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DOES PROGRESSIVITY RAISE TAX CAPACITY? EXPERIMENTAL EVIDENCE FROM THE D.R. CONGO

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Does Progressivity Raise Tax Capacity? Experimental Evidence from the D.R. Congo
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ABSTRACT

Progressive taxation is central to high-income countries' tax systems, but developing countries typically rely on less progressive instruments. We study the introduction of progressive property taxation in a large Congolese city through a citywide field experiment conducted in partnership with the provincial government. Neighborhoods were randomly assigned to a progressive or a proportional schedule. The progressive schedule increased revenue by 56% relative to the proportional one. Gains occurred throughout the property value distribution: at the top, higher statutory rates mechanically raised revenue despite modest compliance losses; at the bottom, lower rates induced compliance gains large enough to offset lower liabilities. Cross-randomized information treatments show that taxpayers responded primarily to their own rates, not to others' rates or to the perceived fairness of the overall schedule. Effective tax rates – taxes paid as a share of property value – declined with property value and were most regressive under the progressive schedule. However, after a progressive schedule was scaled up citywide in subsequent years, targeted enforcement among high-value properties reversed this pattern, aligning statutory and effective rates. Together, the results suggest that progressive property taxation can raise fiscal capacity in low-income settings and, when paired with targeted enforcement, further shift the tax burden onto wealthier property owners.

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An online appendix is available at
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1 Introduction

Progressivity in income taxation emerged in the early 20th century alongside major revenue gains in Europe and the US (Besley and Persson, 2014). Today, progressivity remains a core feature of high-income countries' tax systems (Saez and Zucman, 2019a). It is also strongly associated with the share of GDP raised by income taxation (Figure A1). Yet whether this association is causal, and whether it generalizes to other direct taxes, remains an open question. Can progressivity increase tax capacity?

This question is particularly important in developing countries (Bachas et al., 2024a), where governments face acute revenue shortfalls and barriers to progressive taxation. Informality and low financial development make it difficult to measure taxable income and enforce progressive income taxes (Gordon and Li, 2009; Jensen, 2022).[1] Political economy constraints may further limit demand for progressive taxation in elite-dominated coalitions (Besley and Persson, 2014; Abbas et al., 2025). Finally, low state capacity limits governments' ability to administer progressive systems, often leading them to rely on simplified or presumptive tax instruments (Best et al., 2015; Regan, 2020).[2] Enabling progressivity by relaxing these constraints could potentially boost tax capacity while allowing governments to pursue redistributive objectives.

This paper studies the introduction of progressive property taxation in the Democratic Republic of Congo (DRC), one of the world's poorest countries, where total tax revenue remains below 10% of GDP. Building on a close partnership with the tax authority of the Provincial Government of Kasaï-Central, we study an at-scale field experiment in the city of Kananga (population 1.6 million), comparing neighborhoods assigned to a progressive or proportional property tax schedule.

Our study occurs at a key juncture in the development of the Congolese state: the tax authority recently revolutionized measurement of the tax base through digital mass assessment of property values. By combining drone imagery, AI rooftop detection, a building characteristics survey, and a training sample of expert valuations, the government assessed the value of all buildings in Kananga. This mass valuation relaxed the information constraint — a lack of uniform building assessments — that had led

[1] One offsetting factor is that consumption taxes can be *de facto* progressive in developing countries because poorer households consume more informally (Bachas et al., 2024b).

[2] Because presumptive systems use coarse tax base proxies, they generate horizontal inequities between otherwise-similar taxpayers that depress voluntary compliance and push the optimal schedule toward lower progressivity (Best et al., 2025).

the government to rely on the simplified status quo property tax system: a set of flat fees based on building materials but independent of size or other determinants of value. The new database made it possible to set property tax rates as a percentage of assessed value instead.

The government then faced a policy choice: whether to adopt a progressive or proportional rate schedule. Although proportional property taxation remains the most common approach worldwide, a growing number of developing countries have adopted progressive schedules. Given the challenges of progressive income taxation noted above, property taxes may offer a more feasible way to achieve progressivity in direct taxation in developing countries. In addition to redistributive objectives, past descriptive evidence in Kananga suggested that a progressive schedule would maximize revenue from the property tax (Bergeron et al., 2024).

To investigate these claims, we helped the government embed a field experiment into its 2024 property tax collection campaign. The 460 neighborhoods of the city were randomly assigned to a Progressive tax schedule (41% of neighborhoods), a Proportional schedule (41%), or the Status Quo flat fee system (18%). Our main comparison is between Progressive and Proportional; the Status Quo provides a useful policy benchmark. To credibly compare the revenue impacts of Progressive and Proportional, the design held fixed their revenue potential. Average tax liability was constant across these two treatments, while tax rates in Progressive were calibrated to pivot around this common mean, lowering liabilities for lower-valued properties and raising them for higher-valued ones. All other components of tax administration — the building valuation method, payment modalities, collector visits and incentives, and enforcement efforts — were also held constant across treatments.

Why might a progressive tax schedule raise more revenue than a proportional one with the same average liability? Three forces are at play. The first is the *mechanical effect* of tax rate changes. At the top of the property value distribution, higher statutory rates increase liabilities and mechanically raise revenue absent any behavioral response. At the bottom, lower rates mechanically reduce liabilities and revenue. The second is the countervailing *own-rate behavioral response* in compliance.[3] Higher rates might reduce compliance among owners of high-value properties, while lower rates might encourage compliance at the bottom. Third, there can be *second-order behav-*

[3] As in recent work on property taxation in low-income countries, we focus on tax compliance as the key margin of behavioral response and abstract away from real responses like property investments, which, as we discuss in Section 5.3, are less relevant to our experiment.

ioral responses: compliance effects driven by awareness of others' rates and preferences over the tax schedule as a whole. For example, if property owners perceive progressivity as fairer than the status quo, it could increase perceived fairness and compliance.[4] Which of these forces dominates, and how their relative importance varies across the distribution, are empirical questions our experiment seeks to answer.

According to administrative tax data, Progressive increased average revenue by 56% relative to Proportional.[5] This effect is large, precisely estimated, and robust to a wide range of tests, including controls for imbalanced covariates and cross-randomized treatments, Poisson QMLE specifications for revenue, alternative sample definitions, and administrative adjustments for bill delivery and exemptions. We also rule out several alternative explanations, including possible endogenous effort responses by field-based tax collectors, information spillovers across treatments, and anchoring on past liabilities in the status quo fee-based system.

Progressive increased revenue throughout the property value distribution.[6] These gains, however, reflect different mechanisms among higher- and lower-value properties. Among the bottom 95% of properties, the own-rate behavioral response to lower liabilities — higher compliance — more than offset the mechanical revenue loss. At the top 5% of the distribution, by contrast, higher statutory rates mechanically raised liabilities enough to dominate a modest decline in compliance. In sum, Progressive increased revenue both by eliciting greater compliance among lower-value owners and by raising liabilities on higher-value owners.

Would other progressive schedules have achieved similar revenue gains, or are our results specific to this particular schedule? We answer this question by estimating the revenue-maximizing tax rate (RMTR) schedule, exploiting random variation in tax rates across the property value distribution generated by assignment to Proportional or Progressive. Across parametric and non-parametric specifications, the RMTR increases with property value, although less steeply than under the implemented Progressive schedule. The revenue advantage of Progressive thus does not appear to be an artifact of the specific rates implemented by the government; the estimated revenue-maximizing schedule itself is upward sloping.

[4] These responses may also vary across the distribution, as owners of high-value properties face higher rates while owners of low-value properties face lower rates.

[5] The corresponding difference relative to Status Quo is 63%, after applying a pre-specified adjustment for differences in average tax liability in Status Quo, as explained in Section A4.1.

[6] Although the revenue increases in the top three bands — percentiles 80–100 of the property value distribution — are large (e.g., 21% for the top 5%), they are not statistically significant.

In light of the 2024 results, the government scaled up a progressive schedule citywide in 2025 and 2026. Although the comparison is non-experimental, and other features of tax administration also changed, the steady growth of revenue raised per property after scale-up appears to validate the government's choice to adopt the progressive system and helps address concerns about scale-up (e.g., weaker administration absent researcher involvement).

While much of our analysis of the 2024 experiment focuses on taxpayers' own-rate responses, we also examine *second-order behavioral responses* to the tax schedule as a whole (e.g., fairness considerations). We embedded a cross-cutting information experiment on the back of tax bills in 2024, in which some owners received information about the tax schedule in their neighborhood, while others received placebo information. If favorable attitudes toward progressivity explain the main effects, making the schedule salient should increase compliance more in Progressive than in Proportional. However, this information did not significantly shift compliance levels in either treatment.

We consider several explanations for this null result. First, despite the information treatment, the tax schedule may have remained insufficiently salient, especially if collectors did not explain the information clearly. We therefore repeated the tax bill experiment in 2025 after the government increased collector monitoring through audio recordings. Even under these high-salience conditions, the treatment had no effect on compliance. Second, property owners might not value progressivity. However, this explanation conflicts with clear baseline preferences for progressivity, which we validate in a separate information experiment embedded in the endline survey. Third, owners might care more about effective than statutory progressivity. But another arm in our endline experiment provided information about the effective rate distribution, and it had little impact on perceived fairness. Ultimately, property owners appear to value progressivity, but these preferences were inframarginal in the payment decision.

A progressive statutory rate schedule need not produce a progressive realized tax burden. We characterize the distribution of effective tax rates (ETRs) — taxes paid as a share of property value — because realized incidence matters for welfare and for the evolution of tax morale over time. In 2024, ETRs declined with property value under all three schedules. This decline was steepest in Progressive, reflecting the large compliance response among low-value properties. In Progressive, the top 5% contributed five times as much revenue per property as the bottom 60%, but because their properties were 58 times more valuable, their payments represented a smaller share

of property value, leaving them with a lower ETR. Statutory progressivity can still lead to effective regressivity when compliance responses vary across the distribution.

Tax authorities often turn to enforcement to close the gap between statutory and effective tax rates, and Kananga's government is a case in point. It introduced a suite of interventions that we exploit to study how ETRs evolve under different enforcement regimes. In 2024, randomly selected tax bills included a deterrence message warning owners of follow-up enforcement visits. This *uniform* enforcement policy raised compliance and ETRs. But it did so especially among low-value properties and therefore made the ETR distribution more regressive. In 2025, by contrast, three *targeted* enforcement policies — reducing collection effort at the bottom, introducing serious enforcement (e.g., locking properties and blocking bank accounts) at the top, and sending SMS messages highlighting recent enforcement actions — shifted compliance and revenue up the property-value distribution and thus generated an upward-sloping ETR. By lowering ETRs at the bottom and raising them at the top, targeted enforcement in 2025 aligned the effective rate distribution with the statutorily progressive one.

If Progressive made effective tax rates more regressive (before enforcement), did it also reduce welfare? A simple welfare framework, in which property owners face idiosyncratic delinquency costs, clarifies why it need not. The key intuition is that marginal taxpayers in the bottom of the distribution are better off: they reveal that they prefer paying the lower tax rather than bearing the cost of delinquency. Existing taxpayers in the bottom are also better off because they have lower liabilities. There are welfare losses at the top; however, with standard welfare weights, these are likely exceeded by the welfare gains at the bottom plus the gains from public spending. A progressive statutory reform can thus improve welfare even if it makes the ETR schedule appear more regressive.

The welfare calculus changes when progressivity is paired with enforcement, which raises revenue by increasing the cost of delinquency rather than by lowering statutory burdens. Uniform enforcement imposes these costs throughout the distribution and, in our setting, induces the strongest compliance responses among low-value owners, where liabilities are small and social welfare weights are high. The more regressive ETR distribution therefore corresponds to larger welfare costs for low-value owners. Targeted enforcement, by contrast, reduces enforcement pressure at the bottom while shifting realized payments and ETRs toward owners with lower social welfare weights. This reallocation makes the private costs of targeted enforcement more likely to be

outweighed by the social value of additional public funds.

This paper provides the first experimental evidence on the causal effect of introducing a progressive tax schedule on total revenue. Past evidence is largely descriptive, documenting the evolution of progressivity across countries and over time (Piketty and Saez, 2007; Besley and Persson, 2014; Saez and Zucman, 2019b; Dray et al., 2023; Bachas et al., 2025). The closest paper is Ajzenman et al. (2024), which studies a series of reforms in Argentina that incrementally made the property tax schedule more progressive. Their analysis exploits a regression discontinuity design around rate thresholds to estimate *local* compliance responses, and a tax-letter experiment making salient the increase in progressivity. Our focus, by contrast, is the *aggregate revenue effects* of implementing a progressive property tax for the first time. Moreover, our counterfactual is a proportional tax — the schedule most developing countries use and the natural policy alternative. The government's decision to experimentally assign progressive and proportional schedules allows us to estimate revenue effects on average and across the property-value distribution. The results suggest that many low-income countries with proportional property tax rates could raise fiscal capacity by adopting progressive schedules.

We also contribute to the growing literature on tax incidence and equity in developing countries (Bachas et al., 2024a,b; Best et al., 2025; Fisher-Post and Gethin, 2025; Palomo et al., 2025). This literature illustrates how the distributional effects of taxation in developing countries often differ from their statutory design. For instance, Bachas et al. (2024b) show that consumption taxes can be progressive because informal consumption is concentrated among poorer households, while Best et al. (2025) document horizontal inequities created by presumptive property taxation in Brazil. We build on this literature by studying vertical equity in a setting where statutory progressivity is experimentally assigned. Also novel is our analysis of the gap, in levels and slopes, between effective and statutory tax rates — and how targeted enforcement can help align effective rates with statutory progressivity.[7] Last, we illustrate how the distribution of effective tax rates is an unreliable guide to welfare analysis when compliance responses to tax policy are large.

Finally, we contribute to research on tax fairness and tax morale in developing coun-

[7]While past work has compared tax administration reforms with tax rate changes (Basri et al., 2021), or tax enforcement and tax rate changes (Brockmeyer et al., 2023), there is less evidence on how tax policy *interacts* with enforcement. An exception is Bergeron et al. (2024), who study how the revenue-maximizing tax rate changes with enforcement. Here, by contrast, we examine how enforcement interacts with statutory progressivity and shapes the distribution of effective tax rates.

tries. In survey experiments, citizens in many developing countries report stronger tax morale when they learn that their tax system is progressive (Hoy, 2025). Similarly, in Argentina, information about greater property-tax progressivity increased perceived fairness as well as tax compliance in the bottom of the distribution (Ajzenman et al., 2024). We contribute by studying fairness using four sources of experimental variation: the tax schedule field experiment, the 2024 tax-bill information experiment, the 2025 endline survey experiment, and the 2025 tax-bill information experiment. While we document strong preferences for progressivity, we find no evidence that these preferences contribute to tax compliance. Although there are several possible explanations for this divergence from Ajzenman et al. (2024), it may reflect the difference in income levels. In our low-income setting, property owners appear to value progressivity in the abstract, but when it comes to the costly decision of whether to pay, only their own rate moves the needle.

2 Setting

The study takes place in Kananga, a city of 1.6 million and the capital of Kasaï-Central Province in the Democratic Republic of Congo (DRC). The DRC is among the world's poorest countries. In our baseline survey, median reported household income in Kananga was $53 per month, compared with approximately $40 nationally.

Like many subnational governments in low-income countries, the Provincial Government of Kasaï-Central depends heavily on transfers from the national government. These transfers are frequently delayed and, in most years, either do not fully materialize or fall short of the province's needs. The provincial government thus faces strong pressure to mobilize more reliable local revenue sources. Property taxation is a natural candidate: provincial governments have full control over property tax design and administration as well as how to spend the proceeds.[8] Property is also visible, immovable, and comparatively difficult to conceal, making it a relatively attractive tax base for low-capacity administrations. Moreover, as elsewhere in Africa, rapid urbanization and rising property values in Kananga are expanding the potential property-tax base available to finance urban infrastructure. Yet property taxes remain the most underexploited major tax instrument in low-income countries relative to the revenue shares

[8]See Articles 171-183 of the 2006 Constitution of the Democratic Republic of Congo and the *Loi organique relative aux finances publiques*.

collected in high-income countries (Brockmeyer et al., 2023), suggesting substantial scope for growth.

In Kasaï-Central, the property tax accounts for 29% of total own-source revenue.[9] Since 2016, the tax authority (the *Direction Générale des Recettes du Kasaï-Central*, DGRKAC) has conducted repeated citywide door-to-door property tax campaigns (Weigel, 2020). Despite these efforts, compliance has remained below 10%, even though most properties receive both a bill and a collector visit (Bergeron et al., 2024).

Low local revenue translates into severe under-provision of public goods. In 2018, fewer than 5% of the city's streets were paved. Property tax revenues are intended to finance local public goods, such as roads, trash collection, and street lighting. According to data from 2018, richer households are more likely to rely on private providers of these services, while poorer households depend more heavily on public provision (Figure A2). We therefore expect the benefits of marginal public spending financed by property tax revenue to be broadly distributed across the population and, if anything, tilted toward poorer residents. Consistent with this interpretation, recent public works since 2024 have focused on road paving and public lighting in Kananga's major arteries throughout the city (Figure A3). Low- and high-income neighborhoods appear to benefit from recent public goods provision in roughly equal fashion (Figure A4).

3 Design

3.1 Pre-Reform Tax System: Presumptive Property Taxation

The pre-2024 status quo tax system exemplified the simplified, presumptive tax systems that low-capacity governments often adopt when reliable measures of the tax base are unavailable (Franzsen and McCluskey, 2017; Prichard, 2025). Kananga's housing market is thin and largely informal, and property valuation requires expertise possessed by a small number of trained assessors. As a result, the tax authority formally valued only a few hundred properties, mostly in the city center.[10] For the remaining >99% of the city, the government relied on a simple two-tiered fee schedule. Properties built with non-durable materials such as adobe bricks were classified as low value and faced

[9] Other significant sources of non-transfer provincial revenue include business licenses, mining taxes, and transportation taxes.

[10] Even among these properties, few had been formally assessed in recent years. Instead, the government applied a uniform flat fee of $200 to any large property designated as a "villa" or "apartment."

an annual liability of 3,000 Congolese Francs (CF) — roughly $2 — covering about 90% of properties. Properties made with durable materials such as cement were classified as high value and faced an annual liability of 13,200 CF — roughly $9 — covering about 9% of properties (Bergeron et al., 2024).

These fixed fees, applied over coarse bins of property value, implied a tax *rate* that declined over most of the property-value distribution, before rising again for the top 1% (Figure A5). For the vast majority of property owners, the status quo system was regressive: the implied tax rate for the lowest-value properties exceeded the implied rate for many of the highest-value properties. To address this regressivity and strengthen revenue collection, the provincial government sought to reform the property tax. The first step was to relax the constraint that had made the presumptive system necessary in the first place: the absence of systematic information on building values in Kananga.

3.2 Mass Assessment of Building Values

Inspired by a recent property-tax reform in Freetown, Sierra Leone, and with support from the Local Government Revenue Initiative (LoGRI) (Grieco et al., 2019), we partnered with the provincial government to conduct a mass assessment of all buildings in Kananga and to introduce a new property-tax management software.[11]

First, we collected high-resolution drone imagery of the entire city in partnership with a Kinshasa-based aerial-mapping firm. We used these images to identify each building, assign it a unique Google Plus Code, and estimate its surface area using an AI algorithm to detect and trace rooftops. Teams from the tax ministry then reviewed the output to correct cases in which buildings had been incorrectly merged or split.

Second, government surveyors collected data on 135,915 buildings using a tablet-based questionnaire linked to each building's Plus Code. Enumerators recorded 45 external characteristics for each building, including the number of levels and the quality of the walls, roof, doors, windows, and fence.

Third, we constructed a training dataset for valuation. The government's two senior property assessors conducted in-person visits and detailed market-value assessments for over 1,500 buildings sampled across the city.[12] We then used LASSO to select a parsimonious linear model predicting log property value that minimized out-of-sample

[11] See Prichard et al. (2025) for a detailed description of this process.

[12] In addition to a purely random sample, we oversampled high-value properties, rare in a fully random sample, to ensure accurate predictions in the right tail of the distribution, where mass-assessment models often underpredict values.

root mean squared error (RMSE). The best-performing model includes surface area, location, and 15 building characteristics; it has an out-of-sample RMSE of 0.65 log points and an out-of-sample R^2 of 0.77 (Figure A6).[13] The government chose a linear model over better-performing machine-learning alternatives for interpretability (see below). Still, model performance is similar to that from mass-assessment efforts in other developing countries (Grieco et al., 2019; Bachofer et al., 2020). We then used the model to predict values for every building in Kananga.

These predicted values should be interpreted as *assessed values*.[14] This is standard in property taxation: tax rates are typically applied to assessed values generated by mass appraisal models, simplified formulas, or standardized valuation tables. Our goal was thus not to recover precise market prices but to produce a consistent measure of relative building value within Kananga. That said, we demonstrate that predicted values are strongly correlated with independent survey measures of wealth, income, and expenditure (Figure A7). Similar valuation systems for property taxation have been established in several African countries, including Sierra Leone and Senegal.

Assessed values form the tax base in the new tax management software, *Moptax*, which has two key features. First, it automatically calculates assessed values by applying the valuation formula to recorded building characteristics. This makes valuations interpretable to tax staff and taxpayers. If a taxpayer appeals a misrecorded characteristic, staff can update the database and recompute the tax liability; all changes, including the user who made them, are logged automatically. Second, *Moptax* enables year-to-year tracking of tax liabilities, payments, and arrears using Google Plus Codes, which was previously impossible in the absence of formal street addresses.

3.3 Tax Schedule Experiment

Once the government had a uniform database of assessed building values, it faced the question of what tax schedule to adopt. Proportional schedules, with a single flat rate applied to assessed value, are the most common approach in Africa and globally

[13]Larger prediction errors are somewhat more common in the lower and middle parts of the distribution, where many buildings have similar observable characteristics. Because tax schedules were randomly assigned, and because tax bills displayed tax liabilities rather than assessed values, these assessment errors are unlikely to impact the field experiment. For completeness, however, we illustrate that there is no relationship between the size of over- or underestimation errors in the training dataset and tax compliance or revenue — both overall and within treatment groups (Table A1).

[14]For parsimony, we primarily use the term "property value," but we refer to assessed property values generated by this process.

(Figure A8). Yet a growing number of countries and municipalities have introduced progressive property tax schedules.[15,16]

Interest in progressivity in Kananga was motivated by both revenue objectives and citizen attitudes. On the revenue side, a prior collaboration with the tax authority used randomly assigned property-tax liability abatements to estimate the revenue-maximizing tax rate (Bergeron et al., 2024). That experiment found that compliance was less responsive to tax liability reductions among higher-value properties, providing a revenue-based rationale for progressive taxation independent of redistributive concerns. Regarding citizen attitudes, baseline survey data revealed strong popular support for progressivity: most of Kananga's residents preferred a progressive schedule to a proportional one (Figure A9, Panel A). Views were more divided on which system was fairest, but both progressive and proportional schedules were perceived as substantially fairer than the status-quo flat-fee system (Figure A9, Panel B).

Building on this evidence, the government implemented a citywide randomized comparison of progressive and proportional schedules in 2024. In 189 randomly selected neighborhoods, buildings were subject to a proportional rate of 0.4% of assessed value. In another 189 neighborhoods, buildings were subject to a progressive schedule, with rates increasing across five value bands (Table A2): 0.06% in Band 1 (percentiles 0-60),[17] 0.16% in Band 2 (percentiles 60-80), 0.26% in Band 3 (percentiles 80-90), 0.36% in Band 4 (percentiles 90-95), and 0.56% in Band 5 (percentiles 95-100).[18] A smaller

[15]Countries with nationally progressive property tax systems include Chile, Greece, Ireland, Morocco, Panama, Indonesia, Poland, Singapore, and Turkey. Progressive property taxes have also been implemented at the municipal level in Argentina, Brazil, China, Colombia, and Mexico. Moreover, many property tax systems include progressive elements, such as exemptions or lower rates for low-value properties or surcharges on high-value ones.

[16]One potential concern with using property taxes to achieve progressivity is that taxes may be capitalized into property prices. In frictionless markets, lower property prices could fully offset higher tax liabilities, attenuating the progressivity of the tax schedule. In Kananga, however, this mechanism is unlikely to be first order. The property market is thin, tax liabilities are not highly salient and are only weakly enforced, and financial, housing supply, and demand constraints may limit full capitalization. Moreover, recent evidence from higher-income settings with more developed real estate markets finds little evidence of property tax capitalization (Nielsson et al., 2024). Capitalization is therefore unlikely to substantially undermine progressivity in our setting.

[17]There is one exception: the government imposed a minimum liability of 2,000 CF or $0.70 to cover administrative recovery costs. This creates a small amount of regressivity at the very bottom of the property-value distribution (Figure 1). Our main results are unchanged when we exclude properties in the range where the minimum liability binds (Table A5, Column 10, and Table A6, Column 11).

[18]Notches are common in developing-country tax systems (e.g., Kleven and Waseem, 2013). They may be particularly common in property taxation because owners often cannot easily adjust the tax base, especially when values are assessed only periodically using opaque administrative criteria. Countries with notched progressive property tax systems include Ireland, the United Kingdom, Indonesia,

set of 82 neighborhoods remained in the status quo fixed-fee system (explained in Section 3.1). Although the government never considered this system for the future, it preserved it in 2024 in some neighborhoods as a benchmark. Overall, 41% of neighborhoods, containing roughly 43,000 assessable buildings, were assigned to Progressive; 41% were assigned to Proportional; and 18%, containing roughly 20,000 assessable buildings, remained in Status Quo. Figure 1 summarizes the three tax schedules.[19]

The resulting liabilities were economically meaningful but not unusually large relative to income: using baseline data on household income, average liabilities in Proportional and Progressive amounted to 2.22% of average annual income. In Progressive, this ratio increased from 1.49% in the bottom band to 6.14% in the top band.[20]

A key design feature is that the Progressive and Proportional schedules were calibrated to have the same average tax liability (Figure A10). Progressive tilts rates around a common mean: lower-value properties face lower rates, while higher-value properties face higher rates. The two schedules therefore have the same revenue potential. Any revenue difference between them can be attributed to the *distribution* of tax rates, rather than to their average level. This revenue equivalence does not hold relative to Status Quo, where average liabilities were systematically lower.[21] While our primary comparison is between Progressive and Proportional, when we compare to the Status Quo, we adjust for liability differences using a pre-specified procedure described in Section A4.1.[22]

In addition to equalizing revenue potential across Progressive and Proportional, the experimental design held constant all other aspects of tax administration, as described in Section 3.5.

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and Colombia, including Bogota.

[19]Commercial buildings, which constitute 1.8% of total buildings, were subject to slightly higher rates: 0.66% in Proportional, and 0.3%, 0.4%, 0.5%, 0.6%, and 0.8% in Bands 1–5 in Progressive. For simplicity, we exclude commercial buildings from the main analysis, but the results are robust to including them (Tables A5 and A6).

[20]These magnitudes are similar to other developing-country settings, e.g., 1.5 to 6% in Mexico City (Brockmeyer et al., 2023).

[21]The rates chosen by the government in Proportional and Progressive represented an increase relative to the status-quo fixed fees.

[22]We estimate the quasi-elasticity of compliance or revenue with respect to the tax liability using random variation in rates across treatments within value bands, then predict counterfactual Status Quo compliance and revenue if liabilities were shifted up to the average level in Proportional and Progressive. Figure 2 presents Status Quo compliance and revenue with and without adjustment.

3.4 Tax Bill Experiments and Endline Survey Experiment

To distinguish whether property owners respond only to their *own* tax rate or also to *others'* rates, and the tax schedule more broadly, we embedded a cross-randomized information experiment on the back of 2024 tax bills. The experiment was randomized at the property level.[23] Each owner received one of three sets of information: (*i*) a control message about the property tax, (*ii*) the same message plus the building's position in the citywide distribution of building values, or (*iii*) both of the above plus information on the distribution of tax rates and average liabilities in the neighborhood's assigned tax schedule. Treatment (*iii*) provides the key test of whether owners respond to the shape of the tax schedule. Message content was aligned with the neighborhood's tax schedule treatment: property owners in Progressive learned that tax rates increased with building value, while owners in Proportional learned that all buildings faced a single rate. Figure A11 shows a complete tax bill, and Figure A12 shows the key visuals for treatments (*ii*) and (*iii*) in Proportional and Progressive neighborhoods.

This design allows us to test whether awareness of the tax schedule shifts compliance above and beyond own-rate assignment. Comparing Progressive and Proportional among owners who only received information (*i*) isolates responses to one's own liability.[24] If knowledge of the broader schedule, and the fairness considerations it may trigger, affects compliance, then the compliance gap between Progressive and Proportional should widen among properties assigned to treatment (*iii*).[25]

We further investigate mechanisms in an information experiment embedded in the 2025 endline survey. The design closely mirrors the tax bill experiment. Control respondents received no information, while the main treatment group was shown the same tax rate distribution visual used on the 2024 tax bill, describing the assigned schedule in their neighborhood during the 2024 campaign.[26] Additionally, half of respondents (cross-randomized) learned their building's location in the value distribution, mirror-

[23] The unit of randomization is the property (compound), not the building, so that owners of plots with multiple buildings received a single treatment.

[24] This interpretation assumes that taxpayers did not learn about the tax schedule through word of mouth, an assumption we test in Section 5.5.

[25] Because property owners' preferences over tax schedules may depend on their perceived location in the value distribution, treatment (*ii*) serves as our main control group; we also show results using treatment (*i*) as an alternate control.

[26] A secondary treatment provided the tax-system information together with average 2024 compliance rates within each value band. This allows us to test whether property owners respond more to information about the statutory tax rate distribution or the effective tax rate distribution (i.e., conditional on compliance).

ing treatment (*ii*) in the tax bill experiment. The survey experiment tests the same hypotheses as the tax-bill experiment, but under conditions in which the information was designed to be highly salient: trained enumerators explained the visuals in detail, provided examples, and verified understanding through comprehension checks.

Finally, in the 2025 citywide scale-up of Progressive, we repeated the tax bill experiment with two improvements. First, we simplified the graphs used to convey the distribution of tax rates (Figure A13) and retrained tax collectors on their delivery. Second, the government increased monitoring: collectors' tablets automatically audio-recorded their visits to property owners, enabling analysis of adherence to the protocols and the application of penalties for collectors who failed to read the bill carefully.

3.5 Property Tax Administration

Tax Campaign Mechanics. Across all treatments, the tax campaign followed the same administrative procedures. Tax collectors first delivered bills door-to-door. Each assessable building with a unique Plus Code and tax ID received a separate bill showing the owner's name, a photograph of the building, the total liability, payment instructions, deadlines, and information on where to ask questions or appeal (Figure A14). Importantly, the bill displayed the tax liability but not the assessed value of the building, and it did not make salient the neighborhood's tax schedule. These dimensions were revealed only to randomly assigned subsets of property owners through the information treatments described in Section 3.4.

A few weeks after bill delivery, collectors returned to properties to solicit payment. Each collector received a daily schedule containing both taxpayer-requested appointments and randomly assigned visits. The randomly assigned visits provide an additional safeguard against differential collector targeting, as discussed in Section 3.6. Collectors could also make discretionary visits within the same neighborhood. All visits were recorded with GPS coordinates and timestamps, allowing us to verify adherence to assignments and protocols.

Payment Modalities. Taxpayers could pay either directly to collectors or at the tax authority. Collectors issued sequentially numbered receipts and logged payments at the tax authority.[27] Direct payments at the tax authority were recorded at the payment desk, where a receipt was issued directly by the tax software. All payments, regardless

[27]Receipt books included carbon copies that were regularly audited to ensure none were missing.

of modality, were reconciled individually in the digital tax database.[28] The property tax is owed by the property owner. Roughly 75% of properties are owner-occupied; for rented properties, owners were responsible for arranging with tenants to receive the bill and make payment.

Exemptions. Our analysis excludes buildings deemed non-assessable based on the initial property survey, such as religious buildings, public facilities, cemeteries, buildings under construction, temporary structures, outbuildings, and buildings lacking a permanent foundation, walls, or roof. Some property owners were also legally exempt: widows and individuals older than 55 if they resided in the property and no non-exempt adult also lived there. These exemptions were not automatic; eligible owners needed to claim exempt status at the DGRKAC. In practice, only 2,037 properties, or 2.12%, did so in 2024.[29] Because owner-level exemptions could be affected by treatment, our main specification retains owners who may be legally exempt while excluding non-assessable buildings; we then condition on owner exemptions as a robustness check.

Enforcement Message and Follow-up Visits. Selected property owners were informed on the back of their bill that, if they remained delinquent after the payment window expired, they would receive a visit from a separate enforcement team. This team visited nearly all of the selected delinquents at the end of the campaign. Although they collected additional payments, these agents lacked a serious enforcement technology, such as locking buildings, blocking bank accounts, or seizing assets. In 2025, the government introduced stronger enforcement measures for a subset of very high-value residential and commercial properties, as we describe in Section 7.2.2.

Tax Collector Incentives. Tax collectors were contractors trained to deliver bills and solicit payments. Their compensation combined fixed wages for respecting daily visit schedules with a performance wage increasing in taxes collected.[30] As discussed in Section 3.6, the performance payment was designed to neutralize incentives for differential targeting by treatment arm or property value.

[28] Historically, taxpayers in Kananga could only pay their full tax liability. In the 2024 campaign, a randomly selected subset of taxpayers was invited to pay in installments of at least one-third of the liability. This property-level variation is orthogonal to the tax-schedule experiment and studied in a companion paper (Danner et al., 2025).

[29] Official exemption claims by treatment and band are shown in Figure A19. Assessability, field exemptions, and desk exemptions are balanced across tax-schedule treatments, except that Status Quo owners claimed slightly fewer exemptions, likely because their liabilities were lower.

[30] Although collectors were not permanent staff, past promotions to permanent positions created potential career incentives in addition to the explicit compensation scheme.

3.6 Neutralizing Collector Effort

Our design aims to isolate taxpayer responses by holding collector behavior fixed across treatments.[31] For example, if collectors exerted more effort on high-value properties in Progressive neighborhoods, higher revenue at the top could reflect collector rather than taxpayer behavior. We designed collectors' performance wages and visit schedules to neutralize incentives to exert effort differentially by treatment.

The wage scheme sought first to hold constant expected collector compensation across treatments to avoid level differences in effort. Second, it sought to hold constant expected compensation across all properties within a neighborhood, so that collectors had no incentive to differentially target the poor (or the rich).[32] Formally, if a collector receives performance payment w_i when owner i pays and believes payment occurs with probability p_i, expected compensation from pursuing property i is $p_i w_i$. To equalize expected compensation across properties i and j, we set

$$w_j = w_i \frac{p_i}{p_j}$$

This wage structure raises performance payments for properties predicted to be less likely to comply and lowers them for properties predicted to be more likely to comply. We estimated p using random variation in tax abatements from Bergeron et al. (2024) and then predicted each property's payment probability under its assigned 2024 liability.[33] These predictions determined within-neighborhood wage ratios; wages were then scaled at the neighborhood level so that average expected compensation was balanced across treatment arms (Figure A15). Each property's performance payment was printed on collectors' assignment sheets next to the owner's name and tax liability.

A second safeguard comes from collectors' visit schedules during the collection phase. Because half of such visits were randomly assigned, payments collected during these visits cannot reflect differential targeting, conditional on collectors honoring their appointments.[34]

[31] Although door-to-door collection remains policy relevant in many countries, centralized payment systems are likely to become more prevalent as tax systems digitize (Okunogbe and Tourek, 2024). We therefore designed the experiment to shut down endogenous collector responses, allowing us to focus on taxpayer responses.

[32] This design departs from standard commission schemes, which reward collection from higher-liability properties (e.g., Khan et al., 2015).

[33] Of course, these predictions might not coincide exactly with collectors' subjective beliefs about payment probabilities. Fortunately, we can test for differential effort directly using tablet visit data.

[34] Collectors could still vary effort on the intensive margin, for example by staying longer at a

4 Data and Balance

4.1 Data

We combine administrative records with survey data. The administrative data cover property tax payments made during the 2024 campaign, as well as assessed property values, tax deciles and bands, and liabilities. We also use administrative data generated during bill delivery and collection visits. During these visits, collectors recorded timestamps, GPS locations, visit outcomes, and other property-level information relevant for implementation, including whether the owner or another adult was present.

We complement these records with three sources of survey data collected by ODEKA, an independent survey nonprofit. Before the 2024 campaign, we conducted a baseline survey (N= 13,900) that we use to assess balance and characterize taxpayers' preferences over different property tax rate schedules. Second, in the months immediately after the tax campaign, we collected a midline survey (N = 28,583) covering property owners' experiences with tax collection, including perceptions of fairness. Finally, roughly six months after the conclusion of the tax campaign, we conducted an endline survey (N = 5,888) measuring a broader set of attitudes and beliefs about the tax system. The endline also included a survey experiment that provided selected respondents with detailed information about their 2024 tax schedule.

4.2 Randomization and Balance

We randomized neighborhoods to tax schedules within strata defined by geography and average assessed building value. Specifically, we divided Kananga into eight geographic regions and within each region split neighborhoods into above- and below-median assessed value, yielding 16 randomization strata. Following Banerjee et al. (2017b), we implemented 100 re-randomizations and selected the assignment that minimized imbalance across pre-specified neighborhood and property characteristics.

The final assignment achieved a high degree of balance (Table A3).[35] We examine

property. We test for such responses using data on visit duration.

[35]The government deviated from the randomization for 496 taxpayers in the top band, reassigning high-value buildings in the Status Quo group to Proportional because it wanted these buildings to face higher liabilities. Our main specification is the ITT based on the original random assignment, and we show robustness to instrumenting the de facto assignment with original assignment as well as other approaches in Table A4.

37 variables, including (*i*) property characteristics, such as assessed value, income, and access to public goods; (*ii*) owner characteristics, such as age, gender, education, employment, tax morale, and preferences over tax systems; (*iii*) tax campaign features, including cross-randomized treatments, and (*iv*) neighborhood-level exposure to prior tax experiments. Of these variables, three are imbalanced at the 10% level, consistent with what would be expected under random assignment.

5 Results

5.1 Estimation

To identify the causal effects of the tax schedule treatments, we estimate the following equation using OLS:

$$Y_{ins} = \beta_0 + \beta_1 \mathbb{1}_{ns}^{Progressive} + \alpha_s + \boldsymbol{X}_{ins}\boldsymbol{\Gamma} + \epsilon_{ins} \tag{1}$$

where i indexes properties, n neighborhoods, and s randomization strata. The omitted category is Proportional neighborhoods. The α_s are stratum fixed effects. $\boldsymbol{X}_{ins}$ includes property-level pre-treatment covariates, which is empty in most specifications. We cluster standard errors at the neighborhood level (378 clusters). In our main specification, we exclude buildings that collectors never located during bill delivery; we also exclude commercial buildings (1.84% of assessable buildings) to focus on the typical tax base of the property tax (residential property wealth).[36]

While our analysis focuses on the impact of Progressive relative to Proportional, comparing these treatments to the Status Quo system is a policy-relevant benchmark. At times, we thus augment Equation (1) by including indicators for both Progressive and Proportional, with Status Quo neighborhoods as the omitted category.

5.2 Main Results

We begin with the revenue effects of the progressive tax schedule. Relative to Proportional, Progressive increased average revenue per property by 286 CF, or 56% (Figure 2, Panel A). These increases occurred throughout the property value distribution (Figure 2, Panel B), although the positive coefficients in the top two deciles are not statistically

[36] Both of these sample restrictions are balanced across treatment arms, and our results are robust to removing them (Tables A5 and A6).

significant (Table 1, Panel A). Relative to Status Quo, Progressive increased revenue by 308 CF, or 63%, while there is no average revenue difference between Proportional and Status Quo (Figure 2, Panel A; Table 1, Panel B).[37] Revenue in Progressive is higher than in Status Quo up through the ninth decile; in Proportional, revenue is not statistically distinguishable from Status Quo (Figure 2, Panel B; Table 1, Panel B).

Progressive increased compliance by 8.9 percentage points relative to Proportional (Figure 2, Panel C). This increase extends throughout the bottom 95% of the property value distribution (Figure 2, Panel D), with the largest effect in Band 1 (bottom 60%). In the top decile, compliance was low and not statistically distinguishable across treatments (Table 2, Panel A). Compliance was higher in Progressive than Status Quo up through the eighth decile before falling below. Compliance in Proportional, by contrast, was lower than in Status Quo throughout nearly the entire distribution (Table 2, Panel B).

Although the low level of tax compliance — e.g., 10.7% in Progressive — is comparable to levels observed in other low-income countries,[38] it is conservative for three reasons. First, properties are identified and assessed starting from a comprehensive map of all built structures rather than being self-declared by taxpayers. This makes the denominator (when calculating compliance) as large as it can be and eliminates the registration and reporting margin present in other settings.[39] Second, our compliance denominator is in fact too large because it includes *all* assessable properties, even though many owners were legally exempt because they were widowed or 55 or older.[40] Given the novelty of the digital tax system, only 2.12% of owners claimed exemptions at the DGRKAC in 2024. Collector assessments and baseline survey data suggest substantially higher exemption rates (21.16% and 39.25%, respectively). Adjusting the denominator to account for exemptions raises compliance in Progressive to 13–17% (Figure A16, Panels A and B).[41] Third, collectors did not always find an adult when delivering the bill. Conditioning on adult presence at bill delivery further

[37]Because average liabilities were systematically lower in Status Quo, these comparisons use the adjustment described in Section 3.3; unadjusted outcomes are also reported in Figure 2.

[38]It is slightly higher than rates documented in Haiti (Krause, 2020) and Liberia (Okunogbe, 2021) and slightly lower than in Uganda (Regan, 2020) and Senegal (Cogneau et al., 2020) (Figure A17).

[39]Evasion often occurs through omissions from the tax register (Casaburi and Troiano, 2015) or under-assessment through collusion with inspectors (Khan et al., 2015). The main remaining reporting margin is exemption claims, but Figure A19 shows no differential exemption claims across treatments.

[40]Because exemptions may themselves be affected by treatment, our main specification includes all assessable properties.

[41]The survey-based measure is likely an upper bound because the survey identifies owners who are older than 55 or widowed, but does not verify additional co-residence requirements for legal exemption.

raises compliance to 15–18% (Figure A16, Panels C and D). A large gap remains, but after these adjustments, compliance in Kananga exceeds that recorded in Uganda and Senegal, economies two to three times richer (Figure A17).

The effects of Progressive on revenue and compliance are robust to a wide range of alternative specifications. First, the results are very similar when we control for imbalanced covariates, flexibly account for other cross-randomized treatments (Muralidharan et al., 2025), and estimate revenue using Poisson Quasi-Maximum-Likelihood, which accommodates zero outcomes naturally and yields proportional effects on the conditional mean without requiring an arbitrary transformation of zeros (Chen and Roth, 2024) (Table A5, Columns 2–3 and Table A6, Columns 2–4). The results are also robust to alternative sample definitions, such as conducting the analysis at the building level rather than the property level; excluding exempt properties;[42] retaining properties for which the bill was undeliverable;[43] including commercial buildings; excluding owners of multiple plots; excluding payments collected by the enforcement team; and excluding observations at the bottom of the distribution, where the Progressive schedule is effectively regressive because of the minimum tax liability mandated by the government (Table A5, Columns 4–10 and Table A6, Columns 5–11). Across all of these checks, the revenue and compliance effects of Progressive remain large and statistically significant.

5.3 Mechanisms: Mechanical vs. Behavioral Effects of Own Rates

In comparing a progressive system to a proportional one with the same average tax liability, revenue differences may arise through the *mechanical effect* and the *own-rate behavioral response*, both of which vary across the property-value distribution.[44] In the progressive system, higher-value properties face higher tax rates, which mechanically increase revenue, while lower-value properties face lower tax rates, which mechanically reduce revenue. The behavioral effects on tax compliance, however, work in the opposite direction. At the bottom of the distribution, lower rates may increase compliance

[42]There are no differences in exemptions between Proportional and Progressive. Slightly more owners were judged exempt by tax collectors in Status Quo, particularly in Band 1 (Figure A19, Panels A and B). However, this did not translate into more exemptions claimed at the DGRKAC (Figure A19, Panels C and D).

[43]Bill delivery was similar in Proportional and Progressive, while more bills were successfully delivered in Status Quo, especially in Band 1 (Figure A18).

[44]There may also be *second-order behavioral responses*, namely compliance effects driven by awareness of others' rates and of the tax system as a whole, which we examine in Section 6.

and thus raise revenue; at the top, higher rates may reduce compliance and thus lower revenue.

The revenue gains from Progressive indeed reflect different mechanisms at the bottom and top of the distribution (Figure 3). In Bands 1–4, the compliance response dominates the mechanical effect of lower tax liabilities: the lower rates bring enough additional owners into compliance to more than offset the direct revenue loss from lower tax liabilities.[45] In Band 5, by contrast, the mechanical effect of higher tax rates dominates the countervailing (and non-significant) decrease in compliance.[46]

We focus on compliance responses rather than real adjustments to the tax base, following recent work on property taxation in developing countries (Brockmeyer et al., 2023; Bergeron et al., 2024; Best et al., 2025). Real responses are unlikely during the field experiment. First, building values were assessed before tax collection, making it unlikely that we would observe investment responses during the RCT.[47] Second, even in the longer run, assessed values depend on many characteristics, the mapping from characteristics to assessed value is not reported to owners, and owners face uncertainty about when reassessment will occur and whether it will use the same formula.[48] These features weaken incentives to alter property characteristics to lower future liabilities. Indeed, we find no evidence of investment responses to tax schedule treatments (Figure A20) or to discontinuities in the Progressive schedule (Figure A21).

5.4 The Revenue-Maximizing Tax Schedule

A natural question is whether the results summarized in the previous sections are specific to the particular progressive schedule we study. Would *any* progressive tax schedule raise revenue compared to a proportional schedule with similar revenue potential? This question is important in our setting because Progressive could also outperform Proportional if the proportional rate chosen was simply too high, i.e., above the revenue-maximizing tax rate. To address this question, we estimate whether the

[45] This finding — that lowering tax rates at the bottom of the distribution can increase revenue — is consistent with prior evidence from this setting (Bergeron et al., 2024).

[46] Although the revenue increase in the top 5% is large in magnitude (21%), it is not statistically significant at conventional levels.

[47] Taxpayers could in principle reduce their assessed tax base by disinvesting in their property and reporting the change to the tax authority. Doing so would be costly and taxpayers would face uncertainty about how much such changes would reduce their assessed value and tax bill.

[48] This contrasts with the historical English window tax, where the tax base depended on a single known and visible characteristic, creating a clear margin for avoidance (Keen and Slemrod, 2021).

revenue-maximizing tax schedule itself is upward sloping.

We estimate the revenue-maximizing tax rate (RMTR) schedule directly using the random variation in tax rates generated by experimental assignment to Proportional or Progressive. We adapt a formula for the RMTR in Bergeron et al. (2024) to have tax rates expressed as percentages of property value (rather than fees). As we discuss in Section A5, the intuition behind this formula is that, at the optimum, the mechanical revenue gain from raising the tax rate must equal the offsetting revenue loss from the associated decline in compliance. We can thus write the RMTR as:

$$\tau^{RM} = \frac{\mathbb{P}(\tau^{\mathrm{RM}})}{-\frac{d\,\mathbb{P}(\tau)}{d\tau}\Big|_{\tau=\tau^{\mathrm{RM}}}} \tag{2}$$

where $\mathbb{P}(\tau^{\mathrm{RM}})$ is the share of owners who pay at tax rate τ^{RM}, and $-\frac{d\,\mathbb{P}(\tau)}{d\tau}$ is the marginal compliance response to a higher tax rate. Under the assumption that compliance is locally linear in the tax rate, we can estimate the RMTR by computing $\frac{-\beta_0}{2\cdot\beta_1}$, where β_0 and β_1 are the intercept and slope from a linear regression of compliance on the tax rate. We estimate this relationship separately within property value percentiles, deciles, quintiles, and tax bands, exploiting the variation in tax rates among similar buildings generated by assignment to Progressive or Proportional.

Across parametric and non-parametric specifications, the revenue-maximizing tax rate increases in property value (Figure 4). In the parametric approach, we estimate a flexible property-level model in which both the level of compliance and its slope with respect to the tax rate vary smoothly with log property value using cubic splines.[49] We then use Equation (2) to recover the implied RMTR at each point in the value distribution and aggregate the estimates at the percentile level. In the non-parametric specifications, we instead estimate the revenue-maximizing tax rate separately within deciles, quintiles, and tax bands. Across most approaches, the revenue-maximizing schedule is upward sloping and lies between the Proportional and Progressive schedules, increasing from roughly 0.2%–0.25% at the bottom of the property value distribution to 0.5%–0.6% at the top. As shown in Figure 4 and Figure A22 and summarized in Table A7, the slope of the revenue-maximizing schedule is positive and statistically

[49] We use cubic splines as a standard flexible specification for modeling smooth nonlinear relationships. The parametric estimates are also robust to other ways to model the relationship between property value and compliance, including linear, square-root, and percentile-based specifications (Figure A22).

significant in most specifications.[50] While a lower proportional rate would likely have also raised more revenue than the rate used in 2024, the Kananga government could do better still by implementing a progressive schedule.[51]

This exercise identifies the revenue-maximizing schedule conditional on the common average liability in Progressive and Proportional, rather than the unconstrained optimum over all possible schedules. This is the policy-relevant level for the context, given that the government chose these rates. A natural question is nonetheless whether the positive slope of the RMTR is an artifact of this level. For the advantage of a progressive schedule to fail at other average levels, the ratio in Equation (2) — compliance divided by the marginal compliance response to a higher tax rate — would need to switch from increasing to flat (or decreasing) in property value. At a lower average liability, for instance, the slope would stay positive as long as compliance among owners of low-value properties remained more rate-sensitive, relative to its level, than compliance among owners of high-value properties — the pattern we estimate at 2024 liability levels. One might expect attenuated elasticities at lower average liabilities because responsiveness typically weakly increases with the stakes (Chetty, 2012; Taubinsky and Rees-Jones, 2018). But this would apply symmetrically for low- and high-value properties and thus likely leave the slope of the RMTR unchanged. The most plausible source of asymmetric level-dependence is anchoring on low status-quo liabilities. However, as noted in Section 5.5, we find little evidence of such anchoring. Moreover, Bergeron et al. (2024) estimate similar compliance responses at the bottom of the distribution using experimental rate variation at lower average liabilities.

5.5 Alternative Explanations

Endogenous Collector Effort. In a tax system with in-person collection, treatment effects might reflect collector behavior rather than taxpayer responses. We address

[50] The slope is not statistically significant in the band- and decile-based non-parametric specifications, with one-sided p-values of 0.189 and 0.185, respectively. These non-parametric specifications split the sample into small cells and unsurprisingly yield more imprecise estimates.

[51] To be more precise, if we continue to assume that compliance is locally linear in the tax rate, band-level revenue is quadratic in the rate: $R_b(\tau) = a_b\left[\left(\tau_b^{RM}\right)^2 - \left(\tau - \tau_b^{RM}\right)^2\right]$, where τ_b^{RM} is the RMTR in band b, the first term is revenue at the band RMTR, and the second is the penalty from deviating from it. Calibrating the scale a_b to observed revenue in Proportional, the revenue-maximizing single proportional rate implied by the band-level RMTR estimates is ≈0.25%. This rate would forgo at least 5% of the revenue attainable under the RMTR schedule, with losses concentrated among high-value properties. Indeed, any single rate low enough to maximize revenue at the bottom falls at least 50% short of the RMTR at the top, and the penalty is quadratic in this shortfall.

this concern in two ways. First, as described in Section 3.6, we designed collectors' performance wages to eliminate incentives to differentially target properties by value within neighborhoods or across treatments. We assess whether this solution worked using administrative data on the GPS locations and timestamps of every collector visit. There are no systematic differences across treatments in the probability of receiving a visit, the number of visits, or the duration of visits on average and by decile (Table A8). Our main results are also unchanged when we control for these visit measures (even though these are "bad controls") (Table A9).

Second, we exploit randomly assigned collection appointments. If collectors mostly honored these appointments, any associated tax payments cannot reflect differential targeting because these visits were randomly assigned. Collectors honored 86% of random appointments and there are no treatment effects on the share of random appointments honored (Table A10). Most importantly, the treatment effects remain consistent with the main estimates when we restrict attention to randomly assigned payment facilitation visits, despite the smaller sample size (Table A11). Together, this makes it unlikely that endogenous collector effort explains our findings.

Fraudulent Payments. One collector response we did not anticipate is that some collectors paid certain households' taxes out of pocket in order to earn the associated performance wage. This occurred because for 19% of buildings the performance wage exceeded the tax liability. These "excess wage" cases arose from the final step of our wage-setting procedure, in which we adjusted the overall wage level to equalize expected collector compensation across treatments, thereby pushing performance wages above tax liabilities for some very low-value properties. Because this issue occurs among properties with very low liabilities, it is unlikely to explain our main revenue results, especially revenue increases outside of the bottom deciles.

Nonetheless, together with the tax authority, we investigated these payments intensively during the campaign and make several adjustments to fraud-proof our estimates. Once the issue became apparent, independent ODEKA enumerators audited all recorded payments among "excess wage" properties by visiting property owners to verify payments and inspect their receipts. The audit indicated that 2.4% and 8.8% of revenue in waves 1 and 2 of the campaign were from likely fraudulent payments (Figure A23).[52] In response, the tax authority fired eight collectors who had collected the

[52]Fraud became more prevalent in wave 2 because collectors had learned that wave 1 pioneers had been compensated for fraudulent payments.

most fraudulent payments, excluded fraudulent payments from wage calculations, and modified the incentive scheme to ensure performance wages never exceeded liabilities while still satisfying the conditions discussed in Section 3.6.

To account for fraudulent payments in our analysis, we use the audit results to trim high-probability fraud cases symmetrically across treatments. This is important because excess-wage opportunities were more common in Progressive, where tax liabilities were lowest. Simply dropping confirmed fraudulent payments would therefore change the sample differentially by treatment. To avoid this, we first identify counterfactual excess-wage cases in Proportional and Status Quo as if properties in those treatments had instead faced Progressive rates.[53] We then use confirmed fraud cases in Progressive to estimate how fraud varies with collector and household characteristics. Finally, we predict likely fraud among the counterfactual excess-wage cases in all treatment groups and drop these predicted cases symmetrically across treatments. This is the approach used in our main specification.

We also show robustness to several alternative approaches (Table A12). First, we report estimates with no fraud adjustment. Second, we include wave and collector fixed effects, since opportunities for fraud varied across both dimensions. Third, we drop Band 1 in wave 2 entirely, given that this was the wave of the campaign most affected by fraud and all excess-wage opportunities were concentrated in the bottom band (Figure A23). Finally, we recode likely fraud cases as noncompliance, which is our most conservative approach given that fraud was more prevalent in Progressive. Across all approaches, the revenue and compliance gains from Progressive remain large and statistically significant.

Spillovers. Another concern is that the neighborhood-level randomization may have generated spillovers across tax systems. For example, property owners in Proportional might have become less willing to pay if they learned that nearby neighborhoods were assigned to Progressive, while owners in Progressive might have responded positively if they perceived themselves as fortunate.

We assess this concern in several ways. First, we examine whether owners were aware of the tax schedule in their or others' neighborhoods, a necessary condition for spillovers. Such awareness was limited: at endline, just over one-third of respondents in Progressive correctly identified the tax system in their own neighborhood, only slightly

[53] Because Band 1 always has lower tax rates in Progressive, any property that was an excess-wage case in other treatments would still be classified as such under this counterfactual exercise.

better than random guessing (Figure A24). At midline, only 17% of respondents reported discussing the property tax with people in other neighborhoods, and neither the frequency nor the content of these discussions differed by treatment (Table A13).[54] Our main results are also robust to flexibly controlling for whether respondents reported such conversations, despite the smaller sample of midline respondents (Table A14). These specifications should be interpreted cautiously, however, since the controls are post-treatment outcomes.

Second, we estimate spillovers directly using the cluster randomization. Following Miguel and Kremer (2004), we exploit random variation in the number, or total border length, of Progressive neighborhoods adjacent to non-Progressive neighborhoods, controlling for the total number, or border length, of adjacent neighborhoods. Greater exposure to nearby non-Progressive neighborhoods does not appear to attenuate or amplify compliance (Table A15). Spillovers are thus unlikely to be an important threat in our setting.[55]

Anchoring on Status Quo Rates. A possible behavioral concern is that the effect of Progressive partly reflects taxpayers anchoring on the pre-existing schedule and thus getting additional "transaction utility" (Thaler, 1985), the feeling of receiving a good deal, that inclines them to pay above and beyond their response to the tax rate itself. We assess this interpretation in two ways. First, we classify properties according to whether both the Progressive and Proportional schedules imply tax cuts or tax increases relative to the status quo (Figure A25). The treatment effects of Progressive are significant in both subsamples, where the sign of the change relative to the status quo is held fixed (Table A16). Moreover, when we plot compliance against the size of the implied tax cut or increase relative to the status quo within a value band, responses appear smooth rather than increasing more sharply for larger tax cuts (Figure A26).[56]

Second, the anchoring interpretation would predict revenue declines in Progressive over time as people re-anchor to the new schedule and any transaction utility from

[54]The most common topics were property valuation and tax liability calculation. Taxpayers were more likely to discuss tax liabilities in Progressive and Proportional than in Status Quo, likely reflecting the substantial liability changes. But discussion patterns did not differ between Progressive and Proportional.

[55]As an additional test, we exclude owners observed to hold multiple plots, for whom cross-system exposure may have been especially salient. The results are unchanged (Tables A6 and A5, Columns 9 and 8). Because owner identifiers are incomplete, this test should be interpreted as suggestive.

[56]In an alternative transaction utility interpretation, property owners respond only to sufficiently salient deviations from the anchored benchmark, so that transaction utility would arise only for large tax cuts. The absence of such nonlinearities is inconsistent with that view.

receiving a tax cut dissipates. By contrast, as we discuss below, revenue does not decline when comparing 2024 Progressive neighborhoods with all neighborhoods after the citywide progressive scale-up in 2025-2026. The same logic also predicts greater compliance in neighborhoods that moved from Proportional in 2024 to Progressive in 2025: owners in these neighborhoods received tax cuts relative to the previous year. Yet, if anything, these neighborhoods have lower compliance (Table A17). These patterns are difficult to reconcile with anchoring.

5.6 Progressive Scale-Up: Revenue in 2025 and 2026

In light of the 2024 results, the government scaled up a progressive tax schedule citywide in 2025 and 2026. Relative to 2024, the 2025 and 2026 campaigns differed along three main dimensions. First, the schedule was implemented everywhere rather than randomly assigned across neighborhoods. Second, while preserving progressivity, the government adjusted the tax rates in each band.[57] Third, as we discuss in Section 7.2.2, collection and enforcement efforts were reallocated toward high-value properties. The government stopped bill delivery and in-person collection for most properties in Band 1 to focus scarce resources on the top of the distribution.[58] It also introduced serious enforcement — locking buildings and blocking bank accounts — among the city's most valuable properties and sent SMS messages publicizing recent enforcement actions.[59]

Because all of these features changed at once, a one-to-one comparison between 2024, 2025, and 2026 is not possible. We therefore treat the 2025 and 2026 results as descriptive evidence on revenue trends after scale-up. Average revenue per billed property was higher in 2025 than in the 2024 Progressive arm and increased further

[57]Rates increased slightly in Band 1 to preserve a minimum tax amount of $2, but the more consequential change in that band was the near-complete withdrawal of collection effort. In Bands 2–5, where collection effort stayed constant, tax rates were lower in 2025 and 2026 than in 2024 (Figure A27), and below our estimates of the revenue-maximizing levels. If the government were purely revenue-maximizing, it appears to have overcorrected. Two explanations are likely. First, the government did not observe our RMTR estimates when it set the 2025 schedule. Facing uncertainty about the location of the RMTR, a risk-averse government might set rates conservatively, since overshooting could trigger more costly forms of taxpayer backlash than undershooting. Second, if the government places positive weight on taxpayer welfare, its optimal rates would fall below the RMTR.

[58]In both years, 8% of properties in deciles 4–6, the top half of Band 1, were randomly selected to receive bills and collection visits to benchmark this policy change (Figure A28).

[59]In addition, in 2025 (but not 2026), in-person tax collection was hindered by the sharp appreciation of the Congolese franc against the dollar. The appreciation disrupted the dollar-denominated property tax system. Because most households hold cash in francs and collectors were required to use the official exchange rate, well above the market rate, in-person payment became less attractive.

in 2026 (Figure 5).[60] The stability and subsequent growth of revenue after scale-up appears to validate the government's decision to adopt the progressive system. It also helps alleviate concerns about scaling up (Banerjee et al., 2017a), including the possibility that researcher involvement, spillovers, or other experiment-induced factors artificially boosted Progressive's performance in 2024.

6 Does Perceived Fairness Matter? Second-Order Behavioral Responses

Our previous mechanism analysis (Section 5.3) focused on how taxpayers respond to their *own* statutory tax rate. We now ask whether they also respond to *others*' rates, that is, to the tax schedule as a whole. If property owners view progressivity as fair, Progressive may increase compliance not only through lower own rates, but also through higher perceived fairness. We assess the importance of these second-order behavioral responses using information experiments on tax bills and in the endline survey.

6.1 2024 Tax Bill Experiment

As discussed in Section 3.4, the front of tax bills contained no information about the tax schedule: owners only learned their own liability. On the back, they were randomly assigned to receive either (*i*) a control message with additional details about the property tax, (*ii*) the same information plus their building's position in the value distribution, or (*iii*) both of the above plus information on the distribution of tax rates in the tax system assigned to their neighborhood. Treatment (*iii*) provides the key test of whether compliance responds to the overall shape of the tax schedule in addition to one's own liability.

We find no evidence of such a response. Compliance in Progressive and Proportional was essentially unchanged by the tax-system information treatment, both on average and across the property-value distribution. This is true whether we use the location information treatment as the control group (Figure 6, Panels A and B) or the placebo information treatment as the control group (Figure A29). This cross-randomized information experiment provides little evidence that second-order behavioral responses

[60] There is also interesting heterogeneity across the property-value distribution, which we discuss in Section 7.

explain the main effects we observe during the 2024 campaign.

6.2 Unpacking the Null: Evidence from Survey Experiments and the 2025 Tax Bill Experiment

Why did making the tax schedule salient not affect compliance? Four explanations are plausible: taxpayers may not value progressivity (*preferences*); the information treatment may have been too weak or complicated to make schedule differences salient (*salience*); owners might care more about the distribution of effective tax rates than statutory tax rates (*effective rates*); or fairness considerations may simply be inframarginal in the payment decision (*inframarginality*).

Regarding the *preferences* explanation, baseline survey evidence suggested that Progressive was widely preferred to Proportional and Status Quo, and that Progressive and Proportional were both viewed as substantially fairer than Status Quo (Figure A9). However, these preferences were elicited before taxpayers experienced the new systems. To move beyond hypothetical preferences, we examine whether assignment to Progressive changed perceived fairness at midline and endline. Owners in Progressive indeed viewed the tax system and their tax rates as fairer than did owners in Proportional, especially toward the bottom of the distribution (Figures A30 and A31).[61]

A stronger test comes from the endline survey experiment discussed in Section 3.4. For treated respondents, enumerators explained the tax schedule they faced in 2024. In Progressive, this information increased perceived fairness of the tax system by 0.31 standard deviations and perceived fairness of one's own tax liability by 0.23 standard deviations (Figure 6, Panels C and D and A32, Panels A–D). These effects are visible throughout the distribution, including among owners of high-value properties. By contrast, respondents in Proportional did not meaningfully update about the perceived fairness of the tax system when informed about the rate distribution, and respondents in Status Quo updated negatively. Consistent with their fairness perceptions, informed respondents in Progressive also reported a higher intended likelihood of paying in the future (Figure A32, Panels E and F). Taken together, these results demonstrate that progressivity is widely viewed as fair. The null compliance effects of the 2024 tax-bill experiment are unlikely to reflect absent or weak preferences for progressive taxation.

[61] By contrast, we observe no corresponding increase in intended future payment, which we interpret as a measure of tax morale. We do find suggestive evidence that taxpayers assigned to the tax system they said they preferred at baseline are somewhat more likely to pay (Table A18).

We next consider the *salience* explanation: owners may have been unaware of the tax schedule applied in their neighborhood, even when that information was on the tax bill. This is a real possibility given that owners appear to have had limited knowledge of the tax system they faced in 2024 (Figure A24). We therefore repeated the tax-bill experiment in 2025 after revising its procedures to make the information treatment more comprehensible. Tax fliers were simplified through iterative pre-testing (Figure A13). Collectors were also monitored via audio recordings of every bill delivery visit to be sure they read the treatment aloud and explained it carefully. An independent team of backcheckers listened to random samples of these recordings (stratified by collector) and evaluated the quality of collectors' explanations and property owners' likely comprehension. These new procedures appear to have had the intended effect of raising awareness of the progressive tax system: 91.22% of owners were recorded by tax collectors as having understood the information provided in the experiment.

Even under these higher-salience conditions, however, learning about the progressive tax schedule had little effect on compliance (Figure 6, Panels E and F).[62] This remains true in subsamples where salience and understanding should have been greatest: among owners who (*i*) were deemed to have had high comprehension of the tax bill information (Figure A33); (*ii*) were physically present during bill delivery and thus received the message directly (Figure A34, Panels A and B); and (*iii*) received visits in which collectors spent above-median time explaining the bill (Figure A34, Panel E).[63] Ultimately, low salience appears unlikely to explain the null compliance effects in the tax bill information experiments.

A third possibility is that property owners care less about statutory progressivity than about the progressivity of the *effective* tax rate schedule, i.e., the distribution of the tax burden conditional on compliance. To test this, another arm of the endline survey experiment informed respondents not only about statutory rates, but also about the distribution of tax compliance by property value band.[64] In this treatment, respondents learned that compliance was many times higher in Band 1 than Band 5. However,

[62] We find similar effects when comparing the tax-system information treatment to the own-location treatment (Figure 6, Panels E and F). We also find no differential effects between respondents whose priors about their value band were too low and those whose priors were accurate or too high (Figure A34, Panels C and D).

[63] We find marginally significant effects at the 10% level ($p = 0.072$) for the own-location-and-rate-distribution information arm when collectors spent above-median time explaining the bill, relative to the placebo arm.

[64] We did not include this information in the tax-bill experiment because the tax authority would not have approved a message whose most likely effect would be to dampen compliance.

this additional information had little effect on perceived fairness or intended payment in Progressive (Figure A35). These null results make it unlikely that the reason for limited responsiveness to information about progressivity in our tax bill experiment is that people demanded information about effective, not statutory tax rates. That said, we acknowledge that persistently low ETRs at the top that open a gap between the statutory and effective tax schedule could over time erode tax morale and confidence in the state, as we explore further in Section 7.

The most plausible explanation for the null tax bill experiment results is *inframarginality*: property owners appear to prefer progressive taxation and view it as fair, but these preferences are ultimately inframarginal when deciding whether to pay taxes. What matters for compliance, by contrast, is owners' own liabilities. For instance, owners recalled their own tax liabilities much better than they recalled the tax schedule they faced (Figure A36). Similarly, perceptions of fairness of the system closely track perceived fairness of one's own liability (Figure A31, Panels B and D). The apparent inframarginality of information about tax progressivity may be specific to low-income, weak-state settings like Kananga.[65] But, at least in this context, a progressive property tax schedule chiefly shapes compliance and revenue through its effects on own rates rather than by activating fairness considerations or other components of tax morale tied to the level or distribution of others' rates.

7 Effective Tax Rates and Enforcement

Our focus, thus far, has been why Progressive raises more revenue than Proportional. We now turn to incidence. A tax schedule may be progressive in statutory terms yet look very different in de facto or *effective* terms, i.e., once compliance behavior is taken into account. Distinguishing between statutory and effective progressivity matters for two reasons. First, a persistent gap between statutory and effective tax rates may undermine the long-run legitimacy of the tax system. The role of the tax authority is to implement the tax schedule set by policymakers; if large taxpayers are allowed to pay less than their intended share, this may discredit the tax authority and weaken tax morale among other taxpayers (Slemrod, 2007; Frey and Torgler, 2007). Second, effective tax rates describe who actually bears the burden of the state's revenue

[65] For example, in Argentina, an upper-middle-income country with higher compliance, similar information increased perceived fairness across the distribution and raised compliance among low-value property owners, though not among middle- or high-value owners (Ajzenman et al., 2024).

requirement, and are therefore important when evaluating the welfare consequences of tax policy, as we discuss in Section 8.

7.1 The Distribution of Effective Tax Rates

To characterize the realized distribution of the tax burden, we study *effective* tax rates (ETRs), defined as taxes paid as a share of property value. In interpreting ETRs, it is useful to distinguish between the level and the slope of effective taxes. The level of ETRs captures how much tax is paid, on average, as a share of property value. The slope captures how this burden changes with property value; it reveals whether owners of high-value properties actually pay a larger share of their property wealth than owners of low-value properties.

In 2024, ETRs in Kananga were low in level and declined with property value under all tax systems (Figure 7).[66] The low level of ETRs reflects low compliance overall: many owners did not pay, so taxes paid fell far short of taxes owed (Figure 2, Panel C). The downward slope reflects the fact that compliance declined with property value in both the Progressive and Proportional systems (Figure 2, Panel D). Although the top value band contributed five times as much revenue per property as the bottom band, property values in the two bands differed even more sharply: values in the top band were 58 times higher. Higher-value properties therefore bore a smaller tax burden relative to property wealth than lower-value properties. This pattern is strongest in Progressive, where high compliance in lower value bands raised the ETR at the bottom. As a result, the most progressive schedule in statutory terms was the most *regressive* in effective terms.

7.2 How Enforcement Shapes the ETR Distribution

In light of this gap between statutory and effective tax rates, a natural question is whether stronger tax enforcement might narrow the gap. Enforcement can shape the level and shape of the ETR distribution, depending on where compliance responds. We examine both *uniform* and *targeted* enforcement interventions, embedded in the 2024 and 2025 tax campaigns.

[66] In many countries, ETRs decline at the very top of the distribution because large taxpayers are better able to engage in profit shifting and international tax planning (Bachas et al., 2025).

7.2.1 Uniform Enforcement

The cross-randomized enforcement message on the backs of 2024 tax bills warned owners of visits from a separate enforcement team (as noted in Section 3.5). By noting the property's selection for such visits, the treatment was designed to be stronger than canonical tax enforcement fliers (e.g., Slemrod, 2019), which typically stop at making salient penalties and other costs of delinquency. The enforcement team carried out 86% of promised visits and collected many payments. However, the agents ultimately lacked the ability to impose meaningful penalties. Because this message was randomized independently of property value, it provides a clean test of a *uniform* enforcement policy.

Properties assigned to this intervention were 2.97 percentage points more likely to pay their property taxes on average. Importantly, it had a larger impact on compliance among low-value properties, raising compliance by 4.87 percentage points in Band 1 compared to 0.77 percentage points in other bands combined (Figure 8, Panel A). Uniform enforcement therefore increased the level of effective tax rates across the distribution. However, because it raised compliance more among low-value properties, it also generated a steeper, more regressive ETR gradient (Figure 8, Panel C).

7.2.2 Targeted Enforcement

In 2025, the government scaled up progressive property tax rates for the entire city and implemented three interventions reallocating collection and enforcement effort from the bottom of the distribution to the top: (*i*) reducing bill delivery and collection effort in Band 1; (*ii*) introducing serious enforcement among the most valuable properties; and (*iii*) sending SMS messages about recent enforcement actions. Unlike uniform enforcement in 2024, these interventions were all *targeted*, i.e., explicitly designed to change the level as well as the slope of the ETR.

Lowering Collection Effort in Band 1. First, the government reduced collection effort to zero for almost all properties in the bottom value band. The government decided to focus its limited resources on collecting taxes from the top of the distribution. As a result, in 2025, most owners in this band did not receive tax bills or collector visits (Figure A28). They could still pay voluntarily by visiting the tax authority. Unsurprisingly, without bill delivery or collector visits, very few owners did: compliance and revenue approach zero (Figure 9, Panels A and B). The resulting lower compliance

reduces effective tax rates at the bottom of the distribution and flattens the downward ETR slope (Figure 9, Panel C).

Serious Enforcement of Large Residential and Commercial Properties. Second, the government began serious enforcement against delinquent owners of the highest-value properties in the city. The 50 most valuable commercial and 50 most valuable residential properties were targeted for enforcement at the end of 2025. The process involved delivering a sequence of documents with escalating legal force: the *avis de mise en demeure de paiement* followed by the *commandement* and culminating in a 48-hour warning. If owners remained delinquent, bailiffs were empowered to seal commercial properties, block owners' bank accounts, or seize assets. To our knowledge, the DGRKAC had rarely used these tools to enforce the property tax in the past but apparently felt emboldened to do so after the 2024 tax reform. Although implementation was imperfect, the campaign led to a major increase in enforcement: almost all targeted properties received the first document, while 52% and 38% received the second and third documents, respectively (Table A19, Columns 1–3).[67]

Many targeted owners paid after receiving these documents and before the final enforcement stage. Tax authorities ultimately sealed multiple commercial properties and blocked the bank accounts of a handful of property owners (Table A19, Column 4); to our knowledge, they did not seize physical assets from any residential properties.[68]

We compare compliance, revenue, and effective tax rates for these properties to those of the next 200 most valuable commercial and 200 most valuable residential properties. Although the sample is small, the treatment effects are large and statistically significant: compliance rose by 19 percentage points, and revenue increased by a factor of 233 (Figure 9, Panels D and E).[69] Importantly, by raising payment among the very top

[67] A total of 68 *avis de mise en demeure de paiement*, 52 *commandements*, and 38 48-hour warnings were delivered. Non-delivery reflects three factors. First, some owners paid after receiving earlier notices and therefore did not receive later ones. Second, given that this was the first-ever such enforcement campaign, the tax authority simply worked down a list based on value — and this list included some ineligible properties due to exemptions or non-assessable status. Third, 51 of the top-100 properties had been top-coded in property characteristics because owners refused access during the valuation census. These artificially high valuations were intended to induce owners to appeal at DGRKAC, but no such appeals were actually filed until enforcement began. Once reviewed, all 51 properties — 45 residential and 6 commercial — had their liabilities revised downward, fell out of the top 100, and were therefore not enforced.

[68] This is consistent with the composition of the final enforceable caseload: as noted above, 45 of the 50 initially targeted residential properties were removed from the top-100 list after review and were therefore no longer subject to enforcement.

[69] The RD estimate for revenue is 157,370, while predicted revenue at the cutoff is 674, implying a

of the distribution, targeted enforcement increased ETRs where they were previously lowest relative to statutory rates. The ETR schedule in 2025 thus bends upward at the top, narrowing the statutory-effective gap in both levels *and* slopes (Figure 9, Panel F).

SMS Reminders about Enforcement. Finally, the tax authority sent a series of SMS reminders to randomly selected property owners that made salient the new enforcement actions taken against commercial properties. These messages informed recipients that businesses had been recently sealed by the DGRKAC for failing to pay property taxes. Although the messages were sent to all selected owners, their content was relevant to owners of higher-value properties potentially exposed to such sanctions. We therefore interpret this intervention as a targeted enforcement policy. Its effects on compliance and revenue were modest, but they also work in the direction of raising the ETRs toward the top of the distribution rather than at the bottom (Figure 9, Panel I and Table A20). The SMS intervention thus contributed less by raising the overall level of effective taxation than by modestly improving its slope.

In sum, the 2025 targeted interventions reshaped the incidence of the property tax. By lowering ETRs at the bottom and raising them at the top, they changed the ETR gradient, not just its level (Figure 10). Targeted enforcement thus transformed the ETR distribution from regressive to progressive — in line with the statutory distribution.[70]

8 Welfare

This final section considers the welfare implications of a progressive property tax reform as well as uniform and targeted enforcement. We highlight how, in settings with large compliance responses to tax policy changes, the distribution of ETRs is an unreliable guide for welfare analysis.

Consider a simple framework with two types of property owners, high-value (H) and

treatment effect approximately 233 times as large as the counterfactual revenue level.

[70] A natural concern is that size-based enforcement could distort property values over time. Although it is too soon to test for such responses, their scope is likely limited in our setting. Despite the targeted enforcement in 2025, there is no statutory threshold of property value above which taxpayers face a higher enforcement probability — as is the case for large taxpayer units in firm taxation, for instance — or below which they face none. We should therefore not expect sharp responses to targeted enforcement as the target can change. Moreover, as discussed in Section 5.3, the residential property market is unlikely to be responsive to tax policy in our setting.

low-value (L).[71] Type $\theta \in \{L, H\}$ faces liability T_θ and chooses whether to comply. Paying yields utility $u(y_\theta - T_\theta)$, non-compliance yields $u(y_\theta) - \gamma_i$, where γ_i is an idiosyncratic delinquency cost capturing fear of penalties, social stigma, tax morale, and other psychological costs of rule-breaking. Owners comply when $\gamma_i > u(y_\theta) - u(y_\theta - T_\theta)$. Social welfare is $W = \omega_L V_L + \omega_H V_H + B(r)$, where ω_θ are welfare weights on private welfare V_θ and $B(r)$ is the social value of public goods financed by tax revenue r with marginal value $b(r)$.

8.1 Progressive Tax Reform

Consider first a progressive reform that lowers taxes on low-value properties ($dT_L < 0$) while raising them on high-value properties ($dT_H > 0$). If compliance among low-value property owners is highly elastic, the ETR at the bottom can *increase* despite the tax cut, because the compliance response more than offsets the statutory rate reduction in $\text{ETR}_L = c_L T_L / y_L$. Yet welfare for low-value property owners unambiguously rises: existing compliers pay less, while those induced into compliance reveal that paying the lower tax is preferable to bearing the delinquency cost of noncompliance. By revealed preference, no one voluntarily switches to a worse outcome.[72] At the top, by contrast, high-value owners who remain compliant are worse off because they pay higher taxes. In line with our empirical results, we assume these owners are highly inelastic to rate changes and that there are no marginal noncompliers. With standard welfare weights ($\omega_H < \omega_L$), implementing a progressive tax system can therefore increase welfare even if it makes the ETR distribution *more regressive*: the compliance surge raises ETR_L sharply, while at the top realized payments rise only modestly — low compliance at the top keeps ETR_H low in level — so the realized distribution becomes more regressive. Table 3 summarizes the intuition. In developing countries, where compliance responses can be large, ETRs and welfare analysis are complementary but distinct objects and can point in opposite directions.

8.2 Enforcement

Enforcement shifts the delinquency cost γ. When it raises γ, enforcement induces some previously-noncompliant households to pay while imposing higher delinquency costs on

[71] This framework builds on Best et al. (2025); Appendix A6 provides additional details.

[72] This analysis holds fixed the enforcement environment, captured by γ_i, so those who begin paying after the reform do so voluntarily and must be better off.

those who remain noncompliant, with no direct private welfare gain. The welfare case therefore rests entirely on whether the public goods financed by the additional revenue justify these private losses. In contexts like the DRC, where public goods are severely underprovided, $b(r)$ is plausibly high. Unlike the rate reform, where the bottom ETR rose even as welfare improved, enforcement-induced ETR changes are directionally informative about welfare, but still incomplete because they omit the magnitude of the underlying changes in delinquency costs.

Uniform enforcement. Under uniform enforcement, both low- and high-value property owners face higher delinquency costs and are privately worse off ($dV_L < 0$, $dV_H < 0$). Welfare improves only if the public goods benefits exceed *all* the private losses. In our setting, low-value property owners respond more strongly to enforcement. This compliance gain comes at a low revenue rate per household (since T_L is small) while imposing welfare costs on the large mass of low-value owners who remain noncompliant and bear higher delinquency costs without changing behavior. As a result, uniform enforcement makes the ETR *more regressive*, not because statutory rates changed, but because the compliance increase is concentrated at the bottom. Unlike the progressive tax reform, where a rising ETR at the bottom masked welfare *gains*, here the rise in bottom ETRs reflects a higher burden on low-value owners and is therefore consistent with lower private welfare for that group. Even so, ETRs remain an incomplete guide in welfare analysis because they omit delinquency costs borne by owners who do not change behavior.

Targeted enforcement. Targeted enforcement increases delinquency costs at the top ($d\gamma_H > 0$) while reducing them at the bottom through lower bill delivery and collection effort ($d\gamma_L < 0$). Low-value owners are therefore better off ($dV_L > 0$), and high-value owners worse off ($dV_H < 0$). The private welfare costs are thus confined to high-value owners, who are either induced into compliance or face a higher cost of remaining delinquent.[73] Lower collection effort at the bottom reduces compliance and pulls down the ETR, consistent with lower enforcement on low-value owners. At the top, by contrast, higher enforcement raises compliance and ETR, consistent with higher enforcement burdens on high-value owners. Targeted enforcement therefore makes effective taxation more progressive by shifting realized payments toward the

[73] As in Section 5.3, we abstract from adjustments to the tax base itself: the incentive to disinvest or forgo investment is likely weak given the uncertainty in mapping property characteristics to assessed values, while the private cost would be high.

top. As with uniform enforcement, however, ETRs still omit the underlying changes in delinquency costs. Overall, targeted enforcement raises welfare if (*i*) the revenue gained at the top exceeds the revenue forgone at the bottom — as is likely when top liabilities are much larger — and (*ii*) the value of those public funds, plus the welfare gain to low-value owners, outweighs the welfare loss to high-value owners (Table 3). With $\omega_L > \omega_H$ and a high $b(r)$ in the DRC context, both conditions are plausibly met.

Could the government achieve a similar ETR distribution and welfare impact with a proportional tax schedule, targeted enforcement, and tolerated noncompliance (forbearance) at the bottom? Such a policy could indeed generate progressive effective rates. But this alternative is less attractive on both welfare and revenue grounds compared to a progressive schedule with targeted enforcement. On the welfare side, if noncompliance entails any delinquency cost γ, then low-value owners bear a cost even though the government collects no revenue from them. By contrast, removing low-value properties from the bill delivery list — essentially exempting them — sacrifices little revenue and eliminates these delinquency costs.[74] On the revenue side, a proportional schedule with targeted enforcement leaves money on the table at the top: among the high-value owners who are actually enforced, a progressive schedule sets higher statutory liabilities.[75] Combining *progressive* rates with targeted enforcement can raise revenue, achieve effective progressivity, and avoid the welfare costs of forbearance.

9 Conclusion

We evaluate a citywide field experiment in Kananga that randomized neighborhoods to progressive, proportional, or fee-based property tax systems. Relative to a proportional schedule with the same average liability, the progressive schedule increased revenue by 56%. These gains arose throughout the property-value distribution, but through different channels: at the bottom, lower rates increased compliance enough to offset lower liabilities; at the top, higher liabilities outweighed modest compliance losses. Consistent with these results, our estimated revenue-maximizing schedule in

[74] If one applied this exemption policy with a proportional rate schedule in the rest of the distribution, this would qualify as a progressive system. Indeed, many property tax systems are progressive by exempting the bottom and/or including a surcharge on the top.

[75] Setting the proportional rate high enough to match the RMTR at the very top of the distribution would reduce revenue elsewhere because lower-value bands have lower RMTRs, and would require high tax rates for most property owners, lowering their welfare.

this context is also upward sloping in property value.

These same compliance patterns also illustrate how statutory and effective tax schedules can diverge. ETRs declined with property value under all tax systems and were most regressive in Progressive. This pattern does not imply that Progressive reduces welfare: lower statutory rates at the bottom can make low-value owners better off even when their realized payments rise as a share of property value. But it does reveal how progressive rate design alone is insufficient to make the realized tax burden progressive. Only when the government introduced enforcement targeting higher-value properties in tandem with statutory progressivity did the ETR distribution bend upward.

Although proportional property taxes remain common in developing countries, our evidence indicates that progressive schedules can raise revenue while advancing redistributive objectives. Because our results are driven by owners' responses to own rates — a mechanism likely to travel across contexts more reliably than fairness perceptions — we suspect this lesson should generalize in other low-income settings. Progressive schedules paired with targeted top-end enforcement can boost fiscal capacity while shifting the realized tax burden toward wealthy property owners.

These results open new questions. One is whether progressive property taxation generates longer-run responses, including capitalization into prices, investment distortions, mobility, or sorting. Another concerns the political economy of progressive tax reform. Progressivity may raise revenue and improve perceived fairness, but its adoption is not guaranteed, least of all when effective progressivity requires credible enforcement against elites. Understanding when governments choose to introduce progressive tax schedules, sustain them, and enforce them against high-value taxpayers remains a first-order question for the political economy of tax capacity.

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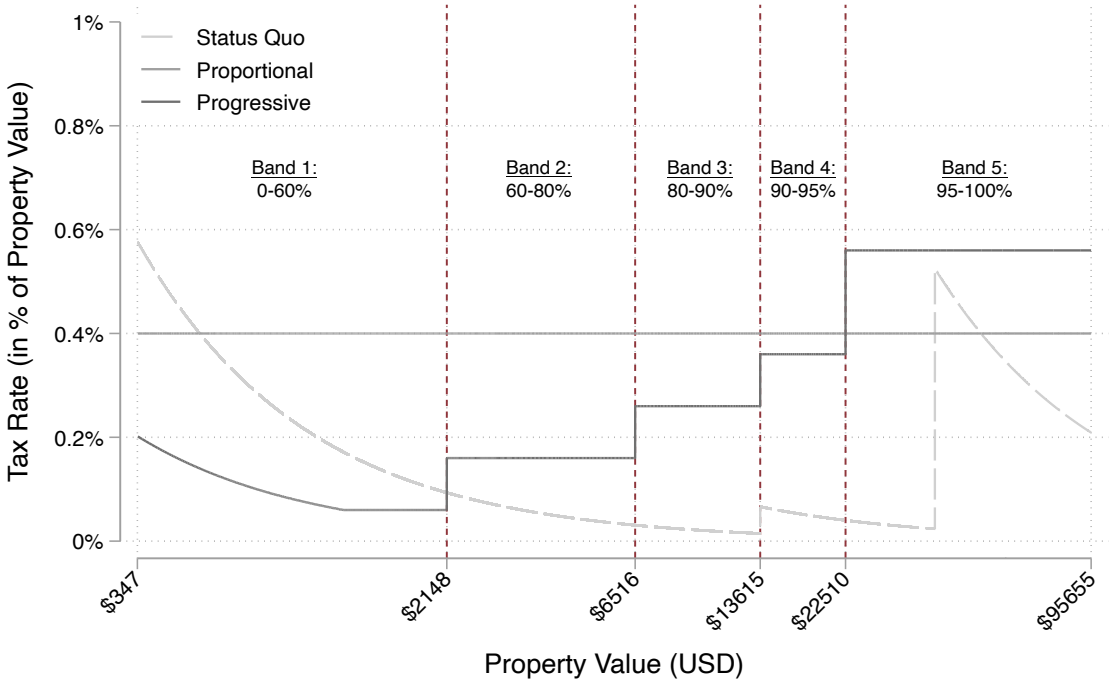
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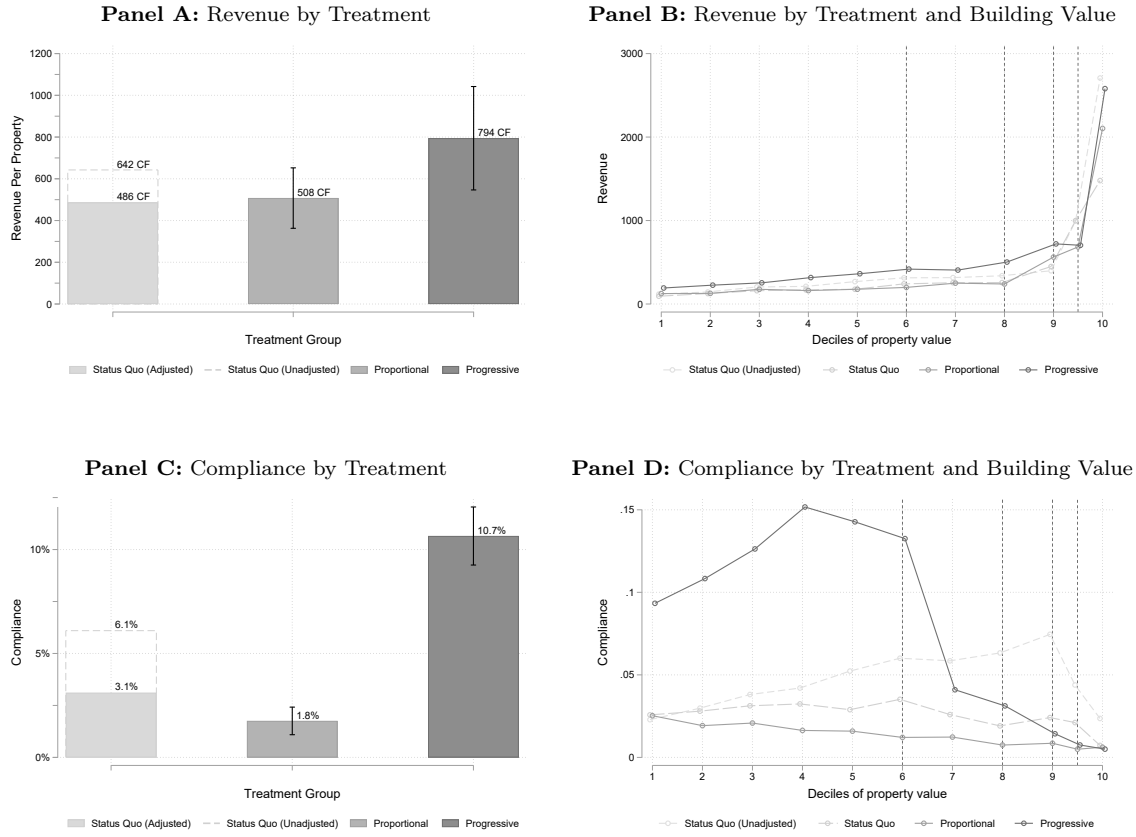
10 Exhibits

Figure 1: Three Tax Systems: Tax Rates



Notes: This figure shows tax rates under the three tax systems used in the 2024 property tax campaign. The y-axis is the tax rate as a percentage of property value; the x-axis reports log property value, with labels shown in USD for readability. Vertical dashed lines mark the five value-band cutoffs: percentiles 0–60 for Band 1, 60–80 for Band 2, 80–90 for Band 3, 90–95 for Band 4, and 95–100 for Band 5. The solid gray line shows the flat Proportional rate, the solid black line shows the Progressive schedule, and the dashed gray line shows the implied tax rate under the Status Quo fee schedule, expressed as a percentage of property value. The Progressive schedule declines in property value at the very bottom of the property value distribution because the government imposed a minimum tax liability of 2,000 CF or $0.70 to cover recovery costs. We discuss this figure in Section 3.

Figure 2: Treatment Effects on Tax Revenue and Compliance



Notes: This figure summarizes treatment effects on revenue and compliance in the 2024 property tax campaign. Panels A and B report revenue outcomes. Panel A shows property-level revenue, defined as total revenue collected across all buildings within a property, by treatment group. Panel B shows building-level revenue by treatment and decile of the building-value distribution. Panels C and D report the corresponding compliance outcomes. Panel C shows property-level compliance, defined as an indicator for at least one building within the property having paid, by treatment group. Panel D shows building-level compliance by treatment and decile of the building-value distribution. For properties assigned to Status Quo, the main estimates adjust for liability differences using the pre-specified procedure described in Section A4.1; unadjusted Status Quo outcomes are shown as dotted bars in Panels A and C and dotted lines in Panels B and D. The sample includes all assessable residential buildings that received a tax bill in the 2024 property tax campaign. In Panels B and D, the vertical lines indicate the value bands used in the tax schedules. In all panels, 95% confidence intervals are shown for comparisons of Progressive and Proportional to adjusted Status Quo, with standard errors clustered at the neighborhood level. Tables 1 and Table 2 report the corresponding building-level treatment effects by decile for revenue and compliance, respectively. We discuss this figure in Section 5.2.

Table 1: Treatment Effects on Tax Revenue by Decile of Building Value

		Decile of Property Value										
		Band 1: 0–60%						*Band 2: 60–80%*		*Band 3: 80–90%*	*Band 4: 90–95%*	*Band 5: 95–100%*
	All Deciles Pooled	1	2	3	4	5	6	7	8	9	9.5	10
Panel A: Proportional vs Progressive												
Progressive	175.154**	66.299**	97.886***	77.658**	155.779***	187.346***	220.483***	157.549***	259.983***	154.170	14.970	340.554
	(78.026)	(27.469)	(25.570)	(33.695)	(31.682)	(38.653)	(50.502)	(55.959)	(81.476)	(159.108)	(333.434)	(1311.673)
Observations	77698	7543	7738	7836	7883	7898	7853	7825	7783	7831	3787	3721
Control Mean	311.903	114.739	117.827	172.383	161.226	175.128	195.403	260.753	243.802	558.662	620.415	1630.929
Panel B: Status Quo vs Proportional and Progressive												
Proportional	18.238	31.652	1.965	16.790	-8.249	0.135	-42.327	-4.881	-17.016	113.194	-314.828	624.290
	(46.991)	(25.014)	(26.089)	(32.696)	(26.982)	(31.596)	(41.874)	(45.787)	(61.265)	(125.382)	(277.866)	(754.101)
Progressive	195.960**	98.689***	100.515***	94.410***	147.382***	186.119***	176.625***	151.667***	245.722***	271.131**	-295.306	1101.337
	(80.036)	(20.825)	(27.090)	(25.079)	(25.967)	(31.333)	(43.294)	(44.367)	(62.694)	(129.949)	(264.322)	(1513.476)
Observations	96295	9460	9613	9716	9738	9776	9740	9688	9616	9642	4653	4653
Control Mean	312.831	93.412	125.595	159.516	169.419	176.774	241.283	254.808	256.759	448.946	998.909	1478.833

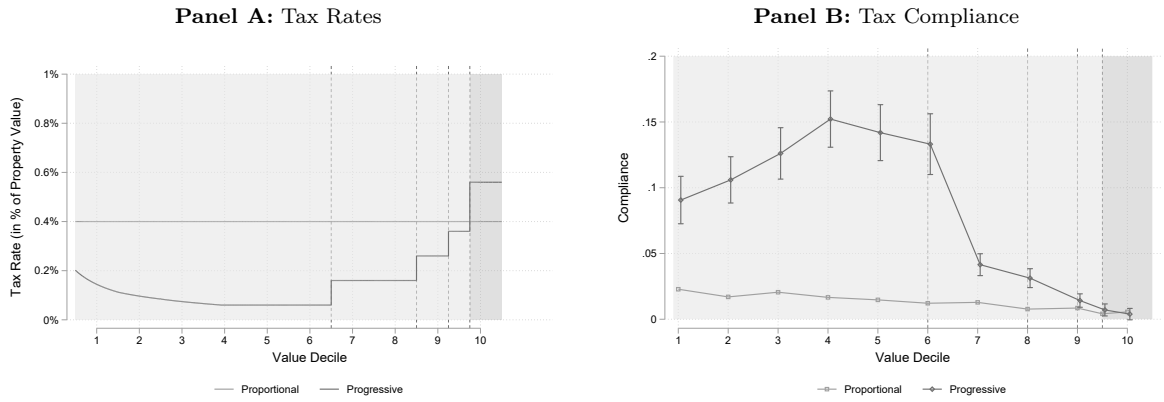
Notes: This table reports treatment effects on tax revenue per building, pooled and by decile of the building-value distribution. Panel A estimates Equation (1) comparing Progressive to Proportional. Panel B adds comparisons to Status Quo, with Status Quo outcomes adjusted for liability differences using the pre-specified procedure described in Section A4.1. All regressions include stratum fixed effects. The sample includes all assessable residential buildings that received a tax bill in the 2024 property tax campaign. Standard errors are clustered at the neighborhood level. ***, **, and * indicate significance at the 1, 5, and 10% levels. We discuss this table in Section 5.2.

Table 2: Treatment Effects on Tax Compliance by Decile of Building Value

		Decile of Property Value										
		Band 1: 0–60%						*Band 2: 60–80%*		*Band 3: 80–90%*	*Band 4: 90–95%*	*Band 5: 95–100%*
	All Deciles Pooled	1	2	3	4	5	6	7	8	9	9.5	10
Panel A: Proportional vs Progressive												
Progressive	0.072***	0.068***	0.089***	0.106***	0.136***	0.127***	0.121***	0.029***	0.024***	0.006**	0.003	-0.002
	(0.006)	(0.009)	(0.009)	(0.010)	(0.011)	(0.011)	(0.012)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)
Observations	77698	7543	7738	7836	7883	7898	7853	7825	7783	7831	3787	3721
Control Mean	0.014	0.023	0.017	0.021	0.017	0.015	0.012	0.013	0.008	0.009	0.004	0.006
Panel B: Status Quo vs Proportional and Progressive												
Proportional	-0.013***	-0.000	-0.009*	-0.010**	-0.016***	-0.013***	-0.023***	-0.014***	-0.012***	-0.016***	-0.016***	-0.001
	(0.003)	(0.006)	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.003)	(0.004)	(0.004)	(0.005)	(0.003)
Progressive	0.058***	0.068***	0.080***	0.095***	0.119***	0.114***	0.097***	0.015***	0.012***	-0.010**	-0.014**	-0.002
	(0.006)	(0.009)	(0.009)	(0.010)	(0.011)	(0.011)	(0.012)	(0.005)	(0.005)	(0.004)	(0.006)	(0.003)
Observations	96295	9460	9613	9716	9738	9776	9740	9688	9616	9642	4653	4653
Control Mean	0.027	0.026	0.028	0.031	0.032	0.029	0.035	0.026	0.019	0.024	0.021	0.007

Notes: This table reports treatment effects on tax compliance per building, pooled and by decile of the building-value distribution. Panel A estimates Equation (1) comparing Progressive to Proportional. Panel B adds comparisons to Status Quo, with Status Quo outcomes adjusted for liability differences using the pre-specified procedure described in Section A4.1. All regressions include stratum fixed effects. The sample includes all assessable residential buildings that received a tax bill in the 2024 property tax campaign. Standard errors are clustered at the neighborhood level. ***, **, and * indicate significance at the 1, 5, and 10% levels. We discuss this table in Section 5.2.

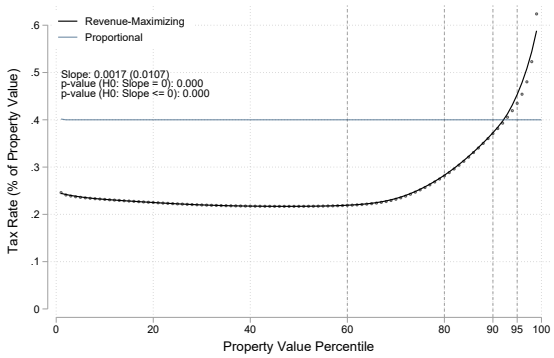
Figure 3: Mechanical v. Behavioral Effects Throughout the Distribution



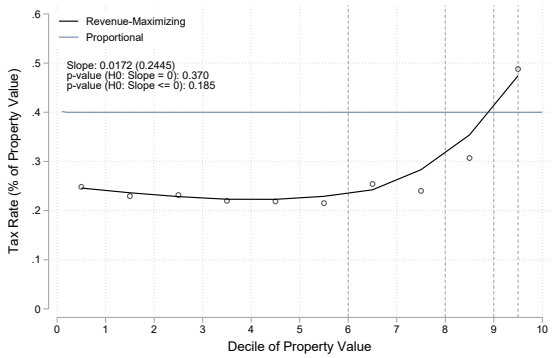
Notes: This figure decomposes revenue responses under Progressive relative to Proportional across the building-value distribution. Panel A shows the tax rates assigned under under the two schedules. Panel B shows average building-level compliance, with 95% confidence intervals for the comparison of Progressive to Proportional. Light gray shading indicates the bottom 95% of the value distribution, where the behavioral response to lower rates — higher compliance — more than offsets the mechanical effect of lower liabilities. Dark gray shading indicates the top 5% of the distribution, where the mechanical effect of higher liabilities dominates the behavioral response in compliance. The sample includes all assessable residential buildings that received a tax bill in the 2024 property tax campaign. We discuss this figure in Section 5.3.

Figure 4: The Revenue-Maximizing Tax Schedule

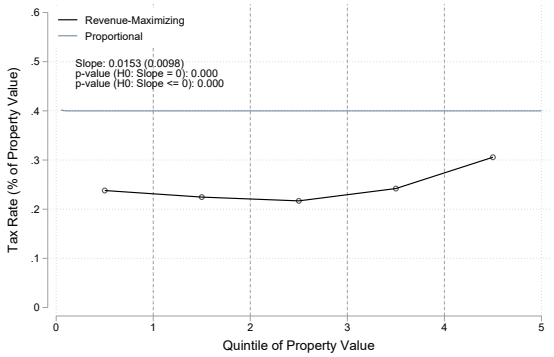
Panel A: RMTR (Parametric)



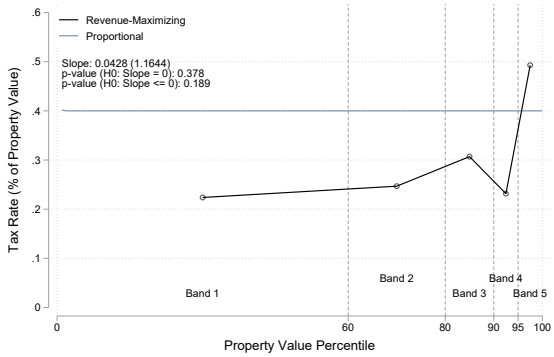
Panel B: RMTR by Decile (Non-Parametric)



Panel C: RMTR by Quintile (Non-Parametric)

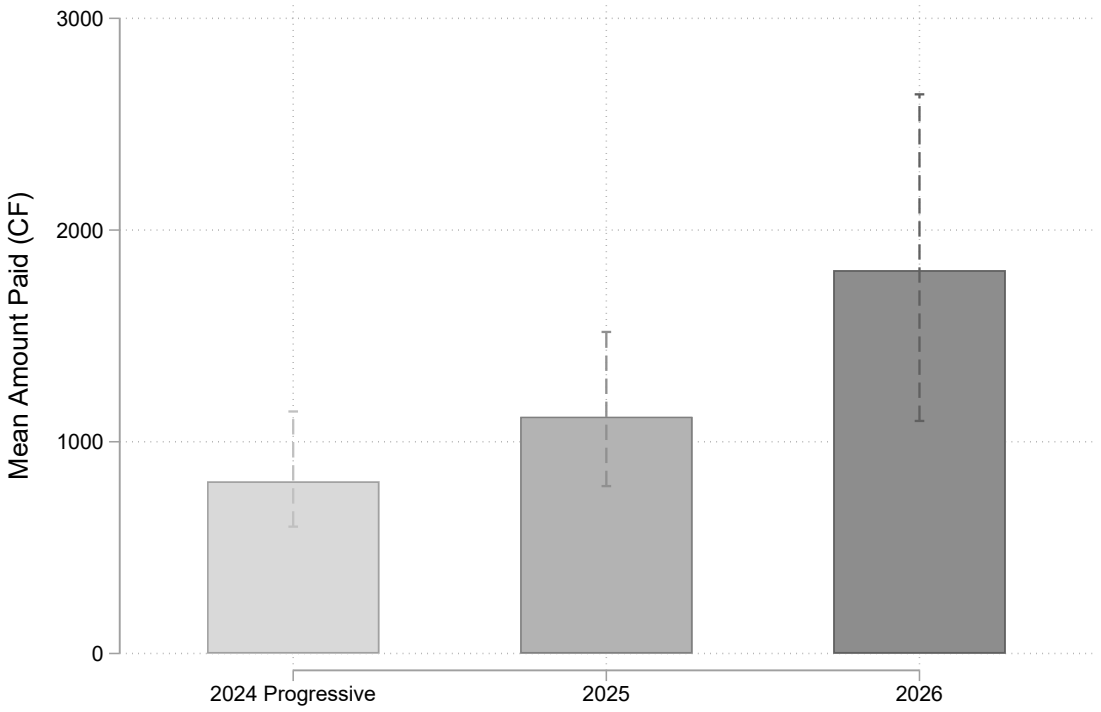


Panel D: RMTR by Band (Non-Parametric)



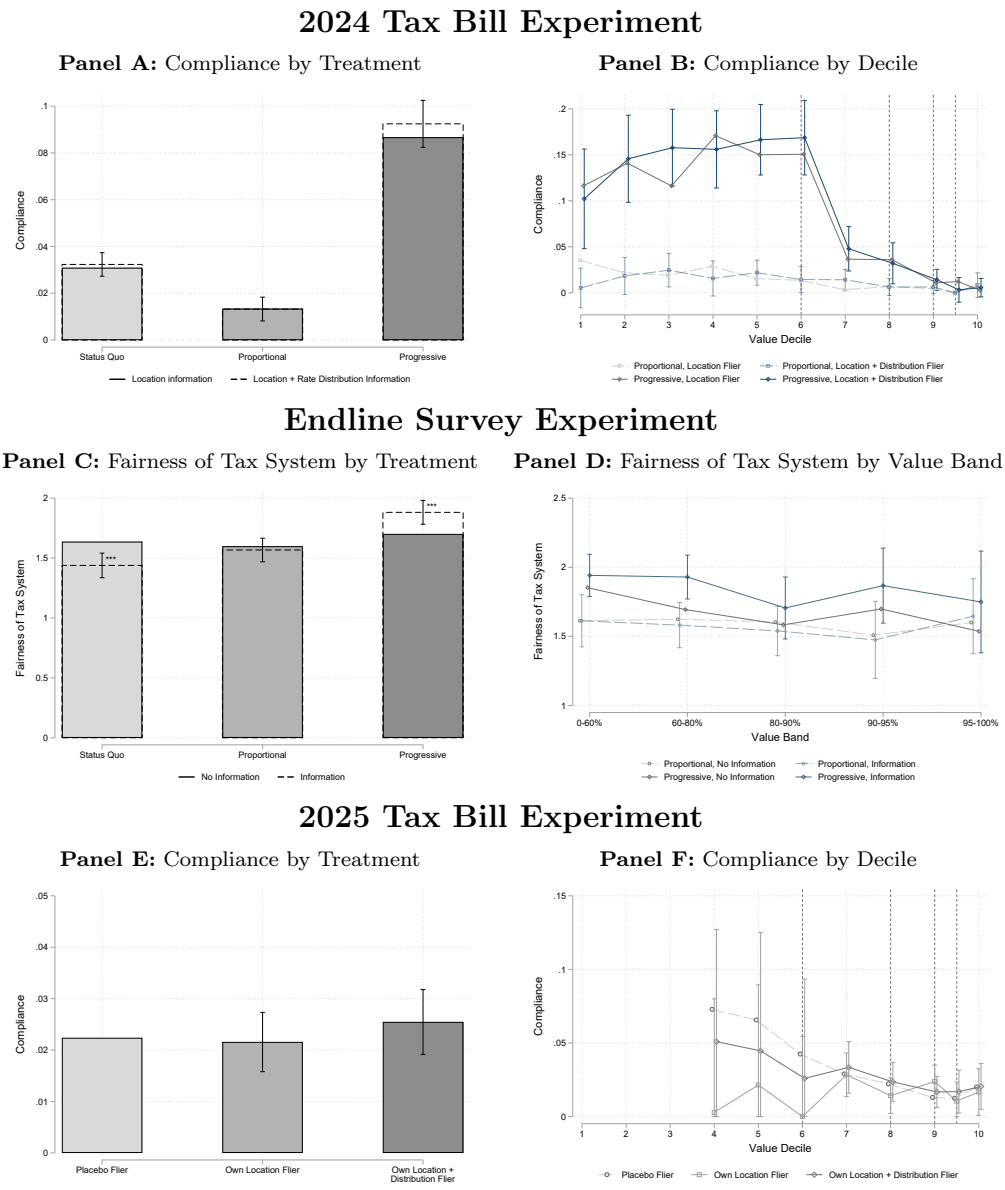
Notes: This figure reports the revenue-maximizing tax rate (RMTR) schedules estimated using several estimation methods. The RMTR is computed using Equation (2), exploiting random variation in assigned tax rates among buildings in Proportional and Progressive neighborhoods. Panel A estimates the RMTR parametrically using cubic splines in log property value, while Panels B–D estimate the RMTR non-parametrically by decile, quintile, and value band. In each panel, we report the slope from a regression of the estimated RMTR on position in the property-value distribution, using percentiles in Panel A and deciles, quintiles, or bands in Panels B–D. Standard errors for the slope and p-values for tests of a non-zero or positive slope are obtained from a neighborhood-clustered bootstrap with 1,000 replications. The Proportional tax rate is shown in each panel. We discuss this figure in Section 5.4.

Figure 5: Revenue in the 2024 Progressive Neighborhoods vs the 2025 and 2026 Tax Campaigns



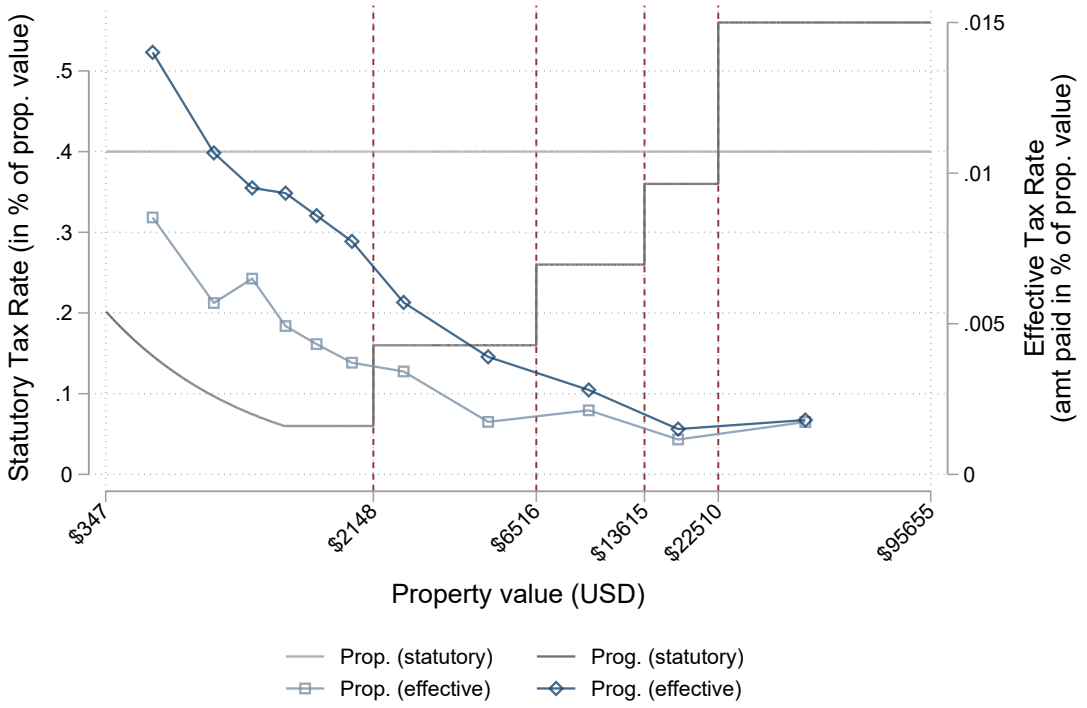
Notes: This figure reports property-level tax revenue, defined as total payments across all assessable buildings within a property, conditional on receiving a bill. It compares revenue in neighborhoods assigned to Progressive during the 2024 tax campaign with revenue in the 2025 and 2026 campaigns, when all neighborhoods were assigned a progressive schedule. To make samples comparable across years, we exclude properties in deciles 1–3, since most of these properties did not receive tax bills in 2025 or 2026. We also restrict the 2025 and 2026 samples to properties assigned to receive a facilitation visit, since all billed properties were assigned to received facilitation visits in 2024. Finally, because the figure is intended to capture pre-enforcement revenue, we exclude payments made after the onset of enforcement actions against high-value properties assigned to targeted enforcement interventions in 2025 or 2026. 95% confidence intervals are computed from 1,000 neighborhood-clustered bootstrap replications for each year. We discuss this figure in Section 5.6.

Figure 6: Information Treatments, Fairness, and Compliance Responses



Notes: This figure summarizes evidence on second-order behavioral responses to the tax schedule. Panels A and B report effects of the 2024 tax-bill information experiment on building-level compliance, overall and by value decile. In Panel A, Status Quo compliance is adjusted for liability differences using the pre-specified procedure described in Section A4.1. Panels C and D restrict to endline survey respondents and report effects of the endline information experiment on perceived fairness of the tax system, overall and by value band. Panels E and F report effects of the 2025 tax-bill information experiment on building-level compliance, overall and by value decile. Across the tax-bill and endline information experiments, control messages provided either (*i*) additional information about the property tax or (*ii*) the same information plus the building's position in the value distribution. Treated taxpayers also received information about the distribution of tax rates in their neighborhood. Panels A–D use group (*ii*) as the control group. Panels E–F report results for all groups. Panels A, B, E, and F include all assessable residential main buildings that receive a tax bill in the corresponding year. The sample is restricted to main buildings because information treatments were assigned at the main-building level within each property. In Panel E, we exclude respondents in deciles 1—3 who received a bill as part of the legal intervention (Bergeron et al., 2026). In Panel F, most properties in deciles 1—3 are omitted because collection effort was reduced in the bottom value band and these properties generally did not receive a bill. In deciles 4—6, only 8% of properties received a bill, which explains the larger standard errors in these deciles. ***, **, and * indicate significance at the 1, 5, and 10% levels in Panels A, C, and E. We discuss this figure in Sections 3.4 and 6.

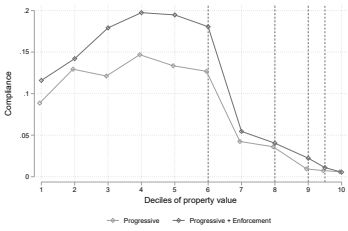
Figure 7: Effective Tax Rates by Treatment and Decile



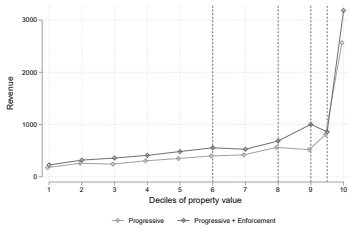
Notes: This figure plots the building-level effective tax rate (ETR), defined as taxes paid divided by property value, by deciles of the building-value distribution. It compares ETRs under Progressive and Proportional with the corresponding statutory tax rate schedules. Gray lines show statutory rates under Proportional and Progressive, corresponding to the left y-axis. Blue lines show ETRs under Proportional and Progressive, corresponding to the right y-axis. The sample includes all assessable residential buildings that received a tax bill in 2024. We discuss this figure in Section 7.1.

Figure 8: Effects of Uniform Enforcement in 2024

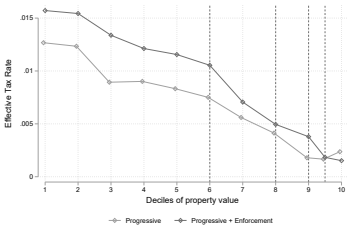
Panel A: Compliance



Panel B: Revenue

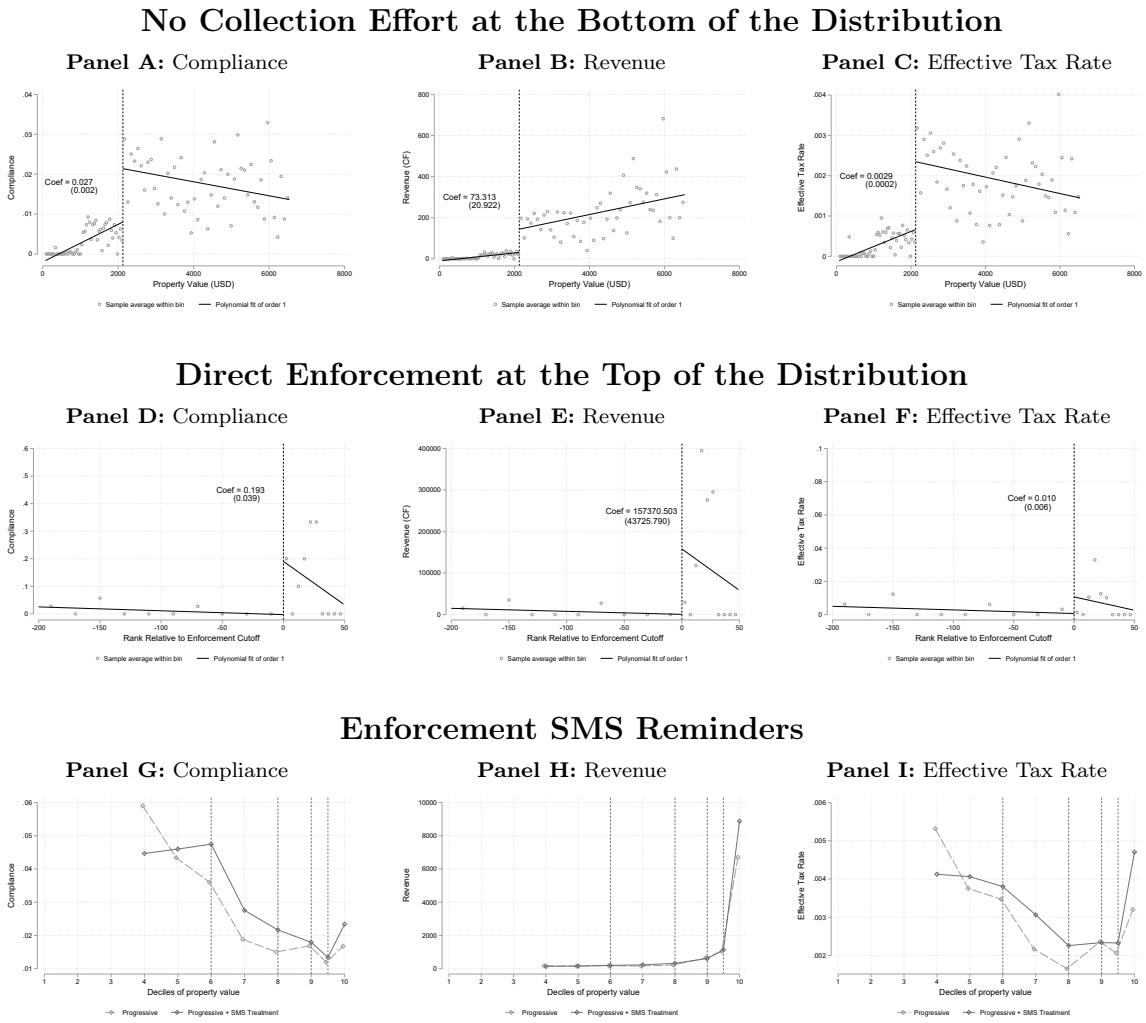


Panel C: Effective Tax Rate



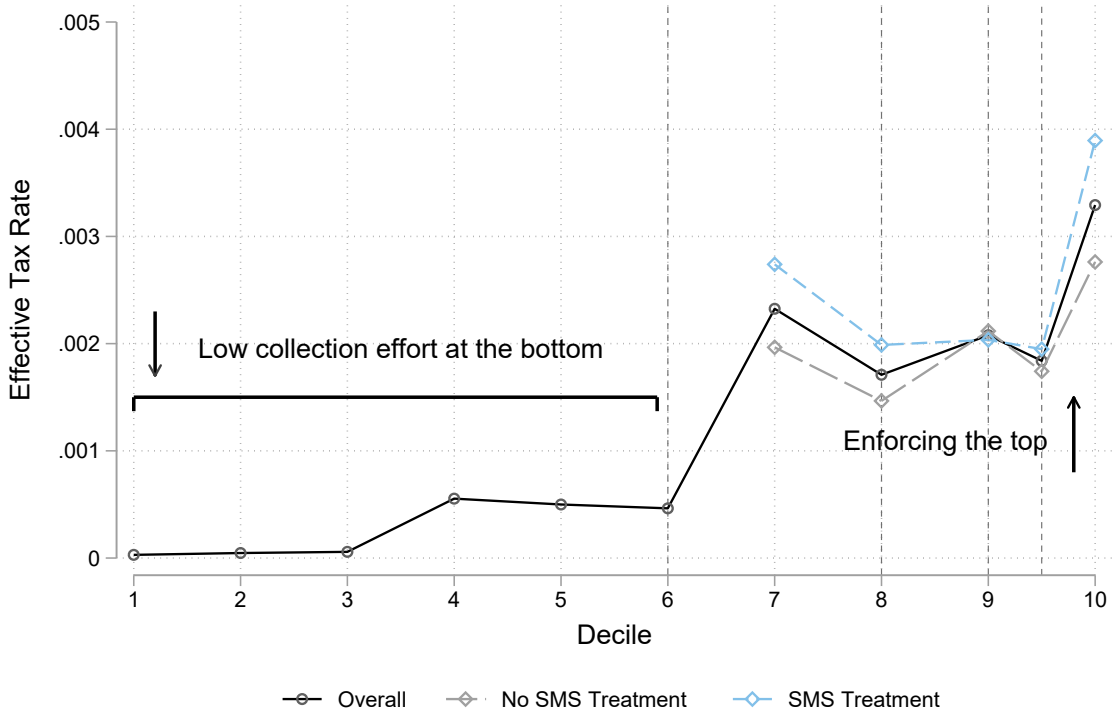
Notes: This figure reports building-level effects of the uniform enforcement intervention implemented during the 2024 property tax campaign, focusing on Progressive neighborhoods. Owners assigned to the intervention were informed on their tax bill that, if they did not pay on time, they would receive a visit from a separate enforcement team. The enforcement team conducted most visits during the final phase of the campaign and collected payments from delinquent owners. Panel A reports compliance by decile of the building-value distribution for buildings assigned and not assigned to enforcement. Panels B and C report the corresponding revenue and effective tax rate outcomes. The sample includes all assessable residential buildings that received a tax bill in the 2024 tax campaign. We discuss this figure in Section 7.2.1.

Figure 9: Effects of Targeted Enforcement Interventions in 2025



Notes: This figure summarizes the three 2025 interventions that reallocated collection and enforcement effort across the property-value distribution. Panels A–C present regression-discontinuity estimates around the cutoff below which routine collection effort was removed in the bottom value band. These panels use the full sample of assessable properties in 2025, including buildings that did not receive a bill. Panels D—F present regression-discontinuity estimates for the direct enforcement intervention targeting the highest-value properties, all of which received a bill. The running variable is each property's rank in the value distribution, computed separately for residential and commercial properties, with the cutoff normalized to zero in each category. Treated properties are the 50 highest-value residential and 50 highest-value commercial properties; control properties are the next 200 properties in each category. Residential and commercial properties are pooled after normalizing ranks relative to the category-specific cutoff. Panels G–I report building-level outcomes for properties randomized to receive an SMS reminder making recent enforcement actions against delinquent businesses salient, relative to properties that did not receive the SMS, among properties that received a bill. Commercial properties are included in Panels D–I because they were part of both the direct enforcement intervention and the SMS reminder experiment at the top of the distribution. Respondents in deciles 1–3 who received a bill as part of the legal intervention (Bergeron et al., 2026) are excluded from all panels. Across rows, columns report building-level compliance (Panels A, D, and G), revenue (Panels B, E, and H), and effective tax rates, defined as the taxes paid divided by property value (Panels C, F, and I). We discuss this figure in Section 7.2.2.

Figure 10: Effects of Targeted Enforcement on ETRs in 2025



Notes: This figure plots the building-level effective tax rate (ETR), defined as taxes paid divided by property value, by deciles of the building-value distribution in the 2025 tax campaign. In deciles 7–10, which received full collection effort, outcomes are shown separately by assignment to the SMS reminder treatment. The sample includes all assessable properties in 2025, including properties that did not receive a bill, since non-delivery of bills was one margin through which collection effort was reduced in deciles 1–6. Commercial properties are included because they were part of both the direct enforcement intervention and the SMS reminder experiment at the top of the distribution. Respondents in deciles 1–3 who received a bill as part of the legal intervention (Bergeron et al., 2026) are excluded from the sample. We discuss this figure in Section 7.2.2.

Table 3: Welfare implications of progressive reform and enforcement interventions

	Progressive vs. Proportional	**Uniform enforcement vs. no enforcement**	**Targeted enforcement vs. no enforcement**
dW	$dV_L > 0,\ dV_H < 0,\ dB(r) > 0$	$dV_L < 0,\ dV_H < 0,\ dB(r) > 0$	$dV_L > 0,\ dV_H < 0,\ dB(r) > 0$ if H revenue gain $> L$ revenue loss
When is $dW > 0$?	L-gains + Public goods $> H$-losses	Public goods $>$ all losses	L-gains + Public goods $> H$-losses
Do ETRs capture welfare?	No: ETR can rise even when L gains	Directionally right, but misses delinquency costs	Directionally right, but misses delinquency costs

Notes: This table summarizes the welfare implications of the progressive tax reform and the enforcement interventions discussed in Section 8. The subscripts L and H denote low- and high-value property owners, with housing consumption flows $y_H > y_L$. Private welfare for type $\theta \in L, H$ is denoted by V_θ, and aggregate welfare is $W = \omega_L V_L + \omega_H V_H + B(r)$, where ω_θ are social welfare weights and $B(r)$ is the social value of public spending financed by tax revenue. The signs in the first row summarize the direction of changes in private welfare and public-good benefits under each policy. The final row emphasizes that effective tax rates (ETRs) are not, in general, sufficient for welfare analysis: under the progressive reform, ETRs can rise for low-value owners even when their private welfare increases, while under enforcement interventions ETR movements are directionally informative but omit delinquency costs borne by noncompliers. The formal framework is presented in Online Appendix A6.