondents to the Survey Experiment to distribute the same tax burden of $10,000 between Household A worth $100,000 and Household B worth $400,000. Instead of providing options, in this question respondents needed to type numbers with their preferred allocation of the $10,000 tax burden among the two households, which requires mathematical calculation. The histogram in Figure B.4 shows the results of the responses to this question. The horizontal axis shows bins of the share of the total tax burden respondents allocated to household A and the vertical axis presents the share of the responses for each bin. The vertical red line denotes the case of proportional taxes. The results show that the majority of respondents prefer the modal bin that includes that the poorer household pays $2,000 in

taxes (corresponding to a tax rate of 2 percent of the $100,000 home) and the richer household pays $8,000 in taxes (corresponding to a tax rate of 2 percent of the $400,000 home). This suggests that households in other places in the United States also consider it fair for everyone to pay the same property tax rate.

In the Survey Experiment we also included two more questions with larger differences in the home values of Households A and B. Specifically, in the second scenario (the histogram in Figure B.5.a) subjects were asked how they would distribute $24,000 of taxes between Household A (worth $100,000) and Household B (worth $1,100,000) and in the third scenario (the histogram in panel (b)), subjects were asked how they would distribute $30,000 of taxes between Household A (worth $400,000) and Household B (worth $1,100,000). In both panels of Figure B.5, the horizontal axis shows bins for the share of the total tax burden respondents would allocate to Household A in each given scenario and the vertical axis presents the share of the responses for each bin.[52]

The vertical red lines in both panels of Figure B.5 denote the case of proportional taxes. The results of the histograms in panel (a) show that the red lines, which indicate proportional taxes, coincide with the modal response. Panel (b) shows slight preferences for regressivity. In sum, even though desired tax regressivity increases somewhat when the difference between the prices of hypothetical Households A and B increases, preferences for regressivity appear to be limited for property taxes. However, the results in these two scenarios in Figure B.5 should be taken with a grain of salt. Given that the ratios of the two households' values are more mathematically complex (likely too difficult for most respondents to do in their heads) and the set of responses that subjects could provide is continuous instead of choices as in the Field Survey, it is likely that respondents did a lot of rounding and were more prone to making errors in their calculations.

[52] We split the responses from the 2,065 subjects who responded to the survey among the three scenarios we included.

B Field Experiment: Additional Details and Robustness Checks

B.1 Additional Details about the Data, Design, and Implementation of the Field Experiment

This section presents supplementary details about the data, design and execution of the field experiment.

First, we describe the filters used to arrive at the main sample of 423,607 residential single-family households in Dallas County shown in column (2) of Table B.1. We started with the DCAD's full database of 736,900 real property (i.e., non-business personal property) accounts in Dallas County in 2020. We then applied various filters to arrive at the 423,607 households in the final sample. We excluded commercial real properties, non-single-family residential properties (e.g., condos, townhouses, mobile homes, apartments, P.O. boxes, vacant lots) which are likelier to be rentals, and properties with key information missing such as the proposed value (in 2020 or 2019), taxable values, property address or owner's mailing address, or the number of bedrooms or bathrooms. Finally, we excluded households with proposed values lower than $50,000 or greater than $7.5 million.[53]

Next, we outline the filters we used to select the subject pool for the field experiment. Starting with the main sample of 423,607 residential single-family households in Dallas County described above, we filtered out households with missing information on year built, households flagged by National Change of Address as invalid or having moved, households where the Census' geocoding tool did not yield an address match, and households with tax rates lower than 1 percent.

We further excluded households where the owner's mailing address did not coincide with the property address, since these households may be investors or less likely to receive

[53] The average tax rate (2.01%) and tax amount ($5,916) figures shown in the letters are based on all single-family homes, without making these and other exclusions.

our letter, and properties with certain keywords in the owner field. Specifically, we excluded keywords suggesting that a business operates in the property (e.g., "LLC," "corp," "realty"), suggesting ownership by a government body (e.g., "Texas," "city"), or where the listed owner is not a person's name (e.g., "estate," "community"). Finally, we filtered households where we could not find a comparison household that we use for a treatment we study in Nathan et al. (2023).

After applying all these filters we arrived at a sample of 78,462 households which is the subject pool used in Nathan et al. (2023). We then randomly selected 50,983 households who received a letter. Finally, we removed 589 households who had already protested before potentially receiving our letter (May 21st, 2020) to reach to the field experiment's subject pool of 50,394 households.

All the letters we mailed included information on the household's proposed market value and estimated tax amount, and we cross-randomized whether we also showed the "Average Dallas Home" column. We also cross-randomized whether the letters included an additional row with the "Estimated Tax Rate" (see Section 3.3 for a description of the mailing design and see Figure 2 for the first page of a sample letter with a red box highlighting the parts that were randomized).

Definitions of each of the variables disclosed in the table of the letter were summarized in the notes provided below the table. Below, we provide additional details about each of these variables:

- Proposed Value for "Your Home:" The estimated market value of the property on January 1st, 2020, as proposed by the DCAD. This is the market value included in the Notice of Appraised Value posted online by the DCAD on May 15th, 2020 and mailed to homeowners when there is a change in ownership, when the DCAD changed the property's market value, or when the DCAD changed the property's homestead exemption status.

- Proposed Value for the "Average Dallas Home:" The average market value for all single-

family residential properties, excluding condos, townhomes, and mobile homes in Dallas County on January 1st, 2020, as proposed by the DCAD.

- Estimated Tax Amount for "Your Home:" This is the estimated total property taxes due, obtained by summing estimated taxes due across all applicable jurisdictions for the subject's household in the 2020 tax year. We followed a similar process as the DCAD to estimate 2020 property taxes due. That is, for each jurisdiction, the property's estimated taxes due are calculated as the jurisdiction's estimated taxable value for the household (provided in the DCAD's data) multiplied by the jurisdiction's 2019 tax rate.[54]

- Estimated Tax Amount for the "Average Dallas Home:" This is the average 2020 estimated tax amounts due across all single-family residential properties in Dallas County (excluding condominiums, town homes, and mobile homes).

- Estimated Tax Rate for "Your Home:" The estimated property tax rate for the subject's household. This is calculated as the household's Estimated Tax Amount divided by its Proposed Value.

- Estimated Tax Rate for the "Average Dallas Home:" This is the average 2020 estimated property tax rate for all single-family residential properties in Dallas County (excluding condominiums, town homes, and mobile homes). It is calculated as Estimated Tax Amount of the Average Dallas Home divided by the Proposed Value of the Average Dallas Home.

We use a race prediction algorithm to impute likely race – Ethnicolr (Sood and Laohaprapanon, 2018). We ran this algorithm using the first and last names of each individual listed as a homeowners of each household. We then, for each household, average the race

[54] Due to data availability, we did not include Special Districts in our calculation of estimated taxes due. This makes little difference in practice, as these special rates account for less than 0.01% of the average tax amount.

probabilities of each homeowner, and assign the household to the racial group with the highest probability.[55]

Column (3) of Table B.1 presents summary statistics for the subject pool used in the field experiment. Comparing the statistics in Column (2) and (3) of Table B.1 does not reveal substantial differences between the universe of 423,607 residential single-family properties in Dallas County and the subject pool we use in the field experiment.[56] Moreover, both the home value and age in the universe of residential single-family properties in Dallas County and in the subject pool, in columns (2) and (3) respectively, are similar to those in the whole United Sates shown in column (5).

Next, we show that the treatment groups in the field experiment are well-balanced in terms of observable characteristics, demonstrating that the randomization was successful. Table B.3 breaks down the averages of the characteristics we used in the randomization, by treatment group. Column (1) of Table B.3 corresponds to the average characteristics for the whole subject pool (which by construction is equal to column (3) of Table B.1). Columns (2) through (5) of Table B.3 present the pre-treatment characteristics for households who received a letter and were randomly assigned to each of the four treatment groups corresponding to the four types of tables (shown in Figure B.1). Column (6) reports p-values for the null hypothesis that each average characteristic is equal across these four treatment groups. Consistent with successful random assignment, the results show that the observable characteristics are well-balanced across these treatment groups.

B.2 Details about the Field Survey Sample

In this section we show how households who received our letters in the field experiment differ in terms of observable characteristics from the subset of households who responded to the Field Survey.

[55] For more details, see Nathan et al. (2023).

[56] We only observe the homeowners' age, which we obtained from a private vendor, for the homeowners in the subject pool we use in the field experiment.

Table B.4 compares the characteristics of three groups of households: (a) all households who were mailed a letter containing a link to the Field Survey, (b) households who responded to the Field Survey, and (c) households who did not respond to the Field Survey. Column (1) corresponds to the average pre-treatment characteristics for households who received a letter and thus were invited to take the Field Survey (which by construction is equivalent to column (3) of Table B.1). Columns (2) and (3) break down recipients into those who responded to the Field Survey and those who did not. Column (4) reports p-values for the null hypothesis that the average characteristics are equal between respondents and non-respondents. The results show that survey respondents are clearly not a random sample of the subject pool: the differences between the characteristics of respondents and non-respondents are statistically significant (with the exception of the tax rate) and are often economically large. Most notably, survey respondents were almost twice as likely as non-respondents to have protested in 2019. This is consistent with the interpretation given in Section 4 that those individuals who were more likely to protest taxes were more likely to choose to respond to our Field Survey.

In Table B.5 we show subjects' characteristics by treatment group for the Field Survey sample. For reference, column (1) reproduces column (4) of Table B.1 for the whole survey sample, columns (2) through (5) present the pre-treatment characteristics for the four types of tables in the letters (from Figure B.1) and column (6) reports p-values for the null hypothesis that each average characteristic is equal across the four treatment groups. Recall that randomization was done for the field experiment sample. Since subjects self-select into answering the survey, it is possible that treatment groups could be unbalanced in the survey sample. However, the results show that these observable characteristics that we consider are well-balanced across these treatment groups.

B.3 Field Experiment: Additional Results and Robustness Checks

In this section we present additional robustness checks of the results from the field experiment in Table 2 in the body.

Table B.6 contains these robustness checks. For reference, column (1) in Table B.6 reproduces the baseline results in column (4) of Table 2 using the sample of subjects who answered the Field Survey. Column (2) provides a falsification test using direct protests in the year 2019 as the dependent variable. Because the information cannot have effects until it is disclosed, we would not expect the information to have an effect on 2019 protests. As expected, the coefficient in column (2) is close to zero, statistically insignificant, and precisely estimated. This result can also be seen in Figure 3.b in the main text which includes falsification tests for years 2015-2019; however column (2) Table B.6 also reports the standard error of the estimated effects in 2019 and the mean and standard deviation of the outcome variable.

Columns (3) through (5) of Table B.6 provide evidence that the information treatment was consequential not only in terms of its effects on whether households choose to protest, but also on their subsequent market values and estimated taxes. Column (3) examines the extensive margin: i.e., the dependent variable is an indicator that takes the value 100 if the household saw a reduction in market value through a direct protest and 0 if the protest was not successful or if the household did not file a protest. The coefficient from column (3) is large (-13.881) and statistically significant (p-value=0.008), indicating that some of the protests affected by the information shock were successful. Columns (4) and (5) look at different margins of the success of direct protests. In column (4), the dependent variable is the percent-reduction in the market value as a result of a direct protest: i.e., it takes the value 0 if the protest was not successful or if the household did not protest, and it takes the value 10 if the successful protest resulted in a reduction of the market value of 10%, for example. Again, we find the coefficient on the information shock is negative (-0.798) and

statistically significant (p-value=0.049). In column (5) the dependent variable is equal to the percent-reduction in the estimated taxes due to a successful direct protest: i.e., it takes the value 0 if the tax amount was not reduced or if the household did not protest directly, and it takes the value 10 if the protest resulted in a 10% reduction in the tax amount (for example).[57] The coefficient is again negative (-0.402), although it is less precisely estimated and thus statistically insignificant. One challenge when seeking to compare the results in columns (4) and (5) to the results in column (1) is that the distribution of the outcome variables in columns (4) and (5) are quite different from the baseline results in column (1). The standardized effects, however, are comparable in magnitude: column (1) indicates that a 1 pp information shock induces an effect on protests of 0.31 ($= \frac{-12.566}{50.52}$) standard deviations, while the corresponding effects are of -0.21 ($= \frac{-0.798}{3.78}$) and -0.12 ($= \frac{-0.402}{3.48}$) standard deviations in columns (4) and (5), respectively.

Next, we discuss the role of salience of the tax rate. In the field experiment, we cross-randomized whether the table included a third row with the tax rate. Since this third row does not add any new information (it is simply the ratio between the previous two rows) its inclusion should not matter if subjects are rational, but might matter if showing the additional row makes the differences across taxpayers more apparent to them. Columns (6) and (7) of Table B.6 split the sample based on whether the additional row with the average tax rate in the county was shown (column (6)) or not (column (7)). The results suggest that the effects of information are somewhat stronger when the rate is shown than when it is not, although the coefficient estimates in columns (6) and (7) are statistically indistinguishable from each other.

Finally, in column (8) of Table B.6 we conduct the analysis restricting the sample to the subjects who in the Field Survey answered that they considered fair for everyone to pay exactly the same tax rate. The results in column (8) are similar in terms of both magnitude

[57] Note that, on average, the tax savings are smaller than the reduction in the market values. The main reason for that is that when the homestead cap is binding, a reduction in the market value may not affect the taxes due in the first year (but it can affect the taxes due in future years).

and statistical significance to the baseline results in the text, that are also reproduced in column (1) of Table B.6.

Figure B.1: Sample Information Tables

a. Average: No, Rate: No

	YOUR HOME
Proposed Value	*$174,810*
Estimated Tax Amount	*$3,057*

Source: *Data provided by Dallas Central Appraisal District (CAD). Proposed Value is Dallas CAD's estimate of the home's market value as of January 1st, 2020. Estimated Tax Amount is our estimate of taxes due this year using the latest tax rates available (some exemptions might not be included).*

b. Average: Yes, Rate: No

	YOUR HOME	AVERAGE DALLAS HOME
Proposed Value	*$174,810*	*$294,846*
Estimated Tax Amount	*$3,057*	*$5,916*

Source: *Data provided by Dallas Central Appraisal District (CAD). Proposed Value is Dallas CAD's estimate of the home's market value as of January 1st, 2020. Estimated Tax Amount is our estimate of taxes due this year using the latest tax rates available (some exemptions might not be included). Average Dallas Home values are based on all single-family homes in Dallas County, excluding condos, townhomes, and mobile homes.*

c. Average: No, Rate: Yes

	YOUR HOME
Proposed Value	*$174,810*
Estimated Tax Amount	*$3,057*
Estimated Tax Rate	*1.75%*

Source: *Data provided by Dallas Central Appraisal District (CAD). Proposed Value is Dallas CAD's estimate of the home's market value as of January 1st, 2020. Estimated Tax Amount is our estimate of taxes due this year using the latest tax rates available (some exemptions might not be included). Estimated Tax Rate is the estimated tax amount divided by Proposed Value.*

d. Average: Yes, Rate: Yes

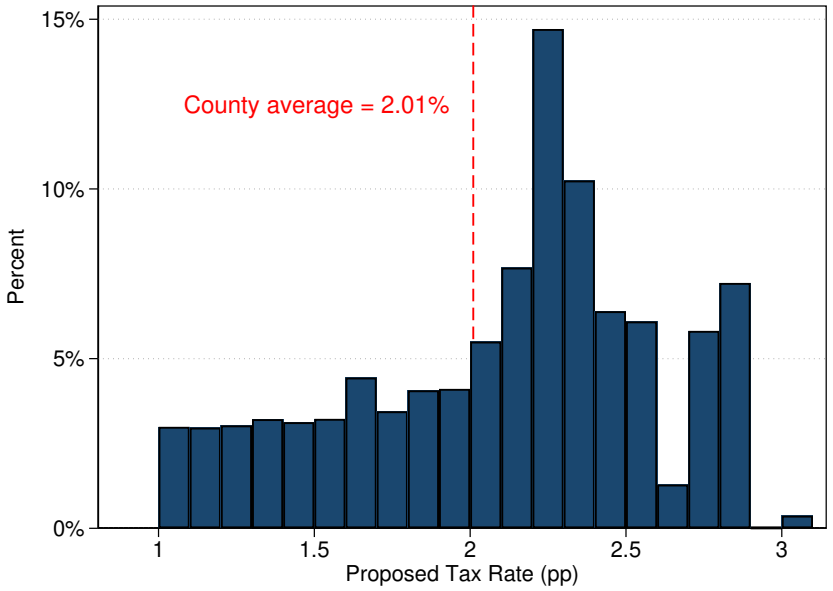
	YOUR HOME	AVERAGE DALLAS HOME
Proposed Value	*$174,810*	*$294,846*
Estimated Tax Amount	*$3,057*	*$5,916*
Estimated Tax Rate	*1.75%*	*2.01%*

Source: *Data provided by Dallas Central Appraisal District (CAD). Proposed Value is Dallas CAD's estimate of the home's market value as of January 1st, 2020. Estimated Tax Amount is our estimate of taxes due this year using the latest tax rates available (some exemptions might not be included). Estimated Tax Rate is the estimated tax amount divided by Proposed Value. Average Dallas Home values are based on all single-family homes in Dallas County, excluding condos, townhomes, and mobile homes.*

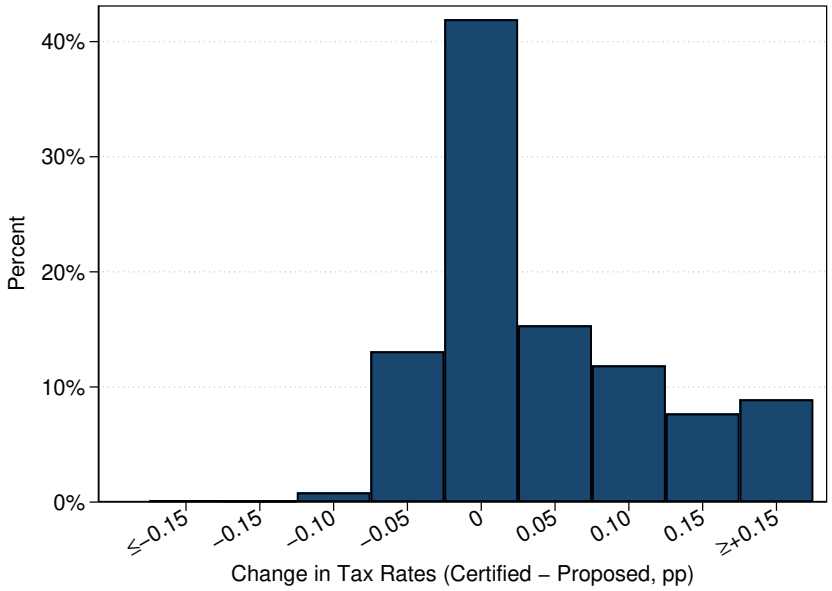
Notes: Each panel corresponds to the hypothetical table that a given household would receive if assigned to the specified treatment group. The table was placed in the middle of the first page of the letter, within the red frame with dashed lines in Figure 2 (the red frame was not included in the actual letters – See Appendix C for a sample of the letter without the red boxes added). Appendix B.1 provides details on how the values shown in each table were calculated.

Figure B.2: Distributions of Subject Households' Property Tax Rates and Tax Rate Changes Due to Protesting

a. Subject Households' 2020 Proposed Tax Rates

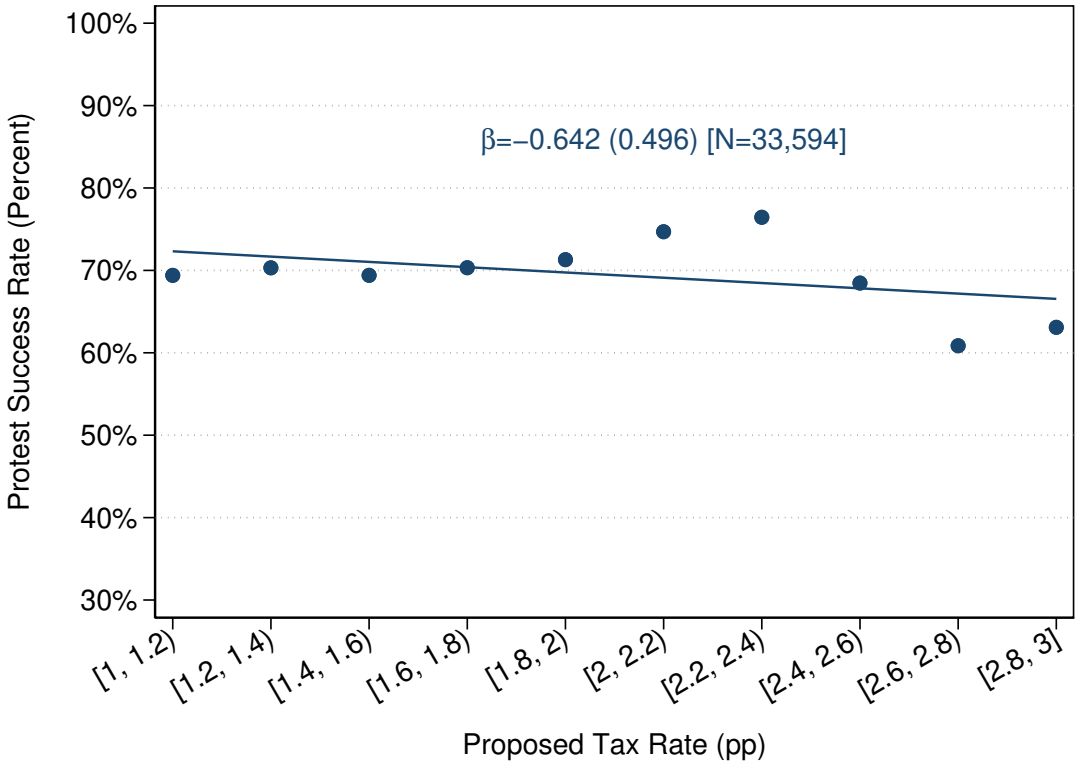


b. Changes Between Proposed and Certified Tax Rates



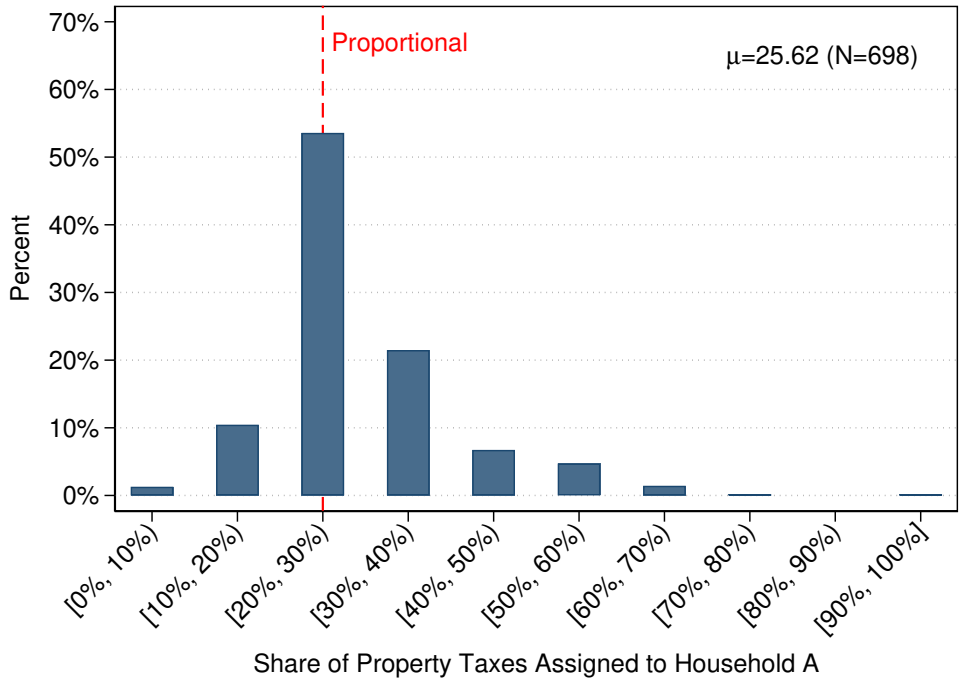
Notes: Panel (a) shows the distribution of 2020 proposed tax rates (i.e., prior to protesting) for subjects that were mailed a letter in the field experiment. The dashed red line indicates the average proposed tax rate across the main sample of single-family homes in the county. Panel (b) presents the distribution of tax rate changes, computed as the difference between a subject's 2020 certified tax rate (i.e., after protesting if the subject did so in 2020) and the 2020 proposed tax rate, for subjects that were mailed a letter in the field experiment and whose direct protests in 2020 successfully reduced their household's market value. Bins are left-end-point-inclusive. Proposed tax rate is defined as the household's proposed tax amount divided by its proposed market value (as notified by the DCAD). Certified tax rate is the certified tax amount divided by the certified market value.

Figure B.3: Successful Protests by Tax Rate



Notes: This figure features the relationship between successful direct protests and proposed tax rates. A successful protest is defined as a protest that results in a reduction of the DCAD's assessment of the household's market value. Proposed tax rate is defined as the household's proposed tax amount divided by its proposed market value (as notified by the DCAD). The sample contains households in the main sample of 423,607 single-family homes that protested directly in 2020 and had proposed tax rates between 1% and 3%. The blue dots correspond to each proposed tax rate bin. The blue line corresponds to the linear fit and is shown with the corresponding slope and robust standard error (in parentheses).

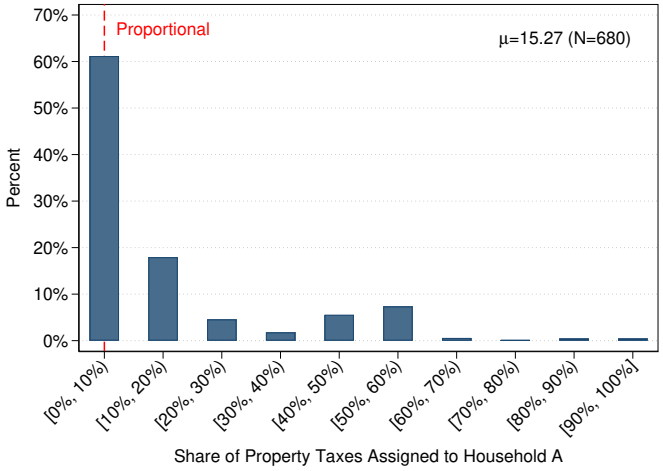
Figure B.4: Evidence on Social Norms about Fair Tax Rates from the Survey Experiment



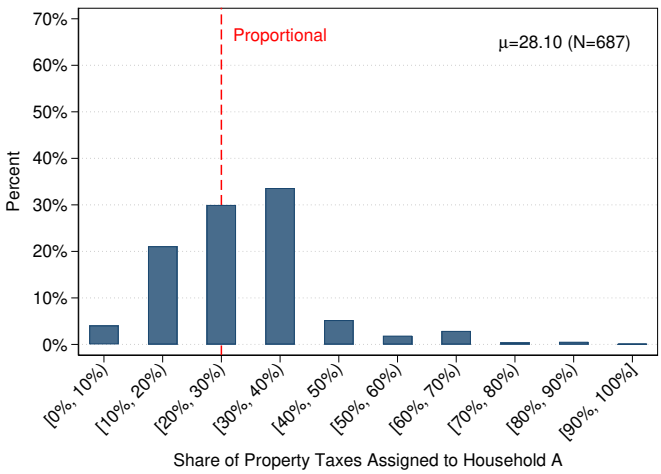
Notes: This histogram shows the results of responses from 698 subjects to a question included in the Survey Experiment regarding the fair distribution of tax burden. Subjects were randomly asked to choose how to distribute the total tax burden among Household A and Household B. This figure shows how subjects responded when asked to distribute a total tax burden of $10,000 between Household A (which is worth $100,000) and Household B (which is worth $400,000). The horizontal axis shows bins for the share of the total tax burden respondents allocated to Household A. The horizontal axis shows the seven options presented to respondents for the share of the tax burden to allocate to Household A. The vertical axis presents the share of the responses for each bin. The dashed red line indicates the share of taxes allocated to Household A that provides the same (proportional) tax rate for both households.

Figure B.5: Evidence on Social Norms about Fair Tax Rates from the Survey Experiment: Two Additional Scenarios

a. Low Versus High-Valued Home ($24K Total Taxes)



b. Mid Versus High-Valued Home ($30K Total Taxes)



Notes: The histograms in this figure show the results of responses to a questions included in the Survey Experiment regarding the fair distribution of tax burden. Subjects who answered the Survey Experiment were randomly selected to one of three possible scenarios to choose how to distribute the total tax burden among Household A and Household B. The first scenario is shown in Figure B.4, and the latter two are contained in this figure. The horizontal axis in both panels shows bins for the share of the total tax burden respondents allocated to Household A. The vertical axis presents the share of the responses for each bin. Panel (a) shows how subjects responded that they would distribute $24,000 of taxes between Household A (which is worth $100,000) and Household B (which is worth $1,100,000), and panel (b) shows how subjects responded that they would distribute $30,000 of taxes between Household A (worth $400,000) and Household B (worth $1,100,000). The dashed red line indicates the share of taxes allocated to Household A that provides the same (proportional) tax rate for both households in each scenario.

Table B.1: Descriptive Statistics: Survey Experiment, DCAD Single Family Homes, Field Experiment and Field Survey Samples

	(1) Mean/SE	(2) Mean/SE	(3) Mean/SE	(4) Mean/SE
2020 Home Value ($1,000s)	294.12	306.91	343.16	394.98
	(5.70)	(0.56)	(1.41)	(6.99)
2020 Property Tax Rate (%)	1.28	1.98	2.10	2.11
	(0.02)	(0.00)	(0.00)	(0.01)
2019 Owner-Protest (%)		5.93	5.85	10.33
		(0.04)	(0.10)	(0.70)
2019 Agent-Protest (%)		7.96	4.60	5.67
		(0.04)	(0.09)	(0.53)
2020 Homestead Exemption (%)		74.24	83.76	92.80
		(0.07)	(0.16)	(0.60)
Number of Bedrooms	3.08	3.24	3.30	3.41
	(0.02)	(0.00)	(0.00)	(0.01)
Age	42.69		52.37	52.68
	(0.28)		(0.08)	(0.34)
White (%)	82.95	38.58	44.28	56.57
	(0.83)	(0.07)	(0.22)	(1.14)
Hispanic (%)	4.50	30.46	27.32	15.31
	(0.46)	(0.07)	(0.20)	(0.83)
Black (%)	4.84	20.21	18.68	17.69
	(0.47)	(0.06)	(0.17)	(0.88)
Asian (%)	7.07	10.75	9.72	10.43
	(0.56)	(0.05)	(0.13)	(0.70)
Survey Experiment	✓			
Dallas County		✓		
Mailed a Letter			✓	
Responded to Field Survey				✓
Observations	2,065	423,607	50,394	1,888

Notes: Average pre-treatment characteristics (i.e., prior to the letter delivery) are shown in columns (1)–(5), with standard errors in parentheses. Column (1) corresponds to the individuals recruited from Amazon Mechanical Turk who participated in the Survey Experiment. Column (2) corresponds to the sample of 423,607 single-family homes in Dallas County in 2020. Column (3) corresponds to the subsample of the subjects from column (2) who were selected to participate in the field experiment and were mailed a letter. Column (4) corresponds to the subsample of the subjects from column (4) who responded to the Field Survey. *Home Value* is the proposed value (or the market value, in the case of the Survey Experiment); *Property Tax Rate* is the ratio of the property tax amount over the home value; *Owner-Protest* and *Agent-Protest* indicate whether the subject protested directly or through an agent, respectively; *2020 Homestead Exemption* indicates an effective homestead exemption; *Number of Bedrooms* is the number of bedrooms in the home. Column (1) is based on responses from the Survey Experiment. In columns (2)–(3), the first seven variables are obtained from the county's administrative records, the age variable is provided by a private company, and the ethnicity variables are inferred using an algorithm that analyzes the homeowners' first and last names. Column (4) is based on responses from the Field Survey.

Table B.2: Randomization Balance Test: Survey Experiment

		By Table Type (Average Tax Info./Rate Explicit)				
	(1) All	(2) No/No	(3) Yes/No	(4) No/Yes	(5) Yes/Yes	(6) P-value
2018 Average Home Value ($1,000s)	253.485	250.000	254.914	242.397	266.297	0.372
	(4.755)	(8.865)	(9.073)	(7.642)	7.642	
2018 Average Property Tax Rate (%)	1.388	1.355	1.430	1.376	1.392	0.609
	(0.020)	(0.038)	(0.043)	(0.041)	0.041	
Number of Bedrooms	3.081	3.103	3.077	3.076	3.067	0.917
	(0.019)	(0.038)	(0.038)	(0.037)	0.037	
Age	42.689	42.719	43.386	42.115	42.519	0.436
	(0.278)	(0.549)	(0.549)	(0.569)	0.569	
White (%)	82.954	81.489	84.363	82.505	83.462	0.640
	(0.828)	(1.698)	(1.597)	(1.696)	1.696	
Hispanic (%)	4.504	5.725	3.668	4.771	3.846	0.382
	(0.456)	(1.016)	(0.827)	(0.951)	0.951	
Black (%)	4.843	5.534	4.054	4.573	5.192	0.683
	(0.473)	(1.000)	(0.867)	(0.932)	0.932	
Asian (%)	7.070	6.489	7.529	7.555	6.731	0.871
	(0.564)	(1.077)	(1.160)	(1.180)	1.180	
Observations	2,065	524	518	503	520	

Notes: Average pre-treatment characteristics of respondents, with robust standard errors in parentheses. Column (1) corresponds with the entire Survey Experiment sample, while columns (2)–(5) break the sample by treatment groups: i.e., whether they were provided with feedback on their county's average property taxes (only subjects in columns (2) and (3) received this feedback) and whether the tax rate was made explicit in an additional row in the table summarizing their responses (only subjects in columns (3) and (5) received the additional row). Column (6) reports the p-value of the test of equal means across the four treatment groups. *Average Home Value* is the prior belief (i.e., elicited before the information-provision experiment) about the average property value in the county. *Average Property Tax Rate* is the ratio of *Average Property Tax Amount* over *Average Home Value*. *Number of Bedrooms* is the number of bedrooms in the respondent's home.

Table B.3: Detailed Randomization Balance Test: Full Sample from the Field Experiment

		By Table Type (Average Tax Info./Explicit Rate)				
	(1) All	(2) No/No	(3) Yes/No	(4) No/Yes	(5) Yes/Yes	(6) P-value
Home Value ($1,000s)	343.162	340.086	345.895	337.883	344.581	0.181
	(1.406)	(3.377)	(2.497)	(3.329)	(2.433)	
Property Tax Rate (%)	2.103	2.107	2.104	2.093	2.104	0.252
	(0.002)	(0.005)	(0.004)	(0.005)	(0.004)	
Owner-Protest in 2019 (%)	5.854	5.831	6.032	5.549	5.837	0.492
	(0.105)	(0.254)	(0.184)	(0.252)	(0.180)	
Agent-Protest in 2019 (%)	4.598	4.597	4.707	4.822	4.380	0.352
	(0.093)	(0.227)	(0.164)	(0.236)	(0.158)	
2020 Homestead Exemption (%)	83.760	83.318	83.593	84.139	83.963	0.400
	(0.164)	(0.404)	(0.286)	(0.402)	(0.282)	
Number of Bedrooms	3.304	3.306	3.306	3.307	3.300	0.785
	(0.003)	(0.007)	(0.005)	(0.007)	(0.005)	
White (%)	44.275	43.945	44.234	44.057	44.589	0.748
	(0.221)	(0.538)	(0.384)	(0.547)	(0.383)	
Hispanic (%)	27.321	28.110	27.296	26.633	27.285	0.201
	(0.199)	(0.487)	(0.344)	(0.487)	(0.343)	
Black (%)	18.685	18.316	18.704	19.496	18.454	0.185
	(0.174)	(0.419)	(0.301)	(0.436)	(0.299)	
Asian (%)	9.719	9.628	9.767	9.815	9.672	0.969
	(0.132)	(0.320)	(0.229)	(0.328)	(0.228)	
Observations	50,394	8,506	16,761	8,253	16,874	

Notes: Average pre-treatment (i.e., before the start of letter delivery) characteristics of subjects in the field experiment, with standard errors in parentheses. Column (1) corresponds to the entire field experiment sample, while columns (2)–(5) break the sample into treatment groups: i.e., whether they were provided with feedback on their county's average property taxes (only subjects in columns (2) and (3) received this feedback) and whether the tax rate was made explicit in the table (only subjects in columns (3) and (5) received the explicit tax rate). Column (6) reports the p-value of the test of equal means across the last four treatment groups. *Home Value* is the proposed assessment value; *Property Tax Rate* is the ratio of the property tax amount over the home value; *Owner-Protest in 2019* and *Agent-Protest in 2019* indicates whether the subject protested directly or through an agent in 2019, respectively; *2020 Homestead Exemption* indicates an effective homestead exemption. *Number of Bedrooms* is the number of bedrooms in the respondent's home. *White*, *Hispanic*, *Black*, and *Asian* are the fraction of homeowners by each imputed race.

Table B.4: Characteristics of Respondents to the Field Survey

		Responded to Field Survey		
	(1) Letter	(2) Yes	(3) No	(4) P-value
2020 Home Value ($1,000s)	343.162	394.983	341.145	<0.001
	(1.406)	(6.987)	(1.434)	
2020 Proposed Tax Rate (%)	2.103	2.107	2.102	0.658
	(0.002)	(0.010)	(0.002)	
2019 Owner-Protest (%)	5.854	10.328	5.680	<0.001
	(0.105)	(0.701)	(0.105)	
2019 Agent-Protest (%)	4.598	5.667	4.556	0.040
	(0.093)	(0.532)	(0.095)	
2020 Homestead Exemption (%)	83.760	92.797	83.408	<0.001
	(0.164)	(0.595)	(0.169)	
Number of Bedrooms	3.304	3.410	3.300	<0.001
	(0.003)	(0.015)	(0.003)	
Observations	50,394	1,888	48,506	

Notes: Average pre-treatment (i.e., before the start of letter delivery) characteristics of subjects in the field experiment, with standard errors in parentheses. Column (1) corresponds to all subjects in the field experiment who were mailed a letter. Columns (2)–(3) break down that sample into households that responded to the Field Survey and households that did not respond to the Field Survey, respectively. Column (4) reports the p-value of the test of equal means across the respondent and non-respondent groups. *Home Value* is the proposed assessment value; *Property Tax Rate* is the ratio of the property tax amount over the home value; *Owner-Protest* and *Agent-Protest* indicate whether the subject protested directly or through an agent, respectively; *2020 Homestead Exemption* indicates an effective homestead exemption. *Number of Bedrooms* is the number of bedrooms in the respondent's home.

Table B.5: Randomization Balance Test: Field Survey

		By Table Type (Average Tax Info./Explicit Rate)				
	(1) All	(2) No/No	(3) Yes/No	(4) No/Yes	(5) Yes/Yes	(6) P-value
Home Value ($1,000s)	394.983	395.884	379.275	393.847	413.135	0.278
	(6.987)	(17.027)	(10.423)	(17.172)	(13.905)	
Property Tax Rate (%)	2.107	2.085	2.100	2.063	2.152	0.008
	(0.010)	(0.023)	(0.016)	(0.024)	(0.017)	
Owner-Protest in 2019 (%)	10.328	10.198	10.615	10.313	10.088	0.992
	(0.701)	(1.613)	(1.209)	(1.703)	(1.268)	
Agent-Protest in 2019 (%)	5.667	7.082	6.000	3.125	5.841	0.057
	(0.532)	(1.367)	(0.932)	(0.974)	(0.987)	
2020 Homestead Exemption (%)	92.797	94.618	92.154	92.500	92.566	0.440
	(0.595)	(1.203)	(1.056)	(1.475)	(1.105)	
Number of Bedrooms	3.410	3.445	3.368	3.425	3.428	0.200
	(0.015)	(0.036)	(0.024)	(0.034)	(0.027)	
White (%)	56.568	57.224	56.000	52.500	59.115	0.287
	(1.141)	(2.637)	(1.948)	(2.796)	(2.070)	
Hispanic (%)	15.307	15.014	16.154	14.688	14.867	0.908
	(0.829)	(1.904)	(1.445)	(1.982)	(1.498)	
Black (%)	17.691	18.414	17.846	20.938	15.221	0.188
	(0.878)	(2.066)	(1.503)	(2.278)	(1.513)	
Asian (%)	10.434	9.348	10.000	11.875	10.796	0.722
	(0.704)	(1.552)	(1.178)	(1.811)	(1.307)	
Observations	1,888	353	650	320	565	

Notes: Average pre-treatment (i.e., before the start of letter delivery) characteristics of subjects that responded to the Field Survey, with standard errors in parentheses. Column (1) corresponds to the entire Field Survey sample. Columns (2)–(5) break down the subjects assigned to letter treatments by whether the table in the letter included the additional column (i.e., the county averages) and/or the additional row (i.e., the explicit tax rate). Column (6) reports the p-value of the test of equal means across the last four treatment groups. *Home Value* is the proposed assessment value; *Property Tax Rate* is the ratio of the property tax amount over the home value; *Owner-Protest in 2019* and *Agent-Protest in 2019* indicates whether the subject protested directly or through an agent, respectively; *2020 Homestead Exemption* indicates an effective homestead exemption. *Number of Bedrooms* is the number of bedrooms in the respondent's home. *White*, *Hispanic*, *Black*, and *Asian* are the fraction of homeowners by each imputed race.

Table B.6: Additional Results from the Field Experiment

	(1) P^d_{2020}	(2) P^d_{2019}	(3) W^d_{2020}	(4) ΔMV^d_{2020}	(5) ΔT^d_{2020}	(6) P^d_{2020}	(7) P^d_{2020}	(8) P^d_{2020}
Information Shock ($\overline{\tau}$)	-12.566**	-2.284	-13.881***	-0.798**	-0.402	-10.455	-13.027*	-12.990**
	(5.424)	(2.822)	(5.243)	(0.405)	(0.297)	(8.012)	(7.602)	(6.373)
Field Survey	✓	✓	✓	✓	✓	✓	✓	
Rate Salience						Explicit	Not Explicit	
Mean Outcome (Control)	50.52	10.25	38.48	2.37	1.64	53.75	47.59	51.99
Std. Dev. Outcome (Control)	50.03	30.36	48.69	3.78	3.48	49.94	50.01	50.01
Observations	1,888	1,888	1,888	1,888	1,888	885	1,003	1,412

Notes: Significant at *10%, **5%, ***1%. Robust standard errors in parentheses. All columns present regression results from equation (4) in Section 3.4 for the sample of Field Survey respondents, except column (6) uses the field experiment sample. The variable *Information Shock* ($\overline{\tau}$) corresponds to the information shock term ($D_i \cdot (\overline{\tau} - \tau_i)$). Columns (8) and (9) present results of the same regression in column (1) splitting the sample based on whether or not the letter included the household's tax rate. The regressions in this figure include the following controls: the 2020 proposed value in levels and its annual growth, dummies for multiple owners, school and special districts, number of years since the household's last protest, a dummy for homestead status, a dummy indicating if the household received the extra aid message, and, for each previous year since 2015, a dummy indicating if the household protested in that year and the outcome of the protest (if any) as a percent-reduction in the market value (i.e., the protest history). Control variables for the protest history depend on the year in which the dependent variable is measured. For instance, if the outcome corresponds to direct protests in 2018, the protest history controls include protests in 2015, 2016, and 2017. The dependent variables are defined as follows: P^d_{2020} is an indicator variable that takes the value 100 if the owner filed a direct protest in 2020 and 0 otherwise; W_D indicates if a direct protest resulted in a reduction in the market value; ΔMV^d_{2020} is the percentage reduction in the market value due to protesting, which by construction takes the value 0 if the household did not protest or if the protest was unsuccessful; ΔT^d_{2020} is the estimated percentage reduction in the tax amount due to protesting; P^{agent}_{2020} is an indicator variable that takes the value 100 if the owner filed a protest through an agent in 2020 and 0 otherwise.

C Sample of Full Letter

THE UNIVERSITY OF TEXAS AT DALLAS
Naveen Jindal School of Management

May 15th, 2020

Dear Joan Robinson,

We are researchers at The University of Texas at Dallas and we are reaching out to you as part of a research study. **You can lower your tax burden by protesting the taxable value assessment of your property**. We want to share information that we hope will be useful.

Some people may choose to protest because they feel they are paying more than their fair share. Find below some information about the estimated 2020 taxes for your home at 5329 Jordan Ridge D (Dallas, TX) in Dallas County*:*

	YOUR HOME	**AVERAGE DALLAS HOME**
Proposed Value	*$174,810*	*$294,846*
Estimated Tax Amount	*$3,057*	*$5,916*
Estimated Tax Rate	*1.75%*	*2.01%*

Source: *Data provided by Dallas Central Appraisal District (CAD). Proposed Value is Dallas CAD's estimate of the home's market value as of January 1st, 2020. Estimated Tax Amount is our estimate of taxes due this year using the latest tax rates available (some exemptions might not be included). Estimated Tax Rate is the estimated tax amount divided by Proposed Value. Average Dallas Home values are based on all single-family homes in Dallas County, excluding condos, townhomes, and mobile homes.*

The deadline to protest is June 15th, 2020. You can fill out a short form online or mail it in. You can find instructions on how to do this on the study's website:

https://www.utdallas.edu/taxproject/

If you would like to help us with our study, we kindly ask you fill out the following confidential survey. It only takes a couple of minutes, and we would greatly appreciate your participation:

Visit http://www.utdallas.edu/taxsurvey/ and enter validation code **AAFOGD**

800 W. Campbell Road
Richardson, TX 75080

Website: https://www.utdallas.edu/taxproject/

Please recycle

If you'd like to file a protest, it is really simple. You do not need an agent. You do not need to attend a hearing if you accept an online settlement offered by the county. If the county schedules a hearing and you do not attend it, the protest will simply be dismissed with no penalty.

When you protest you need to provide an argument in a few sentences. For example, you may argue that the appraised market value is too high. In that case, you could use the following:

☑ Value is over market value Opinion of value: $160,000

And remember to attach a separate page (or file, if protesting online) with your argument:

> I found a home that is similar to mine but was recently sold for less than my home's appraised market value. The property located at 5148 Ronryan Rd (Dallas, TX) is 0.29 miles away from my home, and has the same number of bedrooms and a similar square footage. That property was sold on 10/31/2019 for $160,000.

You can find information about this sale by searching for the property's address on Zillow.com or Redfin.com. On these websites you can find other comparable properties to support your protest. You can also protest based on the appraised market values of comparable properties, which can be found on www.dallascad.org/SearchAddr.aspx.

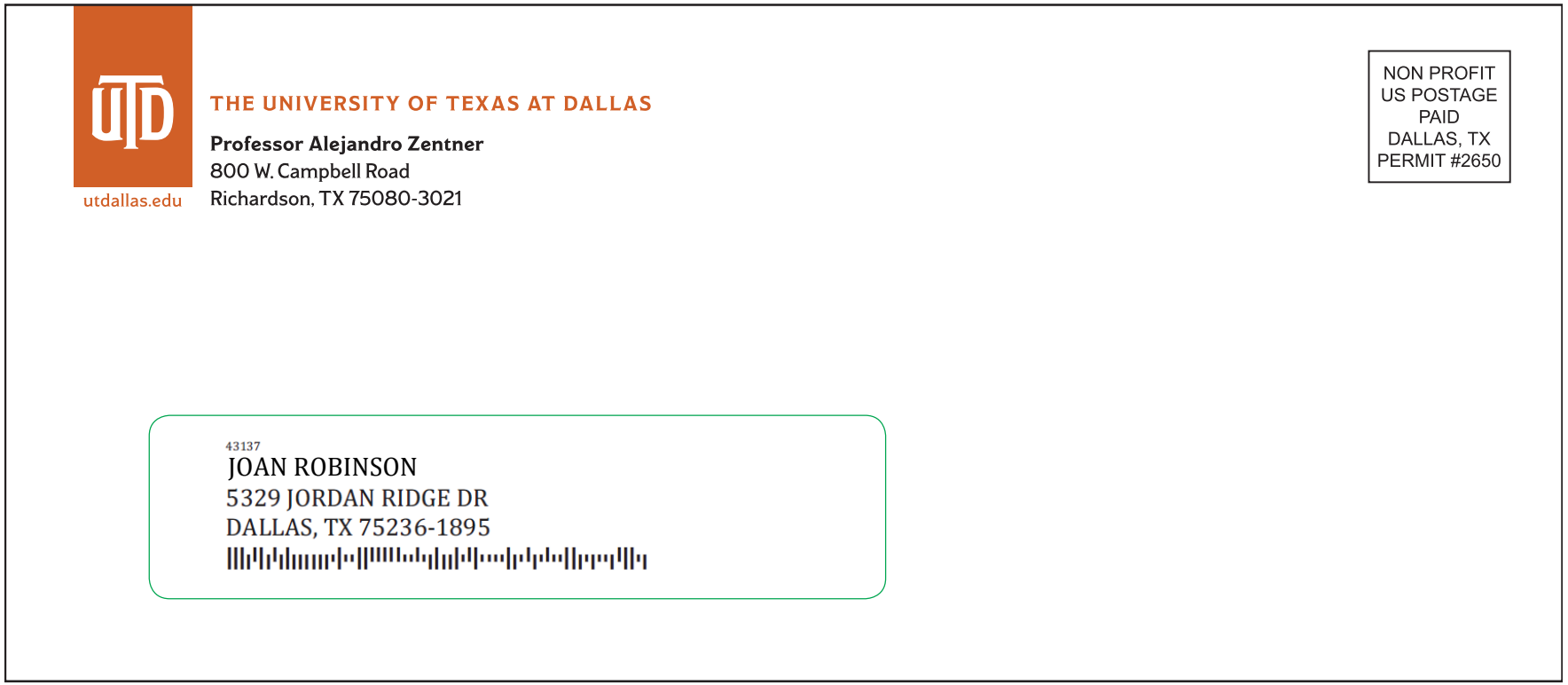
Your household was randomly chosen to receive this letter. *We will not send you any more letters in the future.* If you have any questions about the study, you can find contact information on the study's website.

Thank you for your attention!

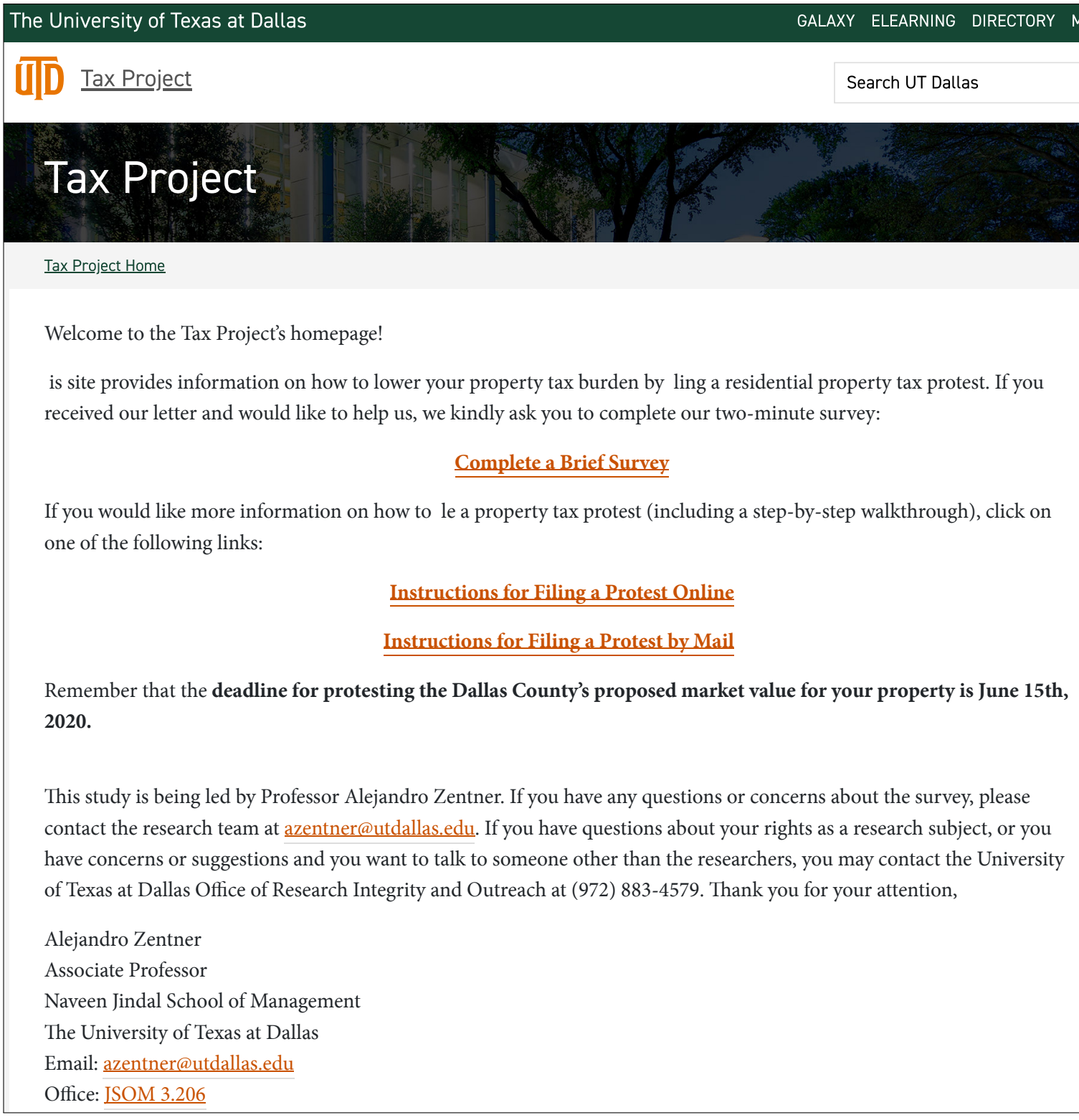
Alejandro Zentner
Associate Professor
University of Texas at Dallas

43137
DOLORES M MORENO
5329 JORDAN RIDGE DR
DALLAS, TX 75236-1895

D Sample Envelope



E Project's Website



F Sample of Online 2020 Appraisal Notice

DALLAS CENTRAL APPRAISAL DISTRICT
NOTICE OF APPRAISED VALUE - RESIDENTIAL
TAX YEAR 2020

www.dallascad.org (214) 905-9402

Mailing Address:
Residential Division
PO Box 560348
Dallas, TX 75356-0348

Account Number: 008035000N0240000
Ownership:

JOAN ROBINSON
5329 JORDAN RIDGE DR
DALLAS, TX 75236-1895

Property Address:
5329 JORDAN RIDGE DR
DALLAS

Legal Description:

Dear Property Owner:

This letter is your official notice of the **2020** proposed property tax appraisal for the account listed above. The Dallas Central Appraisal District (DCAD) appraises all of the property in Dallas County for property tax purposes. State law requires that appraisal districts appraise all taxable property at its fair market value. Your county, city, school district and other local governments use the appraisal in calculating your property taxes. Property taxes support critical services such as schools, police and fire protection, street maintenance and many others.

As of January 1, 2020, the DCAD appraised your real property at:

2020 Market Value:	$174,810
2020 Appraised Capped Value:	$133,428
2020 Estimated Taxes (using last year's tax rates):	$3,057

DO NOT PAY FROM THIS NOTICE. THIS IS NOT A TAX BILL.

Your current year exemptions are: Homestead

The Texas legislature does not set the amount of your local taxes. Your property tax burden is decided by your locally elected officials and all inquiries should be directed to those officials.

The governing body of each taxing jurisdiction decides whether or not taxes on your property will increase. The DCAD only determines the value of the property in accordance with the Texas Constitution and Statutes.

The percentage difference between the 2015 appraised value of $82,850 and the proposed 2020 appraised value is an increase of 61.05% over a 5-year period.

To **PROTEST** the proposed 2020 value or other issues, you must file a protest with the Appraisal Review Board (ARB) by using the online **uFile** system **(preferred method)** or by submitting a written protest (form enclosed).

If you agree with the proposed value, no further action is required.

Deadline for filing a protest: June 15, 2020

Location of ARB hearings: 2949 N. Stemmons Fwy, Dallas, TX 75247

More information about your appraisal and the protest process is on the back of this notice and on the inserts enclosed.

Homestead "Capped" Limitation: The Texas Constitution provides that property with a homestead exemption may not be increased in value more than 10% per year, excluding any new improvements made. This provision takes effect the first year following the year the owner qualified for a homestead. Because of this constitutional limitation, if you received a homestead exemption on this property in the previous year, it will be "**capped**" at the appropriate limit.

052-2193

DALLAS CENTRAL APPRAISAL DISTRICT
NOTICE OF APPRAISED VALUE - RESIDENTIAL
Tax Year 2020
www.dallascad.org

Owner Name: JOAN ROBINSON
Account Number: 008035000N0240000
Property Address: 5329 JORDAN RIDGE DR

CURRENT YEAR 2020	County and School Equalization	City	School	Hospital	College	Special District	Canceled/ Reduced Exemption
Jurisdictions	Dallas County	City of Dallas	Duncanville ISD	Parkland Hospital	Dallas Co Community College		
Market Value - Land	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000		
Market Value - Structure(s)	$ 139,810	$ 139,810	$ 139,810	$ 139,810	$ 139,810		
Market Value	$ 174,810	$ 174,810	$ 174,810	$ 174,810	$ 174,810		
Less Deductions							
Homestead Capped Limitation	$ 41,382	$ 41,382	$ 41,382	$ 41,382	$ 41,382		
Ag-use Value							
Absolute Exemption							
Appraised Value	$ 133,428	$ 133,428	$ 133,428	$ 133,428	$ 133,428		
Less Exemption Amount							
Homestead	$ 26,685	$ 26,685	$ 25,000	$ 26,685	$ 26,685		
Exemption Amount Subtotal	$ 26,685	$ 26,685	$ 25,000	$ 26,685	$ 26,685		
Estimated Taxable Value	$ 106,743	$ 106,743	$ 108,428	$ 106,743	$ 106,743		Total
Last Year's Tax Rate	0.253100	0.776600	1.418300	0.269500	0.124000		2.841500
Estimated Taxes Due*	$ 270	$ 829	$ 1,538	$ 288	$ 132		$ 3,057

PRIOR YEAR 2019	County and School Equalization	City	School	Hospital	College	Special District
Jurisdictions	Dallas County	City of Dallas	Duncanville ISD	Parkland Hospital	Dallas Co Community College	
Market Value - Land	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	
Market Value - Structure(s)	$ 128,090	$ 128,090	$ 128,090	$ 128,090	$ 128,090	
Market Value	$ 153,090	$ 153,090	$ 153,090	$ 153,090	$ 153,090	
Less Deductions						
Homestead Capped Limitation	$ 31,791	$ 31,791	$ 31,791	$ 31,791	$ 31,791	
Ag-use Value						
Absolute Exemption						
Appraised Value	$ 121,299	$ 121,299	$ 121,299	$ 121,299	$ 121,299	
Less Exemption Amount						
Homestead	$ 24,259	$ 24,259	$ 25,000	$ 24,259	$ 24,259	
Exemption Amount Subtotal	$ 24,259	$ 24,259	$ 25,000	$ 24,259	$ 24,259	
Estimated Taxable Value	$ 97,040	$ 97,040	$ 96,299	$ 97,040	$ 97,040	

Tax Ceiling: If you received the Age 65 or Older or the Disabled Person homestead exemption, your school, county, and certain city taxes for this year will not be any higher than they were for the year in which you first received the exemption, unless you have made new improvements to your home. If you improved your property by remodeling or adding an addition, your school, county, and certain city taxes may increase for new improvements. If you are the surviving spouse of a person who was age 65 or older or disabled at death and you were age 55 or older at the time of death, you may retain the school, county, and certain city tax ceilings.

APPRAISAL REVIEW BOARD OF DALLAS COUNTY
NOTICE OF PROTEST - RESIDENTIAL
TAX YEAR 2020

www.dallascad.org (214) 905-9402

Account Number: 008035000N0240000

JOAN ROBINSON
5329 JORDAN RIDGE DR
DALLAS, TX 75236-1895

Property Address:
5329 JORDAN RIDGE DR
DALLAS

Legal Description:

Deed Transfer Date:

Proposed Value: $174,810

CHANGE OF ADDRESS: _____

It is my desire to file a protest based on the issue(s) checked below. Also, I understand that the Appraisal Review Board (ARB) must notify me of any hearing not later than the 15th day before the date of the hearing pursuant to §41.46 of the Texas Property Tax Code. At the time your account is scheduled for an ARB hearing, the evidence that the Chief Appraiser will introduce at your hearing will be available on the DCAD website. You may access this evidence on the website by using the property account number and PIN located on your notice of appraised value and hearing notice.

It is my desire to protest based on the following issue(s) and I have checked the applicable boxes:

- ☐ Value is over market value
- ☐ Value is unequal compared with other properties
- ☐ Property not located in district
- ☐ Exemption was denied or cancelled (Specify _____)
- ☐ Ownership is incorrect (Specify _____)
- ☐ Ag-Use: Change in use of land appraised as agricultural use, open-space, etc.
- ☐ Ag-Use: Open-Space or other special appraisal denied or cancelled
- ☐ Property should not be taxed in district or in one or more taxing units
- ☐ Other: (Specify _____)

Additional Requests: _____ Opinion of Value: _____

If you wish to expedite your hearing by waiving the required deadline date under Section 41.46 of the Texas Property Tax Code, please check the following box: ☐

Signature of Owner (or Agent)	Date Filed	(Agent Registration No., if applicable)
Printed Name	Daytime/Cell Phone No.	E-Mail Address

DEADLINE FOR FILING A PROTEST: June 15, 2020

GENERAL INSTRUCTIONS: Pursuant to §41.41 of the Texas Property Tax Code, a property owner has the right to protest certain actions taken by the appraisal district. There are two options to file a protest, 1) use the online **uFile** system, or 2) mail a protest form.

uFile ONLINE PROTEST & SETTLEMENT SYSTEM: The **preferred method** of protesting your property is to use the online **uFile** Protest & Settlement System. You may access the system by searching your account on our website at **www.dallascad.org** and select the link "Online Protest System". For easy access, you may request your individual PIN through this system or use the PIN located at the top left-side of your Notice of Appraised Value. Once you utilize the **uFile** system to protest your property, you may also be eligible to use the settlement program and settle your protest online. **If you file a protest using the online uFile system, please do not file a written or duplicate protest.**

uFile is the preferred method of filing a protest in order to expedite and insure timely delivery of your protest.

PROTEST FORM: This form is for use by a property owner or designated agent who would like the ARB to hear and decide a protest. If you are leasing the property, you are subject to the limitations set forth in Texas Property Tax Code §41.413. Please review the ownership and property information provided on this protest form and make any necessary corrections.

If you wish to mail your protest and supporting documents, the envelope must be postmarked by U.S. Postal Service on or before the deadline.

Appraisal Review Board of Dallas County
Residential Division
PO Box 560348
Dallas, TX 75356-0348

HOW TO SETTLE THE VALUE OF YOUR PROPERTY

Informal Hearing Process: Due to the COVID-19 Pandemic the DCAD will not be holding face to face informal hearings. Please read the insert titled **Health Alert: Dallas Central Appraisal District Operations / uFile Online Protest and Settlement System**. If you are unable to use DCAD's uFile system then please mail in your protest form with your supporting documentation. You can also drop off your protest form and documentation at DCAD 's office but you will not be able to discuss your issues with an appraiser in person. You may call the number listed on the Notice of Appraised Value and speak to an appraiser about an individual property. Please understand that we mail thousands of notices at this time. Our phone lines will be very busy. Keep trying. You have several weeks to respond before the deadline noted on the Notice of Appraised Value. You may also write our office at 2949 N. Stemmons Freeway, Dallas, TX 75247-6195, or inquire on our website at **www.dallascad.org**. If you provide supporting documentation with your protest, DCAD will make every effort to have an appraiser contact you prior to your scheduled ARB Hearing. Please make sure you provide an e-mail address and/or daytime phone number on your protest form.

UFILE - PREFERRED METHOD

uFile Online Protest & Settlement System: The preferred method of protesting your property is to use the online **uFile** Protest & Settlement System. You may access the system by searching for your account on our website at **www.dallascad.org** and select the link "Online Protest System". For easy access, you may request your individual PIN through this system or use the PIN located at the top left-side of your Notice of Appraised Value. Requesting a PIN does not constitute filing a uFile protest. You must complete the uFile protest process. Once you utilize the **uFile** system to protest your property, you may also be eligible to use the settlement program and settle your protest online. All uFile protests will eventually be scheduled for an ARB Hearing if the protest issue(s) remain unresolved. Once scheduled for an ARB Hearing, DCAD will post the ARB Hearing Date and Time on your account on our website. The ARB will also mail you an ARB Hearing Notification. **If you file a protest using the online uFile system, please do not file a written or duplicate protest.**

WRITTEN PROTEST

Protest Form: If you choose not to use the **uFile** online system, you may use the protest form provided. You should attach to your protest form any documentation that supports your opinion of value or any other protested issue (reference the Standards of Documentation). **If you are protesting more than one account, be sure to staple or bundle together all protest forms and documents to avoid receiving multiple dates and times for your accounts**.

Useful Information: If you have purchased your property within the last three years, please include, with your protest form, a copy of your closing statement or other official record that validates the purchase price.

Filing Deadlines: While June 15 is the deadline to file a residence homestead protest, a different deadline will apply to you if 1) your notice of appraised value was mailed to you after May 15; 2) your protest concerns a change in use of agricultural, open-space, or timber land; 3) the Appraisal Review Board (ARB) made a change to the appraisal records that adversely affects you and you received notice of the change; 4) the DCAD or the ARB was required by law to send a notice about your property and did not; or 5) you had good cause for missing the June 15 protest filing deadline. Contact the DCAD for questions about your specific protest filing deadline.

Weekends and Holidays: If your deadline falls on a Saturday, Sunday, or legal holiday, it is postponed until midnight of the next business day.

Appraisal Review Board (ARB): Members of the ARB are not employees of the DCAD. They serve as jurors to arbitrate issues brought before them. The Texas Property Tax Code outlines specific duties for the ARB to follow. The goal of the ARB is to ensure that each property owner is given a fair and impartial hearing in the most efficient and timely manner.

Hearing Process and Delivery of Requested Information: Once the Appraisal Review Board (ARB) receives and processes your protest your account will be scheduled for an ARB hearing. Once scheduled for an ARB Hearing, your hearing date and time will be posted on the DCAD website. You will also receive an ARB hearing notice by first class mail with your hearing date, time, and location to appear before the ARB. If you do not receive an ARB hearing notice then please call the DCAD to inquire about your ARB hearing date or check your account on the DCAD website. You may request in writing that your ARB hearing notice be sent to you by certified mail but you may be charged for this request. You can also request your ARB hearing notice to be e-mailed to you if you provide an e-mail address on the protest form and request this in writing. If you would like for the ARB to send your hearing notice by certified mail or you want your hearing notice sent to your e-mail address then please indicate so on the attached Protest Form under Additional Requests. If you do not want your ARB Hearing conducted with only one ARB member please indicate so under additional requests. Prior to your ARB hearing, you may request a copy of the evidence DCAD plans to introduce at the hearing to establish any matter at issue. Before an ARB hearing on a protest or immediately after the hearing begins, you or your agent and the CAD are required to provide each other with a copy of any materials (evidence) intended to be offered or submitted to the ARB at the hearing. Evidence may be submitted for any ARB hearing type either in paper or on a small portable device (such as a CD, USB flash drive or thumb drive) which will be kept by the ARB. Do NOT bring evidence by smart phone. At the time your account is scheduled for an ARB hearing, evidence that the Appraisal District will introduce at your hearing will be available on the DCAD website. You may access this evidence on DCAD 's website by using the property account number and PIN located on your notice of appraised value and hearing notice. You may also request this information at the DCAD office.

Telephone Hearings: Due to the COVID-19 Pandemic, the Appraisal Review Board (ARB) will be conducting all protest hearings by telephone. You will be notified of the date and time of your hearing, and will be called by the ARB at the time of your scheduled hearing. Please make sure you provide a daytime phone number on your protest form so the ARB can contact you to start your ARB Hearing.

Hearing Postponements: As a property owner, you are entitled to one postponement of the hearing without showing good cause. You are also entitled to postpone your hearing if you or your agent shows reasonable cause for postponement. You must request this postponement to the ARB before the hearing date. The ARB will determine if good cause exists for missing your hearing.

Residence Homestead Exemptions: If the property is your home and you occupy it as your principal place of residence, you may qualify for one or more residence homestead exemptions, which will reduce the amount of taxes imposed on the property. If you are single or a married couple filing together, you may be eligible to **apply online** for the **Homestead Exemption** at **www.dallascad.org**. If you are filing for the Age 65 or Older or Disabled Person exemption or the property is owned by multiple owners, you are *not* eligible to file online. However, you may select the link "Print Homestead Exemption Form" from the DCAD website or you may call 214-631-0910.

Special Service Accommodations: The DCAD offices are wheelchair accessible and parking spaces for the disabled are provided. The DCAD will provide sign interpretation services for the hearing impaired at any scheduled hearing or meeting if at least 72 hours advance notice is given. The hearing impaired can call TDD at (214) 819-2368.

If you desire any special assistance during the hearing process to accommodate any disability you have, please specify:

_____

Additionally, to arrange for any special service to accommodate a disability, you may contact the Assistant Director of Administration at (214) 631-0520, extension 1107.

G Questionnaire: Survey Experiment

Welcome to our web-based survey that examines residents' preferences regarding property taxes. Please read the consent form below and click "I Agree" when you are ready to start the survey:

The study is being conducted by a team of researchers led by Professor Alejandro Zentner of The University of Texas at Dallas, and it has been designated by The University of Texas at Dallas Office of Research Integrity and Outreach as exempt from review by an Institutional Review Board. No deception is involved, and the study involves no more than minimal risk to participants (i.e., the level of risk encountered in daily life). Participation in the study typically takes 15 minutes and is strictly confidential. All responses are treated as confidential.

○ Yes, I would like to take part in this study and confirm that I am 18 years of age or older, I understand the statements above, and freely consent to participate in the study.

What is the state and county of your primary residence (the place where you usually live)?

State: California

County: Alameda County, California

Do you currently live with your parents or legal guardians?

- ◯ Yes
- ◯ No

Do you (or your parents/legal guardians) rent or own your primary residence?

- ◯ Rent
- ◯ Own

How many years have you (or your parents/legal guardians) owned your primary residence for?

- ◯ Less than 1 year
- ◯ 1 year
- ◯ 2 years
- ◯ 3 years
- ◯ 4 years
- ◯ 5 or more years

Who pays the property taxes on your primary residence?

- ◯ You
- ◯ Your spouse or partner
- ◯ Other:

How do you typically pay for the property taxes on your main residency?

- ○ Monthly (for example, with your mortgage payments)
- ○ Once a year
- ○ Twice a year
- ○ Other:

Next, we will ask you a few questions about home values and property taxes in **2018**.

Consider the **AVERAGE HOME** in your county. What do you think was its **market value** as of **January 1st, 2018**?

$ _____

Note: Please *do not* write in dollar signs, commas or decimal points. If you are not sure, just provide your best guess.

How confident are you about this value?

Not at all confident	Somewhat confident	Confident	Very confident
○	○	○	○

Consider the **AVERAGE HOME** in your county in 2018. What dollar amount you think that home paid in **PROPERTY TAXES in 2018**?

$ _____ Annually

Note: Please do not write in dollar signs, commas or decimal points. These were the property taxes that households either paid monthly from January to December of 2018 or in one lump sum typically around December 2018 or January 2019. If you are not sure, just provide your best guess.

How confident are you about this value?

Not at all confident	Somewhat confident	Confident	Very confident
○	○	○	○

Next, a group of individuals participating in this survey will be randomly chosen to receive some information related to the market values and property taxes in your county as of 2018.

Please continue to the next screen to find out if you will be selected to receive information.

You have been selected to receive the following information. According to the latest data from the American Community Survey, the following are the average market values and property taxes in your county (Alameda County, California) as of **2018**:

Average home value as of January 1st, **2018: $886,452**

Average property taxes paid in **2018: $6,771**

Please take some time to read and understand this information carefully, because you will not be able to go back to this screen. When you are ready, proceed to the next screen.

The previous questions were about home values and property taxes in **2018**. Now, we want to ask you questions about **2020**.

We want to know about **YOUR HOME**. What do you think was the **market value** of your home as of **January 1st, 2020**?

$ _____

Note: Please do not write in dollar signs, commas or decimal points. If you are not sure, just provide your best guess.

How confident are you about this value?

Not at all confident	Somewhat confident	Confident	Very confident
○	○	○	○

What is the dollar amount **YOUR HOUSEHOLD** will pay in **property taxes** for your home in **2020**?

$ _____ Annually

Note: Please do not write in dollar signs, commas, or decimal points. These are the property taxes that you either pay monthly from January to December of 2020 or in one lump sum typically around December 2020 or January 2021. If you do not know the exact amount, just provide your best gues

How confident are you about this value?

Not at all confident	Somewhat confident	Confident	Very confident
○	○	○	○

Consider the **AVERAGE HOME** in your county in 2020. What do you think was the **average market value** as of **January 1st, 2020**?

$

Note: Please do not write in dollar signs, commas or decimal points. If you are not sure, just provide your best guess.

Consider the **AVERAGE HOME** in your county in 2020. What dollar amount you think that home paid in **property taxes in 2020**?

$ _____ Annually

Note: Please do not write in dollar signs, commas or decimal points. These are the property taxes that households will either pay monthly from January to December of 2020 or in one lump sum typically around December 2020 or January 2021. If you do not know the exact amount, just provide your best guess.

Find below a **summary of your answers:**

	Your Home	Average Home in your County
Market Value:	**$800,000**	**$800,000**
Tax Amount:	**$8,000**	**$5,000**
Tax Rate:	**1.00%**	**0.63%**

Relative to the other households in your county, do you feel the dollar amount that your household pays in property taxes is too little, too much, or about right?

- ◯ 0 - I pay too little
- ◯ 1
- ...
- ◯ 5 - I pay about right
- ...
- ◯ 9
- ◯ 10 - I pay too much

Do you consider the amount of property taxes you pay to be too low, about right, or too high?

- ◯ My taxes are too low
- ◯ My taxes are about right
- ◯ My taxes are too high

Imagine you could change how much YOU pay in property taxes (just you, without changing how much others have to pay). What is the dollar amount of **property taxes** you would consider fair for your household in **2020**?

$ _____ Annually

Note: Please do not write in dollar signs, commas or decimal points. These are the property taxes that you either pay monthly from January to December of 2020 or in one lump sum typically around December 2020 or January 2021.

Some counties allow households to file a protest of their home's assessed value or property taxes. For example, a household may file a form to dispute the county's appraisal of its home's value. To the best of your knowledge, does your county allow you to file these types of protests?

- ◯ Yes
- ◯ No

Do you expect to file a protest of your home's assessed value or property taxes **next year (in 2021)**?

- ○ Very likely
- ○ Likely
- ○ Unlikely
- ○ Very unlikely

How likely are you to be **late** on payment of your property taxes next year (in 2021) by at least three months?

- ○ Very likely
- ○ Likely
- ○ Unlikely
- ○ Very unlikely

Imagine the government gave you full power to choose the property taxes that each household must pay, as long as the total property taxes collected stays the same.

You can set taxes any way you want, based on what you consider fair. **What property taxes would you choose for each home?** These two values must add up to $30,000.

Household A (its home is worth $400,000)	$ 0
Household B (its home is worth $1,100,000)	$ 0
Total	$ 0

Which of the following alternatives would you prefer?

- ○ Lower property taxes (your taxes and the taxes of everyone else decrease but you get worse government services)
- ○ Property taxes do not change (your taxes and the taxes of everyone else are held constant and so are government services)
- ○ Higher property taxes (your taxes and the taxes of everyone else increase to provide better government services)

In politics, as of today, do you consider yourself a Republican, a Democrat, or an independent?

- ◯ Democrat
- ◯ Republican
- ◯ Independent

We are almost done. We would like to ask you a few more questions about yourself before finishing the survey.

Please indicate your gender:

- ◯ Female
- ◯ Male
- ◯ Other

How old are you?

Which of the following best describes your ethnicity?

- ◯ White
- ◯ Black or African American
- ◯ Asian or Native Hawaiian and other Pacific Islander
- ◯ American Indian or Alaska Native
- ◯ Hispanic or Latino origin

Are you currently married or living with a partner (not including roommates)?

- ◯ Yes
- ◯ No

Do you have kids?

- ◯ Yes
- ◯ No

Please indicate the type of your current primary residence. Is your primary residence a:

- ◯ Single-Family Home
- ◯ Apartment/Condo/Co-op
- ◯ Townhouse/Duplex
- ◯ Mobile/Manufactured home
- ◯ Other

How many bedrooms does your primary residence have?

- ◯ 0 Bedrooms/Studio
- ◯ 1 Bedroom
- ◯ 2 Bedrooms
- ◯ 3 Bedrooms
- ◯ 4 Bedrooms
- ◯ 5+ Bedrooms

Recent research on decision making shows that choices are affected by the context in which they are made. Differences in how people feel, in their previous knowledge, experience, and in their environment can influence the choices they make. To help us understand how people make decisions, we are interested in information about you. Specifically, whether you actually take the time to read the instructions. If you don't, some results may fail to tell us very much about decision making in the real world. To help us confirm that you have read these instructions, please ignore the question about how you are feeling.
Instead, only check the "none of the above" option. Thank you very much.

☐ Interested	☐ Hostile	☐ Nervous
☐ Distressed	☐ Enthusiastic	☐ Determined
☐ Excited	☐ Proud	☐ Attentive
☐ Upset	☐ Irritable	☐ Jittery
☐ Strong	☐ Alert	☐ Active
☐ Scared	☐ Inspired	☐ None of the above

In your opinion, were the questions included in this survey easy or difficult to understand?

- ◯ Easy to understand
- ◯ Neither easy nor difficult
- ◯ Difficult to understand

Feel free to share any comments with us below. For example, let us know if there is a question you did not understand.

H Questionnaire: Field Survey

Welcome to our web-based survey that examines residents' preferences regarding property taxes. Please read the consent form below and click "I Agree" when you are ready to start the survey:

The study is being conducted by a team of researchers led by Professor Alejandro Zentner of The University of Texas at Dallas, and it has been designated by The University of Texas at Dallas Office of Research Integrity and Outreach as exempt from review by an Institutional Review Board. No deception is involved, and the study involves no more than minimal risk to participants (i.e., the level of risk encountered in daily life). Participation in the study typically takes 2-minutes and is strictly confidential. Participants begin by entering the validation code included in the letter received by mail and then answer questions related to property taxes and demographics. All responses are treated as confidential.

○ Yes, I would like to take part in this study and confirm that I am 18 years of age or older, I understand the statements above, and freely consent to participate in the study.

Please enter the validation code included in the letter (next to the URL of this survey, inside the black box) to begin:

When did you read the letter that included the link to this survey?

- ○ Today
- ○ Yesterday
- ○ This week
- ○ More than a week ago

The Dallas Central Appraisal District (CAD) just released their 2020 estimates of home market values and property taxes.

For your main residency, how much are your estimated annual property taxes for 2020? (don't worry if you don't remember exactly, we just need your best guess)

Relative to the other households in the county, do you think your household pays a fair amount in property taxes?.

1 - Very unfair	2	3	4	5 - Neither fair nor unfair	6	7	8	9	10- Very fair
○	○	○	○	○	○	○	○	○	○

You have time until June 15th, 2020 to protest Dallas CAD's proposed value of your property. Do you intend to protest this year?

- ○ Very likely
- ○ Likely
- ○ Unlikely
- ○ Very unlikely

If you can, please explain why you will (or will not) protest in 2020:

Imagine the government gave you full power to choose the property taxes that each household must pay. You can set taxes any way you want, based on what you consider fair.

Household A's home is worth $100,000 and Household B's home is worth $400,000. Which one of the following property taxes would you choose?

- ◯ Household A pays $10,000 and Household B pays $0
- ◯ Household A pays $9,000 and Household B pays $1,000
- ◯ Household A pays $8,000 and Household B pays $2,000
- ◯ Household A pays $5,000 and Household B pays $5,000
- ◯ Household A pays $2,000 and Household B pays $8,000
- ◯ Household A pays $1,000 and Household B pays $9,000
- ◯ Household A pays $0 and Household B pays $10,000

Recent research on decision making shows that choices are affected by the context in which they are made. Differences in how people feel, in their previous knowledge, experience, and in their environment can influence the choices they make. To help us understand how people make decisions, we are interested in information about you. Specifically, whether you actually take the time to read the instructions. If you don't, some results may fail to tell us very much about decision making in the real world. To help us confirm that you have read these instructions, please ignore the question about how you are feeling. Instead, only check the "none of the above" option. Thank you very much.

☐ Interested	☐ Hostile	☐ Nervous
☐ Distressed	☐ Enthusiastic	☐ Determined
☐ Excited	☐ Proud	☐ Attentive
☐ Upset	☐ Irritable	☐ Jittery
☐ Strong	☐ Alert	☐ Active
☐ Scared	☐ Inspired	☐ None of the above

In your opinion, were the questions included in this survey easy or difficult to understand?

- ◯ Easy to understand
- ◯ Neither easy nor difficult
- ◯ Difficult to understand

Feel free to share any comments with us below.