



## Regular Research Article

Do government accountability and responsiveness enhance support for property taxes? Experimental evidence from China<sup>☆</sup>Xiaobo Lü<sup>a</sup>, Lily L. Tsai<sup>b</sup>, Ping Zhang<sup>c</sup>, Minh Trinh<sup>d</sup><sup>a</sup> University of Texas at Austin, United States of America<sup>b</sup> Massachusetts Institute of Technology, United States of America<sup>c</sup> Fudan University, China<sup>d</sup> Purdue University, United States of America

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## ABSTRACT

The adoption of property taxes is often met with significant challenges in developing countries. Enhancing administrative capacity for assessment and compliance is undoubtedly important, but addressing the political impasse caused by potential mass resentment poses a more formidable challenge. We explore whether institutions for responsiveness and accountability enhance tax morale in societies with weak democratic institutions. We investigate two dimensions of good governance that the government can uphold: government responsiveness to citizen demands in policymaking; and holding corrupt officials accountable. To assess their impact on property tax preferences and compliance behaviors in urban China, we conducted a conjoint experiment and a lab-in-the-field experiment. The former reveals that both responsiveness and accountability have positive effects on preferences for property tax policies; however, the results of the latter provide strong evidence that top-down institutions of accountability are more influential in shaping tax compliance behavior.

## 1. Introduction

Property taxes, particularly those levied annually on property owners, have long served as a vital source of state revenue compared to other forms of taxation because of its appealing attributes: fairness, efficiency, and stability.<sup>1</sup> Despite these appealing qualities, property taxation has yet to emerge as a major source of revenue in the developing world. By the 2010s property tax revenue accounted for a mere 0.51% of the GDP in developing and transitional countries, in stark contrast to the 1.82% observed in OECD countries.<sup>2</sup> Conventional wisdom often attributes the obstacles to adopting property taxes to

daunting administrative and enforcement costs<sup>3</sup>; however, the visibility inherent in property tax also makes it a salient issue, forcing the state to approach it cautiously for fear of potential backlash. Stated differently, many countries are likely to be *reluctant* rather than *incapable* of adopting property tax.

The political sensitivity surrounding property tax can best be exemplified by the Chinese government's failed attempts to tax private homeownership in urban areas over the past two decades. By many measures, China should have encountered fewer hindrances to adopting property tax than other developing countries because of its robust

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<sup>1</sup> See Collier, Glaeser, Venables, Manwaring, and Blake (2017) for a discussion of the benefits of property tax collection.

<sup>2</sup> Calculated by the authors based on IMF Global Revenue Statistics Database (<https://data.imf.org/?sk=77413f1d-1525-450a-a23a-47aeed40fe78>).

<sup>3</sup> Norregaard (2013) highlights the potential and challenges in implementing property tax.

administrative capacity for taxation<sup>4</sup> and its dominant ruling party (the Chinese Communist Party, or CCP hereafter).<sup>5</sup> As part of its market-oriented reforms launched in the 1980s, China implemented a series of housing policy reforms in urban areas, leading to a booming real estate market and significant private ownership of urban property.<sup>6</sup> Following the CCP's declaration of its intention to institute a property tax on urban private property in 2003, the Chinese government embarked on a series of initiatives laying the groundwork for property tax collection.<sup>7</sup> For instance, Shanghai and Chongqing pioneered pilot programs for annual property tax collection targeting wealthier individuals in 2011 (Hou, 2018), followed by regulations aimed at establishing a national home-ownership registration database in 2016.<sup>8</sup> Nonetheless, the expansion of property tax proves to be challenging: Chongqing and Shanghai remain the sole cities collecting property tax by 2025. Even President Xi Jinping, who is arguably the most dominant Chinese leader since Deng Xiaoping, attempted but failed to expand the property tax in 2021 for fear of potential political and economic impacts.<sup>9</sup>

The challenge of introducing property tax in China highlights its complex role, affecting both macroeconomic growth and state–society relations. Private homeownership has been a major source of household wealth in urban China, accounting for 63.9% of household wealth in 2022 in contrast to 28.5% in the United States<sup>10</sup>; therefore, Chinese policymakers are acutely concerned about how citizens might respond to a broad-based property tax. Given China's long history of social unrest over taxation—most recently, some violent rural protests, resulting in the abolition of rural taxation in 2005—convincing citizens to support new demands for tax payment is a core political challenge.<sup>11</sup>

How can the government mitigate political resistance to property tax and achieve compliance from potential taxpayers? Surprisingly, extant studies have offered few answers to these questions in the case of China.<sup>12</sup> Prior research on the prospective implementation of property tax in China has primarily centered on its potential ramifications in the macroeconomy,<sup>13</sup> the real estate sector,<sup>14</sup> revenue contributions to local government,<sup>15</sup> and homeowners' capacity to bear the tax burden and income redistribution.<sup>16</sup> Although a handful of

scholars have explored Chinese citizens' attitudes toward property tax, their research has largely focused on the economic aspects of property taxes (i.e., tax rates, exemption criteria, the use of property tax revenue, and reminders for overdue payment).<sup>17</sup>

We contend that citizen support for a tax policy does not rely solely on economic calculations but also hinges on tax morale, by which non-pecuniary factors enhance tax compliance. Increasingly, scholars have recognized the importance of tax morale to facilitate tax compliance. An important facet of tax morale is rooted in the concept of reciprocity, where voluntary tax compliance is viewed as an exchange for political or economic benefits, such as political representation and the expansion of government services. Demanding political representation, however, is a costly endeavor—economic elites, not ordinary citizens, are often the ones at the forefront in demanding political representation in exchange for their taxation.<sup>18</sup> Meanwhile, the notion that the delivery of government service can enhance tax compliance has garnered mixed empirical support in extant experimental studies.<sup>19</sup>

In this paper, we shift our focus to another dimension of reciprocity that the state could offer in return for support of property tax adoption—upholding government responsiveness and accountability—which in turn enhances state legitimacy and policy compliance.<sup>20</sup> Citizens are more likely to comply voluntarily with state demands when they are legitimate<sup>21</sup> and lead to good governance.<sup>22</sup> One key aspect of good governance is responsiveness to grassroots citizen demands in policymaking. This bottom-up approach has deep roots in the scholarship of democratic theory and the social contract: Citizens are more likely to comply with taxation, or government policies in general, when the state incorporates and responds to their preferences, increasing the likelihood of their perception the process of policymaking as fair or procedurally just. Ultimately, such policies are better for public welfare.<sup>23</sup> A second key aspect of good governance is accountability for corruption and incompetence. Citizens may be more likely to comply with taxation and other government demands when the state punishes politicians with poor performance; hence citizen are more likely to perceive the government as committed to public values and retributive justice, and public funds may be utilized more effectively too.<sup>24</sup>

To test our argument, we employed a survey experiment and a lab-in-the-field experiment to evaluate both citizens' preferences and behaviors regarding property taxes in China. We first carried out a nation-wide conjoint experiment to evaluate the relative strength of previously recognized economic factors vis-à-vis signaling government responsiveness and accountability in the design of property tax policies. The results of our conjoint experiment reveal that Chinese respondents value institutional design for both top-down sanctioning and bottom-up citizen input. Importantly, the marginal effects of these two attributes are similar to the classic economic factors signaling the benefits and costs of tax compliance, suggesting institutions for

<sup>4</sup> Cui (2022) offers an excellent study tracing the development of China's taxation administrative capacity since the 2000s.

<sup>5</sup> For the expansion of state and party power in the Chinese economy in the last two decades, see Lardy (2019) and Pearson, Rithmire, and Tsai (2023).

<sup>6</sup> See Man (2011) for an overview of China's housing reform.

<sup>7</sup> See Zhang (2020) for a discussion of the evolution of property tax in China and the origins of the pilot programs in Shanghai and Chongqing.

<sup>8</sup> The Ministry of National Resources announced detailed regulations on property registrations in 2016.

<sup>9</sup> Xi made a bold attempt to introduce property tax collection in major cities as part of his Common Prosperity agenda in autumn 2021, however, this plan met resistance within the party and was subsequently canceled because of the difficult macroeconomic conditions exacerbated by the COVID-19 pandemic. Introducing the property tax during economic downturns exacerbate the worsening economy, directly undermining the CCP's popular support based on performance legitimacy. See “In Tackling China's Real-Estate Bubble, Xi Jinping Faces Resistance to Property-Tax Plan”, *Wall Street Journal* (Oct. 19, 2021).

<sup>10</sup> See “2022 Trends in China Household Wealth” (<https://chfs.swufe.edu.cn/info/1031/1736.htm>) produced by the Survey and Research Center for China Household Finance, Southwest University of Finance and Economics. U.S. household wealth composition is based on “The Wealth of Households: 2021” produced by the United States Census Bureau (<https://www.census.gov/library/publications/2023/demo/p70br-183.html>).

<sup>11</sup> See Bernstein and Lü (2003) and Bianco (2001) on rural taxation and protests in China. For the abolition of rural taxation in 2005, see Göbel (2010).

<sup>12</sup> See Hou, Ren, and Zhang (2014) for a review of the history and prospects of property tax in China.

<sup>13</sup> Yang and Liu (2023) and Zhou and Pan (2021).

<sup>14</sup> Xu, Yin, and Wang (2023) and Zhang, Hou, and Li (2020).

<sup>15</sup> Li (2014), Liu, Zhang, and Chen (2015), and Zhang, Yao, and Feng (2021).

<sup>16</sup> Cao and Hu (2016), Zhang and Hou (2016), and Zhan and Li (2015).

<sup>17</sup> See, for example, Antinyan, Asatryan, Dai, and Wang (2021), Liu, Chen, and Wei (2020), and Liu, Gao, and Tao (2019). The rationale behind this strategy is motivated by the classic economic model of tax compliance, where the tax rate, the detection probability, and the penalty for tax evasion are the primary parameters shaping tax compliance (Allingham & Sandmo, 1972).

<sup>18</sup> A close reading of canonical scholarship on fiscal bargaining based on early modern Europe reveals that economic elites were at the forefront of fiscal bargaining (e.g., Bates & Lien, 1985; Levi, 1989; North & Weingast, 1989). Kao, Lü, and Queral (2024) offer direct evidence based on a conjoint experiment for hypothetical tax reforms in separate samples of business elites and ordinary citizens in China.

<sup>19</sup> See Luttmer and Singhal (2014) for a summary of the literature.

<sup>20</sup> Tsai (2021) and Tyler (2006).

<sup>21</sup> See Levi (1989), Levi and Sacks (2009) and Murphy, Tyler, and Curtis (2009).

<sup>22</sup> See, for example, Rothstein (2009).

<sup>23</sup> See Levi and Stoker (2000) for a review.

<sup>24</sup> Tsai (2021).

accountability and responsiveness are as effective as the parameters in the standard economic model of tax compliance.

Motivated by the revealed *preference* in the conjoint experiment, we conducted a lab-in-the-field experiment in Shanghai to evaluate tax compliance *behaviors* when subjects have the opportunity to observe government responsiveness and accountability in real time. We employed an iterated public goods game, in which participants made decisions concerning compliance with property tax payments and funding local public goods and services. Respondents played several rounds of this game, and in later rounds they received a treatment informing them whether the relevant authority figure had or had not been responsive to their preference for the use of property tax revenue (i.e., the responsiveness treatment) or punished corrupt officials (i.e., the accountability treatment).

Our experiment revealed an important finding. We found strong evidence that the accountability treatment consistently enhanced tax compliance but only very weak evidence for the responsiveness treatment. In the round when the subjects were first exposed to the experimental treatment, we observed a sharp increase in tax compliance: 18.5 percentage points for the accountability treatment. The positive treatment effects persisted in subsequent treatment rounds and ranged between 11.6 percentage points and 17.8 percentage points, depending on model specification. By contrast, the responsiveness treatment had little impact on our subjects' tax compliance decision. Our findings remained robust across various additional analyses.

Our paper sheds light on two important strands of literature. First, this insight holds essential implications for societies where democratic structures are either absent or ineffective. Conventional wisdom has emphasized improvement of bureaucratic capacity or incentives to enhance state taxation capacity,<sup>25</sup> yet focusing solely on capacity building can be challenging and inadequate in this context, where resources and political will are often in short supply in developing countries. More importantly, the primary challenges facing many developing nations do not necessarily stem from a lack of administrative capacity but instead from the potential political consequences that could undermine state legitimacy and popular support. Our findings illustrate that promoting government legitimacy by strengthening top-down bureaucratic sanctioning is a crucial strategy boosting tax morale that complements building administrative capacity.

This study joins recent studies on the tax compliance issue in the developing world by employing experimental methods. Our paper differs in two important aspects. First, we evaluate whether citizens' perception of good governance enhances their tax compliance behavior<sup>26</sup> but not how taxation incentivizes citizens' political engagement and demand for government accountability.<sup>27</sup> Second, we study both top-down and bottom-up mechanisms of good governance. Contrary to existing studies focusing on bottom-up representation and accountability, our findings suggest that responding to citizen demands for government services does not significantly boost tax morale in China. Instead, signaling top-down accountability (e.g., retributive justice),

<sup>25</sup> The rationale stemming from the economic theories of compliance suggests that taxpayers "play the audit lottery", which maximizes their expected after-tax return—possibly after adjustment for the desired level of risk (Trivedi, Shehata, & Mestelman, 2005, 2). See Slemrod (2019) for a review of the field.

<sup>26</sup> Previous studies have shown that lack of access to government services undermines tax morale. See Ali, Fjeldstad, and Sjursen (2014), Bodea and LeBas (2014), and Castañeda, Doyle, and Schwartz (2020). Meanwhile, Flores-Macías (2018) found some evidence that citizen oversight improved support for taxation. Finally, Timmons and Garfias (2015) shows that corruption undermined municipal property tax revenue in Brazil.

<sup>27</sup> See, for example, de la Cuesta, Martin, Milner, and Nielson (2022), Martin (2023), Paler (2013), and Weigel (2020). For the exception of indirect taxation, see de la Cuesta, Martin, Milner, and Nielson (2023).

such as through initiatives like Xi's anticorruption campaign, may alleviate resistance to new taxes and bolster compliance.

In the next section, we lay out our theoretical framework for examining the impact of grassroots participation and bureaucratic sanctioning on citizen willingness to comply with taxation. We then present our empirical strategy and discuss the experimental results. We conclude by discussing the implications of our findings and suggesting directions for future research. Specifically, we underscore the broader context and additional conditions that influence citizens' support for property taxes, drawing on our findings.

## 2. Government responsiveness, accountability, and policy compliance

Citizens' voluntary policy compliance often stems from their perception of whether or not the state upholds responsiveness to citizens and accountability for good governance.<sup>28</sup> Two distinct facets of good governance—*responsiveness* and *accountability*—can have profound impact on citizen behaviors in policy compliance and are rooted in the canonical theories of the social contract and social justice. To begin, the state could maintain *responsiveness* by addressing citizen demands through grassroots political participation. When citizens believe that authorities employ equitable procedures in formulating policies and responding to citizen demands—that is, they uphold procedural justice—they are more inclined to comply with those decisions.<sup>29</sup> Applying this line of logic to tax compliance, the prevailing view suggests that grassroots participation in policymaking enhances tax compliance because citizens are more likely to pay taxes when the government uses a legitimate process for making decisions about how to allocate public resources and responds to their preferences about the way their taxes are spent. The basic premise is that citizens believe that the government should deliver promised and fair returns for their taxes.

In the developing world, however, using institutions of procedural justice to encourage policy compliance might prove futile. This is often the result of uncertainty and ineffectiveness in the decision-making procedures of the government, a function of the weak formal institutions that are often common in the developing world. Canonical theories are built on the studies of consolidated democracies, where the rule of law is strong and goes hand in hand with political rights and participatory institutions. In these political systems, democratic elections together with the rule of law ensure that citizens can select officials who care about the public interest and punish officials who fail to promote it. In nondemocratic and hybrid regimes, however, citizens have no guarantee that government authorities will respond to their input.

Uncertainty surrounding the effectiveness of citizen action and political fear are critical obstacles to grassroots participation in developing contexts for several reasons. First, formal procedures for government decision making are often unclear or unknown to ordinary people. Second, officials often have an interest in making the workings of government as "remote and incomprehensible" as possible.<sup>30</sup> Finally, citizens in these contexts may also refrain from providing input—even through formally sanctioned channels—out of fear or because they perceive such efforts to be useless. "When citizens perceive the bureaucracy as insensitive, . . . these perceptions may lead to diminished belief in the value of citizens' involvement and political efficacy, negatively affecting citizens' willingness to participate in politics" (Vigoda-Gadot, 2007, 290).

<sup>28</sup> See, for example, Murphy et al. (2009), Rothstein (2009), and Tyler (2006).

<sup>29</sup> See Cohen-Charash and Spector (2001), Dahl (1956), and De Cremer and Tyler (2005).

<sup>30</sup> Khanna and Johnston (2007).

To encourage perceptions of legitimate authority and good governance, the state can highlight its efforts to uphold government accountability by sanctioning officials for poor performance (Fearon, 1999, 55). Top-down institutions for accountability, such as anticorruption measures, may increase citizen willingness to pay taxes because citizens believe that the taxes they pay will contribute to public welfare rather than being wasted or misappropriated by corrupt officials (Field & Frey, 2007). The top-down bureaucratic sanctioning of incompetent officials can serve as a signal to taxpayers, indicating that the noncompliant among them will face consequences, thus deterring free-riding behavior and incentivizing tax compliance (Levi & Sacks, 2009). Higher levels of corruption can lead citizens to conclude that their taxes are being squandered, and they may decide they have no reason to uphold their part of the bargain if the government is not upholding its (Braithwaite, 1998).

Accountability and the punishment of corruption may also increase tax morale by signaling the state's commitment to public integrity and retributive justice (Tsai, 2021; Tsai, Trinh, & Liu, 2022).<sup>31</sup> When authorities punish corruption, they show themselves to be moral actors and leaders (Blau, 1964). Citizens believe that these leaders uphold moral standards and care about the good of the community. In consolidated democracies, retributive justice is embedded into the rule of law. Citizens in liberal democracies are confident (relatively speaking) that the law and the judiciary system exist to punish misbehaving officials. For nondemocratic and hybrid regimes that seek to be seen by citizens as at least somewhat fair and just, institutions such as anticorruption campaigns and anticrime initiatives can create citizen perceptions of retributive justice, which may account in large part for the popularity of political leaders like Xi Jinping in China, Duterte in the Philippines, and Putin in Russia.

### 3. Research design

China is an ideal testing ground to evaluate government responsiveness and accountability in regimes with weak institutions for two reasons. First, citizens in China, similar to many others in the developing world, have limited options to influence policymaking, even though scholars have found that local governments are responsive to citizen input in some instances.<sup>32</sup> Second, government accountability through top-down sanctioning may lack credibility in nondemocracies; however, since Xi Jinping launched the anticorruption campaign in 2012, the credibility of such accountability measures has significantly improved in China. Hence, both top-down accountability and bottom-up grassroots participation, while far from perfect, convey a degree of credibility within the Chinese context.

Our research design consisted of two stages.<sup>33</sup> In the first stage we conducted a nationwide conjoint experiment across major Chinese cities to assess citizen preferences for property tax policies. The experiment presented respondents with pairs of randomized tax policy designs that varied across several dimensions, thus analyzing respondents' choice in each pair yielded aggregate preferences given the institutional design of accountability and responsiveness in tax policy.

In a political environment with weak institutions, the actual policy implementation may not always reflect the institutional design. In the second stage we carried out a lab-in-the-field experiment to investigate whether experiencing government responsiveness and accountability enhances citizen compliance behavior in the city of Shanghai. This experiment simulated the property tax environment with an adapted,

<sup>31</sup> For studies beyond China, see Carlsmith and Darley (2008) and von Hirsch, Roberts, Bottoms, Roach, and Schiff (2003).

<sup>32</sup> See Chen, Pan, and Xu (2016) and Distelhorst and Hou (2017).

<sup>33</sup> Both survey and lab-in-the-field experiments were reviewed and granted an exemption by the Human Subjects Review Committee at the authors' respective institutions.

**Table 1**  
Conjoint experiment attributes and possible attribute values.

Tax policy attributes	Possible values
Channels for citizen input on the use of tax revenue	Yes or No
Provincial Government monitor and the use of tax revenue and punishment for corruption	Yes or No
Fines for late payment of taxation	15% or 3% of tax payment
Tax exemption on first apartment	Yes or No

iterated public goods game, in which each player decided whether to contribute their property tax payment to a pool of common resources from which everyone would receive a payout or to free-ride on other players' contributions. Halfway through the iterated game, we introduced experimental manipulations to simulate whether the authority in charge of disbursing payouts upholds or disavows accountability or responsiveness. Specifically, we compared respondents' decisions in tax compliance before and after observing manipulated government officials' behaviors in accountability or responsiveness. In what follows, we detail the design of these two experiments.

#### 3.1. Conjoint experiment

Conjoint analysis is an experimental technique to solicit aggregate preferences through forced choices. In a conjoint experiment respondents are asked to decide between two or more hypothetical choices that vary across multiple attributes. Respondents make decisions without having to provide explanations, allowing their decisions to capture even politically or socially undesirable preferences that may not be explicitly expressed. Because the values for each attribute are randomly assigned, researchers may still estimate respondents' average preferences regarding each of the attributes by estimating their effects on conjoint decisions (Hainmueller, Hopkins, & Yamamoto, 2014).

Our conjoint experiment presents survey respondents with a pair of hypothetical property tax policies. The policies are represented by four attributes, each of which captures a specific feature of a tax policy and can take one of two possible values as illustrated in Table 1.<sup>34</sup> Central to our research questions are the first two attributes. The first captures responsiveness—whether channels exist for citizen input on the use of property tax revenues. The second attribute reflects accountability—whether higher-level governments audit the allocation of property tax revenues and punish officials who embezzle from this fund. The remaining two attributes represent economic factors that determine tax compliance, namely the economic costs and benefits of the tax regime for individual citizens. Following standard practice for creating conjoint profiles, the order of the attributes was randomized for each respondent; and the values of each attribute were randomly assigned in each round.<sup>35</sup>

Respondents participating in our conjoint experiment faced four rounds of forced decisions. In each round they were given two property tax designs and asked to decide between them. After seeing the two property tax designs and their attributes, respondents were asked to indicate which of the two designs they preferred and then scored their willingness to comply with each design on a 5-point Likert scale. Because the attribute values were randomized, we could estimate the causal effect of each attribute's values on respondents' decisions by regressing their answers on binary indicators representing each attribute value. These Average Marginal Component Effects (AMCEs) captured their preferences among the values of each attribute.

<sup>34</sup> See Appendix A.3 for a screenshot of the conjoint experiment in Chinese presented to the respondents.

<sup>35</sup> To ease the cognitive load on participants in our online conjoint experiment, we conducted a training session before the experiment, acquainting them with the format. Following the training, we administered a quiz to filter out individuals who could not grasp the format.

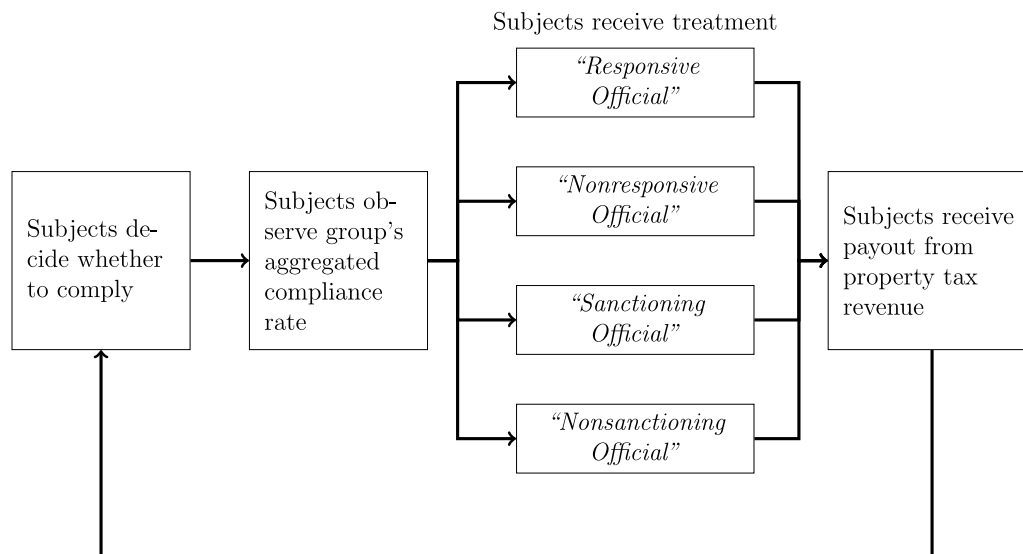


Fig. 1. The step-by-step procedure for each round of the public goods game.

We embedded this conjoint experiment in a larger online survey of Chinese citizens. To avoid biases in sampling strategy, we commissioned two survey firms, Qualtrics and Survey Sampling International (SSI),<sup>36</sup> to separately implement this survey in their respondent pools. For both respondent pools, we used a quota sampling strategy based on age and gender and targeted the adult urban population.<sup>37</sup> Qualtrics and SSI successfully collected data from 464 and 431 respondents, respectively, between May 26 and June 6, 2016.<sup>38</sup>

### 3.2. Lab-in-the-field experiment

To create a simulated property tax environment, we adapted an iterated public goods game in which participants made decisions regarding compliance with property tax payments that fund local public goods and services. The main objective of the lab-in-the-field experiment was to address the concern that the conjoint experiment reflects only the institutional design of government responsiveness and accountability, but both could be unrealistic in the Chinese context. To address this concern, the experimental manipulation in the lab-in-the-field experiment was focused on whether subjects experience positive or negative responsiveness and accountability behavior by the government. We implemented the game in sessions with subjects randomly divided into four groups of approximately equal sizes. Each subject was given an iPad with a preinstalled app to interface with the game. We then provided instructions and conducted some training for every participant in a session.<sup>39</sup>

Following the training we introduced the subjects to the simulation. We informed them that within the simulated property tax environment they would be required to pay property taxes annually, but they would be able to decide whether to comply with this requirement and pay the tax promptly or disobey it and delay payment.<sup>40</sup> In each round the property tax rate was fixed at 0.3%, but the property tax

payment varied across subjects, depending on their property values. If subjects chose not to pay their property taxes on time, they faced a probability, the exact value of which was unknown to them, that they could be audited by the government, resulting in a penalty raising their payment to a value of 150% of their property tax. After our subjects had independently and anonymously made their decisions, we revealed the overall property tax compliance of the entire group.<sup>41</sup> Finally, we informed subjects that all the property tax payments as well as penalties for late payments (if any) would go to the general government property tax revenue. Eighty percent of the revenues were then divided equally among all the subjects within the group as a lump sum payment representing a public good, the remaining 20% percent allocated to government overhead and waste.<sup>42</sup>

To ensure the experiment was incentive-compatible, we tied their experimental compensation to their tax compliance decisions. All subjects were endowed with 15 units of token money at the beginning of the session. The amount of token money could vary after each round, depending on the size of their tax payment, potential penalty for noncompliance, and other subjects' tax compliance decisions. At the end of the experiment, we paid each subject an amount proportionate to their remaining token money, with amounts ranging between 180 and 300 RMBs, approximately the median daily salary in Shanghai.

In total, our subjects played 12 rounds of this game. Rounds 1–6 took place without any experimental manipulation. These six rounds allowed our subjects to familiarize themselves with the game settings. More importantly, we used the behavioral outcomes in these six rounds to establish a benchmark property tax compliance rate for each subject and to estimate the pace at which they adapted their strategies to information about other players' actions. These were necessary to help identify within-subject changes due to the experimental manipulation.

<sup>36</sup> SSI later rebranded as Dynata.

<sup>37</sup> The breakdown of our quotas is as follows: aged 25–34: 23%; aged 35–44: 25%; aged 45–54: 22%; aged 55+: 30%; men: 51%; women: 49%. These quotas were based on the 2010 China Census.

<sup>38</sup> See Appendix A.1 for summary statistics of respondent characteristics. Appendix A.2 reports a balance test verifying that the randomization of attributes was successful.

<sup>39</sup> Our training detailed the development of property tax policy in China. We also discussed the common international practices of using property tax revenue to finance local public goods and services.

<sup>40</sup> We framed the tax compliance decision as whether to pay property tax on time instead of whether to pay property tax at all. Based on our pilot study and focus groups, framing tax avoidance in the lab experiment would have been unrealistic for our subjects, who believe that complete avoidance of paying property tax is impossible; however, delaying property tax payments is possible because delayed payments could be passed over to future potential buyers, effectively allowing property owners to avoid paying. This practice is common in Shanghai.

<sup>41</sup> Specifically, the subjects were informed about the number of group members who paid taxes on time, the number of noncomplying group members who were caught by government auditing, and the total property tax revenues.

<sup>42</sup> We informed the subjects that not all government revenues would be spent on public goods because of government operation costs and waste.



Fig. 2. Estimated AMCEs of conjoint attributes on tax policy preference.

We introduced an experimental manipulation for the treatments of government responsiveness and accountability at the beginning of Round 7 and continuously reexposed respondents to it in all the remaining rounds. Each subject was randomly exposed to one of four possible treatment conditions, with all respondents in the same game session receiving the same treatment throughout Rounds 7–12. Fig. 1 illustrates the sequence of events in each of these rounds.

Among the four treatment conditions the first two signaled the degree of government responsiveness to citizen input. Under the first treatment condition, which we term “responsive official”, the subjects was given an opportunity to vote for their most preferred use of property tax revenue<sup>43</sup>; and they were informed, using animated videos designed to garner attention, that the government official in charge of this expenditure had respected the group’s vote outcomes. Under the second condition, which we termed “nonresponsive official”, the authority simply disregarded the group’s votes. These two treatment conditions reflected the level of responsiveness in many developing countries, where governments may not consistently address citizens’ demands even when formal channels for participation are in place.

The third and fourth treatment conditions pertain to top-down accountability. Under the third treatment condition, which we called “sanctioning official”, the subjects were informed that a corrupt official had stolen money from property tax revenue but had been caught and punished by the higher-level government. The fourth treatment condition, which we called “nonsanctioning official”, conveyed the opposite message: the corrupted official had not been punished. We adopted this anticorruption framing because the anticorruption campaign is a salient issue in China, where a large number of central and local government officials have been prosecuted for corruption charges since Xi Jinping came to power in 2012.

We conducted 16 lab-in-the-field experimental sessions in July 2018 in Shanghai, chosen as the experimental site for three compelling reasons. First, Shanghai is one of the two Chinese cities that had introduced property tax policies in 2011, making annual property tax payments a familiar concept to Shanghai residents compared to those in other regions of China. Second, Shanghai ranks among China’s most developed cities, boasting one of the country’s priciest real estate markets. Consequently, property tax is a prominent issue for Shanghai residents, who may have to bear a substantial tax burden. Last, Shanghai residents generally have higher levels of education, ensuring a

better understanding of the rules governing our behavioral experiment. To closely replicate real-world conditions, we enlisted participants from the general population, excluding full-time students. Subjects were recruited through advertisements on social media. In total, we collected lab experiment data from 123 subjects who are homeowners,<sup>44</sup> summary statistics for whom are detailed in Table C-4.<sup>45</sup>

## 4. Results

### 4.1. Conjoint experiment

Fig. 2 reports estimates of the AMCEs from the baseline model along with 95% confidence intervals. We present results from the SSI sample (as triangles), the Qualtrics sample (squares), and combined results from both samples (circles). As shown, all our AMCE estimates are broadly consistent across both samples; therefore, we focus on results from the combined sample in the remaining part of the section, leveraging the efficiency benefit from the larger sample size.

Notably, each point estimate captures the effect of each attribute on the probability that a respondent would prefer a tax policy. Because each attribute takes one of two possible values, we designate one of the values as the baseline. Intuitively, the AMCE captures how much greater the likelihood that a respondent would prefer a particular tax policy with a non-baseline value for an attribute over another with the baseline value for the same attribute is, all else being equal. For example, the AMCEs for the “Tax Payment Penalty” attribute indicate how often respondents preferred a tax policy with a 3% penalty over another with a 15% penalty.

Our results show that Chinese respondents cared about both responsiveness and accountability. The AMCEs of the corresponding attributes—bottom-up channels for citizen inputs and top-down monitoring and sanctioning—were both estimated to be substantively and statistically significant. Specifically, we found a property tax policy with channels for citizen input about the use of tax revenue 12.4 percentage points more likely to be preferred over a tax policy without them ( $CI = [9.9, 14.9]$ ). Meanwhile, the inclusion of avenues for top-down monitoring and sanctioning was found to increase support for a tax policy by 9.8 percentage points ( $CI = [7.4, 12.1]$ ).

These estimates are comparable to the AMCE estimate for tax exemption in terms of magnitude. Specifically, an exemption for a first apartment increased support for a property tax policy by 13.7 percentage points ( $CI = [11.0, 16.2]$ ). Given the preoccupation with the scope of exemptions in the existing debate, our finding suggests that accountability and responsiveness matter just as much as exemptions and deserves at least an equal amount of attention. Finally, consistent with economic models of tax compliance, we found that a penalty of 3% for non-payment increased support for a tax policy by 18.7 percentage points ( $CI = [16.2, 21.2]$ ) compared to a harsher penalty of 15%.

We conducted additional analyses to probe the robustness of our main findings. Our first concern regarded external validity, given that property ownership was not universal among our respondents and most Chinese residents were still unfamiliar with the practice of property taxation. Moreover, property tax is a form of redistribution from property owners to nonowners; thus these two groups of individuals may

<sup>44</sup> Our sample size was relatively small, reflecting the financial and logistical challenges in recruiting subjects to participate in an hour-long in-person simulation. We attempt to mitigate the lack of statistical power by leveraging repeated measures from our respondents as they completed the 12 rounds of the game. Section 4.2 details our analytical approach.

<sup>45</sup> During the experimental session, we identified a few subjects whose data might be subject to various biases. For example, some older subjects had problems understanding the rules of our property tax compliance game and required our student assistants to help interpret the rules throughout the entire lab session. Hence, we excluded a total of five such respondents in our analyses.

<sup>43</sup> The choices were education, transportation, and community facilities.

have had distinct preferences for property tax. To address this concern, we conducted a subset analysis of our data, separating our respondents by the number of apartments they own. As shown in Figure B-3 in the Appendix, these additional analyses still prove consistent with the main results. Specifically, we find similar preferences experienced by those who owned no apartments, those who owned only one apartment—likely their primary home, and those who owned multiple apartments, because the estimates among these different groups of subjects were statistically indistinguishable.

We also evaluated the concern that direct experiences with actual property taxation might influence preferences for property tax policy. Two cities—Shanghai and Chongqing—have had pilot property tax regimes in place since 2011. We thus examined the results for residents living there versus residents of all other cities. Our analysis does not show markedly different results between residents with direct experience with the property tax and those without experience (Figure B-4 in the Appendix). The estimates for top-down institutions for sanctioning and bottom-up channels for citizen input are broadly compatible in the two subsets of the respondents.

Finally, we evaluated the respondents' stated willingness to comply with property tax as alternative outcome of interest. Figure B-2 in Appendix B.1 reports the baseline results, and they are broadly consistent with the findings above on tax policy preferences. In this analysis, the size of the effects of channels for citizen input about the use of tax revenue and institutions for auditing and punishing misuse of tax revenue roughly align with the size of the effect of tax exemptions. Surprisingly, we found little evidence that low penalties increase tax compliance.

#### 4.2. Lab-in-the-field experiment

Turing to the analysis of the lab-in-the-field experiment, Fig. 3 shows the average tax compliance rate by experiment round for respondents in each of the four treatment conditions. Because subjects were exposed to the treatment videos after making their compliance decision in Round 7, Rounds 1–7 constitute the pre-treatment period, and Rounds 8–12 constitute the post-treatment period. The bold horizontal lines in Fig. 3 indicate the average pre- and post-treatment compliance rates.

Initially, the average property tax compliance rates ranged from 65% to 73% before our experimental manipulation, indicating a notably high degree of property tax compliance among our participants. This finding sharply contrasts with the low compliance rates typically observed in many developing countries<sup>46</sup> largely because China has stronger bureaucratic and coercive capacities than many other developing countries. Moreover, these compliance rates align with a national survey conducted by other researchers one year later, which shows that 68% of urban households did not oppose the introduction of property tax (Liu et al., 2019).

Looking at participants' behaviors after the introduction of experimental manipulations, we found strong evidence that the “sanctioning official” treatment improved tax compliance but no evidence for the “responsiveness official” treatment. Most succinctly, Fig. 3 plots the average tax compliance rate by experiment round for respondents in each of the four treatment conditions. Among the four treatment groups, only in the “sanctioning official” treatment group did respondents' tax compliance rate increase following exposure to treatment. In contrast, compared to the pre-treatment level, post-treatment compliance rates appear markedly lower in the “nonresponsive official” and the “nonsanctioning official” treatment groups and slightly lower in the “responsive official” treatment group.

<sup>46</sup> For instance, Weigel (2020)'s experimental treatment increased property compliance rate from 0% to 10% in Congo.

**Table 2**  
Impact of different types of government officials on tax compliance.

Dependent variable:	Tax compliance				
	Immediate effect		Average effect		
Model:	(1)	(2)	(3)	(4)	(5)
<i>Variables</i>					
Non-responsive	−0.027 (0.077)	−0.079 (0.069)	−0.083* (0.042)	−0.043 (0.045)	−0.039 (0.062)
Responsive	0.008 (0.086)	0.037 (0.065)	−0.019 (0.027)	−0.003 (0.043)	−0.005 (0.060)
Non-sanctioning	−0.113 (0.085)	−0.091 (0.080)	−0.045 (0.047)	−0.031 (0.059)	−0.087 (0.067)
Sanctioning	0.181** (0.084)	0.200* (0.115)	0.040 (0.056)	0.123** (0.057)	0.192** (0.081)
<i>Fixed-effects</i>					
Respondent		Yes	Yes	Yes	Yes
<i>Time trends</i>					
Common				Yes	
Individual					Yes
<i>Fit statistics</i>					
Observations	246	246	1476	1353	1353
R <sup>2</sup>	0.023	0.779	0.542	0.552	0.634

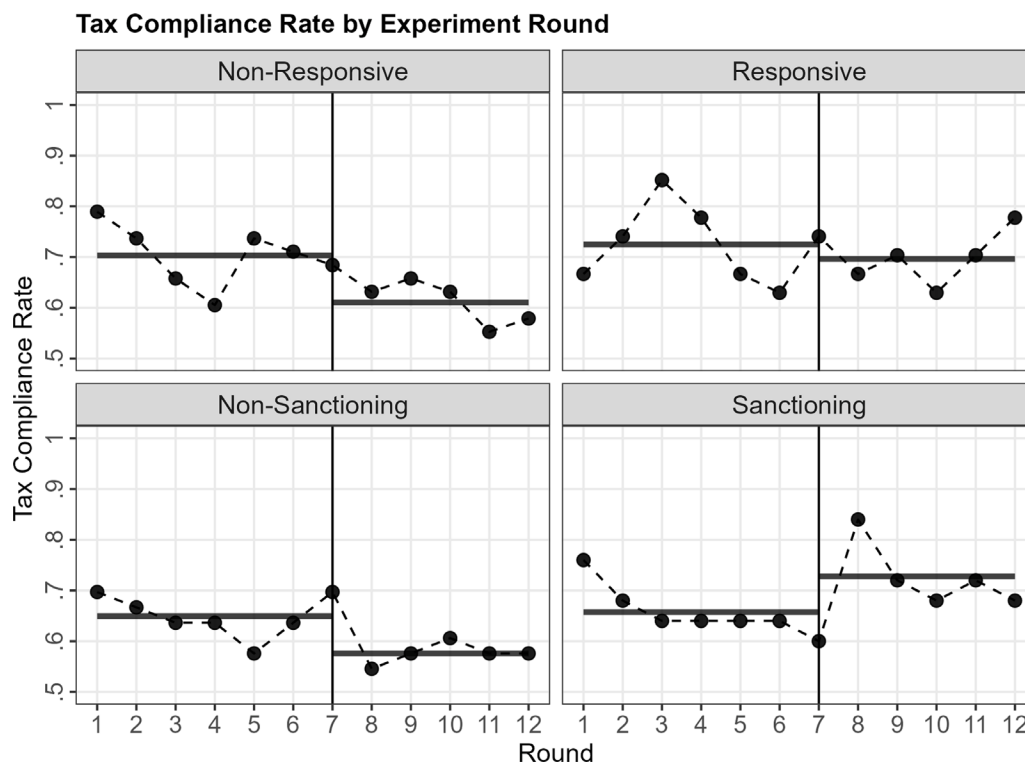
Clustered (Respondent) standard-errors in parentheses  
Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1.

Although evidence from Fig. 3 strongly suggests a positive effect of the “sanctioning official” treatment on tax morale, it also reveals complications that impede a straightforward conclusion. Most notably, in all four treatment groups, tax compliance appears to decrease between rounds, even in the absence of treatment exposure. Although unforeseen in our survey design process, this phenomenon is not surprising. As respondents proceeded through the 12 rounds of the experiment, fatigue and boredom may have set in, potentially causing a gradual increase in noncompliance behavior. More importantly, respondents may have noticed that noncompliance is only occasionally punished, and as they acquired more experience with the experiment and learned to act strategically, they reduced compliance in later rounds. Because our videos appeared in the second half of the experiment, treatment exposure directly correlates with round numbers, allowing the decrease in compliance over time to confound treatment effect estimates. Thus it is imperative for us to account for time trends in the analysis of experimental data.

To address the concerns outlined above, Table 2 presents results from regression analyses in an attempt to account for time trends as well as improve estimation precision through statistical controls. It shows coefficient estimates from regressions of treatment group indicators on respondents' tax compliance. For each respondent-round, we coded four treatment indicators, each of which is a dummy variable equaling one if the respondent was in the respective treatment condition and the round was a post-treatment. Tax compliance is a binary indicator, allowing each coefficient estimate to be interpreted as the effect of the respective treatment video on the expected compliance rate.

Models 1 and 2 in Table 2 present results from analyses that make use of responses only from rounds 6 and 8 of the experiment. Because the treatment video appeared in round 7, rounds 6 and 8 are the pre- and post-treatment rounds closest to the time of exposure; a comparison of tax compliance between these two rounds is less likely to be contaminated by over-time trends. We call the effect identified by this comparison the “immediate effect”. Model 1 is a standard OLS regression of tax compliance on four treatment indicators.<sup>47</sup> In Model 2 we added respondent fixed effects to absorb all idiosyncratic variations across individuals and improve precision; because treatment assignment is randomized, we are not concerned with bias. Still, because

<sup>47</sup> We also estimate an intercept term but omit it from Table 2.



**Fig. 3.** Tax compliance rate by experiment round for respondents in four treatment conditions.  
 Note: Tax compliance rate by experiment round for respondents in each treatment condition. Bold horizontal lines denote average tax compliance rates before (Rounds 1–7) and after (Rounds 8–12) respondents were exposed to the treatment.

they estimate four different treatment effects using only two data points per each of our 123 respondents, both Models 1 and 2 are statistically underpowered, with Model 2 offering only some minor improvements.

To ameliorate the power problem, Models 3, 4, and 5 estimate the average effect over the entire duration of the experiment instead of the immediate effect as in Models 1 and 2. Model 3 includes respondent fixed effects but does not attempt to control for time trends. When no time trends exist, this model would offer the greatest statistical power thanks to repeated measures for each respondent; however, when time trends exist, as in the case of our experiment, it would lead to bias. We present its results for transparency even though it is not our preferred model.

Model 4, our preferred model, controls for a common linear time trend by including the round number as a covariate. When there is no time trends, Model 4 lags behind Model 3 in terms of statistical power, but this difference shrinks under the presence of time trends. In Model 5 we took a step further by using individual time trends through respondent-specific time slopes.

Table 2 indicates a clear, consistent, and positive effect of the “sanctioning official” treatment on tax compliance. Except for Model 3, the effect is statistically significant throughout, with magnitudes indicating an increase in tax compliance rates from 12.3 percentage points (Model 4) to 20.0 percentage points (Model 2). In contrast, none of the coefficient estimates on the remaining treatment effect indicators are statistically significant in a consistent manner. If anything, the effect estimates that most consistently follow in terms of magnitude pertain to the “nonsanctioning official” treatment. These estimates consistently show a negative trend, which, when juxtaposed with the positive estimates for the “sanctioning official” treatment, underscore the stark contrast between upholding top-down sanctioning and its absence. This distinction, however, is not as evident in the case of the “nonresponsive official” and “responsive official” treatments.

Notably, our analyses draw from a relatively small sample of 123 respondents divided over four treatment groups, resulting an inevitable

statistical power problem. The use of repeated measures for each respondents partially mitigates this problem, but ultimately even our most efficient analytical approaches are still powered to detect only very large treatment effects. Specifically, as shown in our power analysis in Appendix C.9, under ideal conditions where no time trends exist, depending on the extent of heterogeneity across respondents, Model 3 may have more than 90% power to detect an effect of 20 percentage points, between 70%–90% power to detect an effect of 15 percentage points, but only 40%–60% power to detect an effect of 10 percentage points. Under more realistic conditions when a negative time trend exists, Model 4, our preferred model, has more than 90% power to detect an effect of 20 percentage points, between 70%–75% power to detect an effect of 15 percentage points, but only 30%–55% power to detect an effect of 10 percentage points. Given a pre-treatment compliance rate of 70%, even a 10 percentage point effect is already a very sizeable effect. Importantly, however, our treatment effect estimates for the “sanctioning official” condition consistently fall above this threshold while estimates for the three remaining conditions are much closer to zero, offering assurance that the statistical (in)significance of these estimates is not a mere accident.

We also conducted several additional analyses to evaluate the robustness of our findings and present them in Appendix C. First, we conducted analyses by separating the samples by apartment ownership characteristics (e.g., number of apartments owned, apartment values). Because of a smaller sample size, we found only suggestive evidence that the estimate of the sanctioning treatment is larger with greater home ownership but also with lower property values (Table C-9). In addition, we found that our results are robust to dropping the first and last rounds (Table C-5) as well as to dropping the seventh round (Table C-6). The reason to exclude these rounds is that the first and last rounds can introduce confounding because respondents may see the first as a practice round—thus not investing sufficient effort in their tax compliance decisions—and expect the last round to be consequence-free, thus behaving too strategically. The seventh round is a potential

source of noise because it is the round in which respondents were introduced to the treatment. We also attempted to replace individual fixed effects with session fixed effects (Table C-7) and replace the linear time trends with higher-order polynomials (Table C-8). All these robustness checks yielded results substantively identical to our main analysis.

Finally, we assessed the external validity of our lab experiment results. In particular, we requested the subjects in our lab experiment to complete a postexperiment survey, which included a similar conjoint experiment that we initially designed for the nationwide survey conducted over the Internet. As reported in Figure C-6 in the Appendix, the conjoint experiment reveals strikingly similar results compared to the main results based on the online conjoint experiment reported in Fig. 2.

## 5. Conclusion

Property tax has been a prominent source of revenue for the state, but the adoption of this tax typically produce impasses, both administrative and political. In this paper we delved into the impact of institutions for accountability and responsiveness in enhancing property tax compliance. We conducted both conjoint experiments and lab-in-the-field experiments in urban China. Our conjoint experiment provides supporting evidence that Chinese citizens value both types of institutions, enhancing their support of a property tax policy. The marginal effects of these two attributes are comparable to factors in the classic economic model of tax evasion. Our lab-in-the-field experiment reveals more intriguing results on tax compliance behaviors. Specifically, we have found that experiencing top-down accountability is more important in enhancing tax compliance than experiencing government responsiveness to citizen input.

Notably, our findings do not suggest that economic considerations are inconsequential or peripheral to Chinese citizens' support for property taxes. Using simulations based on survey data, some scholars have concluded that a tax rate of 0.5% to 1.0% is likely to be more acceptable to urban homeowners.<sup>48</sup> Similarly, offering property tax exemptions under certain criteria is another widely supported proposition among urban residents.<sup>49</sup> Meanwhile, fiscal transparency in the use of tax revenue is a crucial factor in garnering citizen support and ensuring compliance with tax policies, a point reinforced by the findings of our study.<sup>50</sup> Citizen support for property taxes is also inherently tied to the broader tax regime and economic conditions that they experience. Although the Chinese government imposes minimal taxes on personal income and wealth, social security contributions continue to represent a substantial deduction from individuals' earnings. Any reform that increases the tax burden on citizens or firms is likely to trigger strong resentment and encourage tax avoidance, particularly during economic downturns.<sup>51</sup>

Subject to these conditions of the broader context of property taxation in China, our study generates several important implications for understanding the relationship among representation, legitimacy, and tax compliance. Institutions for citizen participation in shaping government decision-making in nondemocratic regimes like China have proved effective in some instances but lacking in others.<sup>52</sup> Promoting

accountability or responsiveness has very distinct implications for institution building. On one hand, signaling responsiveness emphasizes the role of ordinary citizens during the policymaking process, thus requiring building institutions that enhance grassroots political participation and government responsiveness. Signaling accountability, on the other hand, could be achieved by strengthening top-down bureaucratic sanctioning without devolving political power to ordinary citizens. To this end, it is important to determine whether strengthening the institutions to signal bottom-up responsiveness, or projecting top-down accountability through bureaucratic sanctioning without distributing political power to ordinary citizens, would generate greater policy compliance.

We provide experimental evidence from a nondemocratic context, demonstrating that promoting responsiveness to citizen demands can legitimize government policies; but this bottom-up approach may prove ineffective in states with weak or absent democratic institutions. The ineffectiveness of citizen engagement in the developing world is not limited to tax compliance. A growing number of experimental studies have shown that providing information on government performance did not engender greater political participation to enhance accountability and local governance.<sup>53</sup> In addition, participatory budgeting has not consistently delivered its promise to enhance public goods provision.<sup>54</sup> Finally, increasing grassroots participation in monitoring officials could have little impact on reducing corruption (Olken, 2007).

Our findings suggest that the components of accountability must be unbundled and that principals can rely on third parties to take responsibility for some or all of these components. Accountability requires institutions that enable principals to establish the duties of their agents, monitor the behavior of their agents, and sanction them for misbehavior. Accountability sometimes entails multiple principals working together to hold the same set of agents accountable (Braithwaite, 1998). The role of one set of principals (citizens) may be to set policy priorities or monitor the performance of local officials, but another set of principals (higher-level officials) sanctions local officials for poor performance or for failing to respond to the priorities set by citizens. Together, these components of accountability may complement or compensate for one another, ultimately enhancing citizen tax compliance.

## CRediT authorship contribution statement

**Xiaobo Lü:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Lily L. Tsai:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization. **Ping Zhang:** Writing – review & editing, Project administration, Data curation. **Minh Trinh:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

<sup>48</sup> Cao and Hu (2016) and Zhang and Hou (2016).

<sup>49</sup> Hou (2018) and Zhang and Hou (2016).

<sup>50</sup> See Luttmer and Singhal (2014) for a comprehensive review of the relationship between government transparency and tax compliance, particularly in studies utilizing field experiments. Kao et al. (2024) offer direct experimental evidence on fiscal transparency and tax compliance in China.

<sup>51</sup> Zhang and Jing (2020) discuss the strategies and challenges in property tax reform in China. Cheng, Chen, and Qi (2023) demonstrate that firms underreported their profit margins to evade taxes following China's 2008 corporate tax reform.

<sup>52</sup> For rural elections, see O'Brien and Han (2009). For election of local people's congress, see Manion (2015). Qiaoan and Teets (2020) offer a review of government responsiveness under the leadership of Hu Jintao and Xi Jinping.

<sup>53</sup> Kosack and Fung (2014) review the mixed evidence of the impact of transparency on governance.

<sup>54</sup> See Speer (2012) for a review of the limitations of participatory budgeting.

## Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.worlddev.2025.107051>.

## Data availability

Data will be made available on request.

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