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ARTICLES

The Legal Salience of Taxation

Andrew T. Hayashi[†]

Before an injury becomes a legal dispute, the injury must be named, a party must be blamed, and a right against that injury must be claimed. What motivates people to do these things and use legal institutions to seek redress? I provide a partial answer to this question, using a unique dataset to identify the effect that the salience of a tax—that is, its psychological prominence—has on whether a taxpayer will use legal means to lighten the tax’s burden. I term this effect its “legal salience.” I find that reducing property tax salience makes homeowners less likely to appeal their property-value assessments, making it more likely that homeowners will remain overassessed and overtaxed. These overtaxed homeowners never perceive—are never able to “name”—their injury and consequently never obtain the relief to which they might be entitled. Moreover, I show that the selective use of appeals caused by legal salience shifts the tax burden to racial minorities, immigrants, and working families with children. Scholars and lawmakers operate as if only substantive law drives the distribution of a tax burden. But I show that legal salience is one of a number of factors that also affects the tax distribution by

[†] Associate Professor of Law, University of Virginia School of Law. Thanks to Alan Auerbach, Ian Ayres, Vicki Been, Adam Chodorow, Bob Cooter, Charlotte Crane, Sam Dastrup, Yuliya Epifantseva, David Gamage, Chris Griffin, John Infranca, Ruth Mason, Greg Mitchell, Jason Oh, Alex Raskolnikov, Deborah Schenk, Mark Skidmore, Eric Talley, Dennis Ventry, Mark Willis, George Yin, Larry Zelenak, and workshop participants at Arizona State University, University of Cincinnati, University of California at Davis, Duke University, George Washington University, University of Georgia, University of North Carolina, Northwestern University, Ohio State University, Seattle University, University of South Carolina, Southern Methodist University, University of Virginia, and the 2012 Conference on Empirical Legal Studies. I am especially indebted to the staff at the Furman Center for Real Estate and Urban Policy for assistance with data collection and preparation.

motivating only certain individuals to seek tax relief, and I argue that tax laws should be evaluated after taking into account the effects of legal salience.

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INTRODUCTION

Before an injury becomes a legal dispute, the injury must be named, a party must be blamed, and a right against that injury must be claimed.¹ Recognizing the importance of these three

¹ See William L.F. Felstiner, Richard L. Abel, and Austin Sarat, *The Emergence and Transformation of Disputes: Naming, Blaming, Claiming . . .*, 15 *L & Society Rev* 631, 635–36 (1980–81).

steps turns one's attention from how legal institutions adjudicate disputes to what motivates injured parties to seek redress in the first place. For example, if taxpayers are erroneously overtaxed, how do they know it, and what do they do about it? What causes someone who is overtaxed to seek relief? Is it the ready availability of a tax advisor? Is it an abundance of time to devote to what could be a lengthy or complicated legal process? These sorts of factors will affect the ultimate distribution of the tax burden by motivating some people, but not others, to seek tax relief. These factors are arbitrary from the perspective of the law and untethered from any normative theory of taxation, and so their influences on tax distribution appear unjustified. Moreover, tax authorities and lawmakers typically cannot observe how these factors are distributed among taxpayers, and so the effects of those factors are neglected altogether.

Governments can tax only what they can observe or measure, such as income, property value, and the sale of goods or services. This limitation is unfortunate because a taxpayer's ability to pay is both unobservable and generally regarded by tax scholars as the appropriate basis for determining one's proper share of the tax burden.² Recent legal scholarship has proposed creative ways that tax policy can take into account unobservable yet normatively relevant taxpayer characteristics.³ What has gone

² See, for example, Noël B. Cunningham and Deborah H. Schenk, *The Case for a Capital Gains Preference*, 48 Tax L Rev 319, 364 (1993) ("Most commentators believe that the [tax] base should reflect relative ability to pay."). Income, however, is an imperfect proxy for ability to pay. See David A. Weisbach, *Toward a New Approach to Disability Law*, 2009 U Chi Legal F 47, 74–77 (discussing the problem of individuals with a high ability to pay mimicking individuals with a low ability to pay through manipulation of work effort). Some argue that conditioning local-tax liability on income has limited redistributive benefits and negative efficiency effects arising from the taxpayers' ability to relocate, and that local governments should rely on benefits taxes and leave ability-to-pay taxes to higher levels of government. See, for example, Wallace E. Oates, *Fiscal Federalism* 131–45 (Harcourt 1972); George F. Break, *Financing Government in a Federal System* 252–55 (Brookings 1980); Daniel L. Rubinfeld, *Tax Assignment and Revenue Sharing in the United States*, in Charles E. McLure Jr, ed, *Tax Assignment in Federal Countries* 205, 212–16 (Australian National 1983). But see Timothy J. Goodspeed, *A Re-examination of the Use of Ability to Pay by Local Governments*, 38 J Pub Econ 319, 339–40 (1989) (arguing that welfare losses from migration are small and that redistribution is possible).

³ See, for example, Alex Raskolnikov, *Revealing Choices: Using Taxpayer Choice to Target Tax Enforcement*, 109 Colum L Rev 689, 712–14 (2009) (proposing the use of menus of choices that will cause taxpayers to reveal information about themselves that can be used to improve tax compliance); Lee Anne Fennell, *Willpower Taxes*, 99 Georgetown L J 1371, 1420–22 (2011) (arguing that menus can be used to help improve taxpayer self-control). The related idea that contractual default terms can be set so that parties opting out reveal information about themselves has been articulated by Professors

largely unnoticed, however, is that tax systems already unwittingly make taxes dependent on unobservable taxpayer characteristics by providing for tax-mitigating procedures that favor some taxpayers over others because of those characteristics. For example, if the procedures available for reducing tax burdens are more accessible to better-educated taxpayers, then the tax system will tend to reward education, independent of any tax credits or other benefits that the substantive law itself might provide. In this Article, I find that the salience of a tax is an important factor motivating the use of administrative procedures to reduce the tax's burden.

The salience of a tax generally refers to the effect of its visibility or prominence on taxpayer decisions.⁴ This visibility or prominence can be manipulated by altering the way that the tax is presented or paid. For example, the act of writing a large check to the government coupled with the filing of a tax return

Ian Ayres and Robert Gertner. See Ian Ayres and Robert Gertner, *Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules*, 99 Yale L J 87, 97 (1989). Professor Bradley Karkkainen has made similar arguments in the administrative-law context. See Bradley C. Karkkainen, *Adaptive Ecosystem Management and Regulatory Penalty Defaults: Toward a Bounded Pragmatism*, 87 Minn L Rev 943, 966–70 (2003) (describing the value of penalty defaults in a regulatory context). This literature exploits results from economics, in which this approach to overcoming information asymmetries goes under the name of “screening.” The economics literature has long recognized that the self-selection of individuals into certain social programs, on the basis of unobservable characteristics, can “tag” those individuals in an informative way that can be used to make redistributive policies more efficient. See generally, for example, George A. Akerlof, *The Economics of “Tagging” as Applied to the Optimal Income Tax, Welfare Programs, and Manpower Planning*, 68 Am Econ Rev 8 (1978). Professor David Weisbach has noted that the optimal-tax literature views optimal taxation as fundamentally a screening problem. See Weisbach, 2009 U Chi Legal F at 74 (cited in note 2). See also Jeff Strnad, *The Progressivity Puzzle: The Key Role of Personal Attributes* *6–16 (Stanford Law School John M. Olin Program in Law and Economics Working Paper No 293, Aug 2004), online at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=10289 (visited Nov 3, 2014) (providing examples of various information-based taxation models).

⁴ See Deborah H. Schenk, *Exploiting the Salience Bias in Designing Taxes*, 28 Yale J Reg 253, 262 (2011) (“With respect to taxation, salience is used to describe the degree to which a tax or a tax provision is visible or prominent to the public.”). I adopt this definition because of its specificity about the reason why the decision weight of a tax may vary. For a broader definition, see David Gamage and Darien Shanske, *Three Essays on Tax Salience: Market Salience and Political Salience*, 65 Tax L Rev 19, 23 (2011) (“As we use the term, ‘tax salience’ refers to the extent to which taxpayers account for the costs imposed by taxation when the taxpayers make decisions or judgments.”). This latter definition roughly describes what Professors Xavier Gabaix and David Laibson refer to as a “shrouded attribute.” Xavier Gabaix and David Laibson, *Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets*, 121 Q J Econ 505, 512 (2006) (“[S]hrouded attributes are not taken into consideration by some potential customers.”).

makes a tax more salient than if it were collected in smaller increments throughout the year by withholding it from wages. Professor Milton Friedman famously regretted his role in introducing income-tax withholding, believing that it reduced the salience of the income tax, which thereby reduced individuals' resistance to the tax and, in turn, facilitated the growth of government.⁵ The effect of tax salience on economic decisions (such as how much to buy, invest, or work) has been referred to as its "market salience," and the effect on political decisions (such as whether to oppose the tax through voting, lobbying, and so forth) is called its "political salience."⁶ In this Article, I provide empirical evidence of the effect of tax salience on the decision to use the legal system, which I term "legal salience."

Specifically, I find that reducing property tax salience makes homeowners less likely to appeal their property-value assessments, which makes it more likely that those homeowners will remain overassessed and overtaxed.⁷ These overtaxed homeowners never perceive their injury and consequently never seek the legal relief to which they might be entitled. I also find that property taxes are less salient for recent homeowners with higher-priced mortgages, who are more likely to be racial minorities, immigrants, and working families with children.⁸ Lower legal salience means that this population bears a disproportionate share of the property tax burden.

I examine the effect of property tax salience in New York City using a unique dataset created for this analysis. Constructing this dataset, which involved merging data from five different sources and collecting nearly two million individual property tax bills, allowed me to analyze the behavior of individual taxpayers over time and thereby control for many factors that would otherwise confound attempts to identify the effect of tax salience. These tax bills provide information about how the presentation and collection of the property tax varies across property owners and over time. Some owners receive a bill and remit their property tax payments directly to the city while others pay their taxes through an escrow account as part of their monthly mortgage

⁵ See Milton Friedman and Rose D. Friedman, *Two Lucky People: Memoirs* 123 (Chicago 1998).

⁶ Gamage and Shanske, 65 *Tax L Rev* at 20 (cited in note 4). Sometimes "market salience" is referred to as "economic salience." *Id.* I choose the first convention because I construe the term "economic" to include nonmarket behavior.

⁷ See Part II.D.

⁸ See Part II.D.1.

payments. Homeowners using escrow never receive a bill from the city and their tax payments are folded into a monthly payment that includes mortgage principal, interest, and insurance. As a result, the property tax is less visible or prominent for homeowners using escrow than for homeowners who pay the city directly after receiving a bill. I show empirically that this difference in salience makes homeowners who use escrow accounts less likely to appeal their tax assessments.⁹

This Article makes two contributions. First, I theorize that individuals might respond to lower tax salience by decreasing their use of administrative remedies, and I provide empirical evidence that they do respond in this way. Prior tax-salience scholarship, in contrast, has focused almost exclusively on market and political responses to tax salience.¹⁰ I find large and statistically significant positive effects of tax salience on the likelihood of using the property-assessment appeals process. Increasing the salience of a property tax has the same effect on filing an appeal as increasing the benefits from a successful appeal by \$7,000.¹¹ I also embed my empirical analysis of tax salience within a simple economic model of the decision to seek administrative relief, which enhances the credibility of my findings and illustrates how organizing empirical analysis around a model of the individual's decision process makes it easier to interpret the results and inform policy recommendations.¹² I hope

⁹ See Part II.D.2.

¹⁰ Some scholarship doesn't fit snugly into these two categories. See, for example, Jacob Goldin and Yair Listokin, *Tax Expenditure Salience* *3–5 (Seventh Annual Conference on Empirical Legal Studies Paper, July 2012), online at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2097836 (visited Nov 3, 2014) (reporting evidence on the salience of the charitable deduction and the home-mortgage-interest deduction); Brian Galle, *Federal Fairness to State Taxpayers: Irrationality, Unfunded Mandates, and the "SALT" Deduction*, 106 Mich L Rev 805, 824–30 (2008) (noting that tax salience may affect relocation decisions); Sebastien Bradley, *Property Tax Salience and Payment Delinquency* *3–5 (unpublished manuscript, Aug 2013), online at http://faculty.lebow.drexel.edu/BradleyS/Prop_tax_delinquency_draft.pdf (visited Nov 3, 2014) (reporting evidence that reduced property tax salience increases the likelihood of late payments, underpayments, and interest penalties).

¹¹ For the computation of this number, see the discussion of coefficient magnitudes accompanying note 112.

¹² By specifying a model before looking at the data, I both motivate and discipline the empirical analysis. The model motivates the analysis by suggesting which variables are relevant to the decision and facilitating the interpretation of the empirical results. Specifying which variables are relevant in the decision to seek administrative relief also constrains the empirical analysis in a desirable way. Without specifying a theoretical foundation for the selection of variables and the way that they affect the appeals decision, the temptation can be great for researchers to experiment with many combinations

that the framework presented here will be useful to scholars examining the effect of legal salience in other contexts.

Second, I report how legal salience is correlated with other taxpayer characteristics. The central problem—and opportunity—posed by legal-salience heterogeneity is the effect that it has on the distribution of the tax burden by shifting tax liability from taxpayers for whom the tax is more salient (“high-salience taxpayers”) to those for whom the tax is less salient (“low-salience taxpayers”) as high-salience taxpayers make greater use of tax-reducing procedures.¹³ Because its importance has not generally been appreciated, the impact of salience on the distribution of the tax burden is presumably unintended, and it may be at cross-purposes with the goals of the tax system. Armed with an accurate understanding of what motivates people to seek administrative remedies, we can design administrative procedures to further tax-policy goals rather than undermine them.

Most scholarship has given the issue of tax-salience heterogeneity short shrift, largely because of data limitations in identifying *how* tax salience varies.¹⁴ It is rare to be able to match information on individual taxpayers with how salient a tax is for those taxpayers. Using regression analysis and a unique dataset, which I constructed for this purpose, I am able to report evidence of legal salience and how it correlates with other individual taxpayer characteristics. Mortgage escrow is the cause of reduced legal salience in the context that I discuss. Because escrow reduces legal salience for mortgagors, and low-salience taxpayers are more likely to remain overassessed, I find that, as a practical matter, New York City’s assessment-appeals process likely results in heavier property tax burdens for homeowners who use mortgage escrow. Mortgage escrow has historically been required by mortgage lenders for homeowners who borrow more than 80 percent of the purchase price of their homes, and it was recently mandated by federal regulations for individuals receiving loans with an interest rate at least 1.5 percentage points

of variables in order to find statistically significant effects, potentially leading to spurious findings.

¹³ The shift occurs through anticipatory rate increases under New York City’s property tax, and through more indirect measures under other regimes. See Part II.A.3. See also note 134 and accompanying text.

¹⁴ For an example of scholarship that does address this issue, see Jacob Goldin and Tatiana Homonoff, *Smoke Gets in Your Eyes: Cigarette Tax Salience and Regressivity*, 5 *Am Econ J: Econ Pol* 302, 331–33 (2013). See also note 50 and accompanying text.

greater than the average prime lending rate.¹⁵ Homeowners using mortgage escrow tend to be racial minorities, immigrants, and working families with children.¹⁶ The causes and consequences of legal-salience heterogeneity vary across contexts, so I cannot make a universal claim about the distributional effects of legal-salience heterogeneity. Nevertheless, my results clearly show that legal-salience heterogeneity has real and unintended effects on tax distribution and should be considered by tax agencies in structuring administrative rules and procedures.

The case of New York City's property tax also illustrates concerns common to any enforcement regime relying on individual reporting. Taxpayers will tend to report overassessments only when the tax savings from doing so will outweigh the costs to them of appealing. This means that the use of the appeals process is likely to vary across people because of variables that, although arbitrary from the perspective of the law, affect those perceived costs and benefits. These variables include a taxpayer's awareness of the appeals system, her ability to argue her case before the appeals tribunal or hire expert counsel, and the

¹⁵ See notes 45–47 and accompanying text.

¹⁶ A system in which the use of potentially tax-reducing administrative procedures is motivated by factors unrelated to the underlying merits of the case can introduce horizontal and vertical inequities. For evidence of variation in property tax burdens across income groups and property values, see G. Stacy Sirmans, Dean H. Gatzlaff, and David A. Macpherson, *Horizontal and Vertical Inequity in Real Property Taxation*, 16 *J Real Est Literature* 167, 177 (2008) (summarizing literature finding that horizontal inequity arises “from unequal knowledge of market participants, unequal negotiating skills of buyers and sellers, and actions by officials to limit property tax increases”); Marcus T. Allen and William H. Dare, *Identifying Determinants of Horizontal Property Tax Inequity: Evidence from Florida*, 24 *J Real Est Rsrch* 153, 159 (2002) (finding that property assessment is more difficult in neighborhoods with a higher percentage of minority residents); Kenneth K. Baar, *Property Tax Assessment Discrimination against Low-Income Neighborhoods*, 13 *Urban L* 333, 338–47 (1981) (describing widespread assessment discrimination); Keith R. Ihlanfeldt, *Property Tax Incidence on Owner-Occupied Housing: Evidence from the Annual Housing Survey*, 35 *Natl Tax J* 89, 95 (1982) (concluding that income and tax elasticities are not homogeneous across income classes); Daniel P. McMillen and Rachel N. Weber, *Thin Markets and Property Tax Inequities: A Multinomial Logit Approach*, 61 *Natl Tax J* 653, 664–68 (2008) (reporting evidence that sales frequency positively affects uniformity of assessment ratios). In the case of the property tax, horizontal inequities are differential rates of taxation for properties identical in all relevant dimensions and vertical inequities are “inappropriate” patterns of tax differentiation among dissimilar properties. For general definitions of these terms, see Louis Kaplow, *Horizontal Equity: Measures in Search of a Principle*, 42 *Natl Tax J* 139, 140 (1989) (noting that horizontal equity requires “equal treatment of equals” and vertical equity requires “an appropriate pattern of differentiation . . . among people who are not equals”); Richard A. Musgrave, *Horizontal Equity, Once More*, 43 *Natl Tax J* 113, 113 (1990).

cost of pursuing an appeal. I report evidence that mortgage escrow makes property owners less likely to appeal and therefore more likely to bear a heavier tax burden than they would if they did not use escrow. The use of mortgage escrow is a totally arbitrary determinant of property tax liability.

The question of how salience affects the use of administrative remedies in tax law provides an entry point into a broader set of policy questions. Specifically, one can apply the lessons from my study to understand how idiosyncratic differences among individuals affect their use of administrative procedures and, consequently, the de facto allocation of social benefits and burdens. For example, in the federal income tax context, taxpayers may appeal determinations of tax deficiencies or proposed adjustments to a tax return, seek relief from joint and several liability between married taxpayers, challenge the imposition of tax liens, amend a prior year's return, enter a voluntary compliance program, or settle an outstanding tax liability for less than its face amount. Claiming any of a variety of refundable tax credits, such as the earned income tax credit, the child tax credit, the American Opportunity Credit, or the 2007 economic-stimulus payment, requires filing a federal income-tax return, which many households do not do. But tax is just the tip of the regulatory iceberg, and I suggest a select few topics of potential research interest to scholars in other fields in Part III.B.

The remainder of this Article is structured as follows. Part I introduces the concept of legal salience and discusses the causes and consequences of legal-salience heterogeneity. Part II presents an empirical study of legal salience that examines its effect on property tax appeals in New York City. I begin the Part by describing the institutional context in which appeals are made. I then present a theoretical framework of the decision to seek administrative relief, the data-collection process, and the results of the empirical analysis. I also report evidence that those most affected by legal salience are more likely to be racial minorities, immigrants, and working families with children. Part III provides an illustrative analysis of how legal-salience heterogeneity affects the distribution of the tax burden, which helps to identify relevant considerations for evaluating the effects of legal salience in other administrative contexts. I identify some of these contexts before concluding.

I. LEGAL-SALIENCE AND TAXPAYER HETEROGENEITY

When the government burdens an activity by subjecting it to a tax or regulation, there are at least three ways that people respond: by doing less of the activity, by lobbying elected officials to change the law (or replacing those officials with others more sympathetic to their plight), or by using whatever legal means are available to reduce the weight of that burden. The burgeoning literature on tax salience has explored how the visibility or prominence of a tax affects the first two categories of responses—that is, the tax’s market salience and the tax’s political salience. In Part I.A, I summarize this literature and introduce legal salience as a third category of tax-salience responses. The salience of a tax or regulation may not be the same for all people. Although this differentiation has been acknowledged, most scholarship on tax salience has implicitly assumed that taxes either are salient or are not salient, without attending to the potential implications of tax-salience heterogeneity across taxpayers. In Part I.B, I describe some of the causes and consequences of tax-salience heterogeneity. This discussion frames the empirical study of property tax appeals in Part II, in which I identify the specific cause and consequences of salience effects in that context.

A. Three Categories of Tax-Salience Effects

The notion that taxpayers respond differently to taxes depending on how salient those taxes are to them has inspired a growing body of scholarship in economics and law. In the market context, because less salient taxes induce smaller behavioral responses than more salient taxes, salience affects both the inefficiencies created by a tax and who bears its economic burden.¹⁷ In the political arena, tax salience influences the choice of tax instruments and tax rates by elected officials. Empirical research in economics has identified these effects. Legal scholarship has observed these findings, demarcated the concept of tax salience

¹⁷ See Raj Chetty, *The Simple Economics of Salience and Taxation* *3 (National Bureau of Economic Research Working Paper No 15246, Aug 2009), online at <http://www.nber.org/papers/w15246> (visited Nov 3, 2014) (finding that the incidence of a tax depends on its statutory incidence and that a tax can create deadweight loss even if it induces no change in demand); Jacob Goldin, *Optimal Tax Salience* *9–14 (unpublished manuscript, Jan 2014), online at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2009108 (visited Nov 3, 2014) (exploring the optimal mix of high- and low-salience taxes).

into the categories of market salience and political salience, and explored the normative implications of these two kinds of salience.¹⁸ However, none of this scholarship has examined how tax salience affects the decision to make a legal claim.

1. Market salience.

The market salience of a tax refers to the effect of its visibility or prominence on consumers' market decisions, such as whether to buy a particular good, invest in a particular asset, or accept a particular job. Researchers have taken one of two approaches to identifying the effect of salience. The first is to directly manipulate features of the tax that are presumed to affect its visibility or prominence.¹⁹ For example, one might increase the salience of a sales tax that is imposed at checkout by labeling items on store shelves with the tax-inclusive price, or by dividing the tax-inclusive price into its constituent parts and highlighting the tax component by underlining it or presenting it in bold. This approach assumes that manipulating how a tax is presented affects salience alone, but not any other characteristics that are relevant to the purchasing decision. Under the second approach, salience effects are inferred when a tax has a different effect on behavior than some other, economically equivalent, component of the price. For example, if consumers' demand for an item responds less to an increase in its price attributable to a change in the sales tax than to an economically equivalent increase in its pretax price, then one might infer that the sales tax was less salient. This interpretation has certain problems because other factors, such as an aversion to price complexity or distaste for taxes in general, could explain why "partitioning" a price into a tax and nontax component could affect the demand for a good.²⁰

Although work remains to be done to distinguish the effects of salience from other effects of price presentation, there is a growing body of empirical research documenting what appear to be significant tax-salience effects. In a widely cited study,

¹⁸ See, for example, Schenk, 28 *Yale J Reg* at 297–310 (cited in note 4); Gamage and Shanske, 65 *Tax L Rev* at 60–98 (cited in note 4).

¹⁹ See Schenk, 28 *Yale J Reg* at 272–73 (cited in note 4).

²⁰ See Andrew T. Hayashi, Brent K. Nakamura, and David Gamage, *Experimental Evidence of Tax Salience and the Labor-Leisure Decision: Anchoring, Tax Aversion, or Complexity?*, 41 *Pub Fin Rev* 203, 206–07 (2013) (finding that partitioned-pricing effects result from cognitive limitations).

Professor Raj Chetty, Professor Kory Kroft, and Adam Looney report evidence that consumers are less likely to purchase certain items when the prices posted alongside those items are inclusive of sales tax, compared with when only the pretax price is posted, even if consumers know the amount of sales tax that will be imposed at checkout.²¹ They also find that consumer demand is more responsive to increases in the rate of an excise tax, which is reflected in the posted purchase price, than to an increase in the rate of a sales tax, which is imposed at the register.²²

In another oft-cited paper, Professor Amy Finkelstein reports evidence that tolls have a smaller effect on highway driving when they are paid by automatic electronic billing (E-ZPass collection) than when they are paid in cash, presumably because not having to produce a cash payment makes the toll less salient.²³ Evidence of market-salience effects has also been reported for automobile-purchasing decisions, which do not properly account for the effects of taxes on personal property or tax credits provided for automobile purchases,²⁴ and labor supply decisions, which are affected by whether the worker is subject to a wage tax or an economically equivalent consumption tax.²⁵ Personal-property taxes, tax credits, and consumption taxes are imposed after the relevant economic decisions are made and are, for this reason, less salient at the time of those decisions and therefore less likely to be fully incorporated into the cost-benefit calculus.

2. Political salience.

The political salience of a tax refers to the effect of its visibility or prominence on political decisions.²⁶ The interaction between political salience in the minds of voters and in the minds

²¹ See Raj Chetty, Adam Looney, and Kory Kroft, *Salience and Taxation: Theory and Evidence*, 99 Am Econ Rev 1145, 1165–66 (2009).

²² See id at 1160–64.

²³ See Amy Finkelstein, *E-ZTax: Tax Salience and Tax Rates*, 124 Q J Econ 969, 980–83 (2009).

²⁴ See Richard L. Ott and David M. Andrus, *The Effect of Personal Property Taxes on Consumer Vehicle-Purchasing Decisions: A Partitioned Price/Mental Accounting Theory Analysis*, 28 Pub Fin Rev 134, 144–48 (2000); Kelly Sims Gallagher and Erich Muehlegger, *Giving Green to Get Green? Incentives and Consumer Adoption of Hybrid Vehicle Technology*, 61 J Envir Econ & Mgmt 1, 9–11 (2011).

²⁵ See Tomer Blumkin, Bradley J. Ruffle, and Yosef Ganun, *Are Income and Consumption Taxes Ever Really Equivalent? Evidence from a Real-Effort Experiment with Real Goods*, 56 Eur Econ Rev 1200, 1206–07 (2012) (finding a significantly greater effect from an income tax on labor supply than an economically equivalent consumption tax).

²⁶ See Gamage and Shanske, 65 Tax L Rev at 20 (cited in note 4).

of politicians, the degree to which the latter depends on the former, and how the two generate observable political outcomes is complicated and largely the basis of conjecture. However, there is some suggestive evidence and good intuition that tax policy reflects political-salience effects.²⁷

In her study of the effects of highway tolls, Finkelstein found that politicians set higher highway toll rates when those tolls are collected electronically than when they are collected by cash payment.²⁸ Finkelstein also reports that tolls are less likely to increase during election years when tolls are collected by cash than when they are collected electronically, which suggests that the political costs of raising tolls may be reduced when those tolls are less salient.²⁹ Professors Marika Cabral and Caroline Hoxby studied whether the salience of the property tax affects two political outcomes: the existence of state-level statutory limitations on property taxes and overall property tax rates.³⁰ They estimate that greater use of mortgage escrow, which reduces the salience of the property tax, is associated with higher property tax rates and fewer state-level limits on property taxes.³¹ These effects presumably result from reduced political opposition to the property tax.³²

Recent legal scholarship has evaluated the propriety of using tax salience as an instrument for making tax policy more equitable, efficient, and effective at raising revenue. Professor Deborah Schenk argues that there are circumstances in which it is appropriate for the government to exploit the fact that certain taxes have low political salience.³³ For example, politically non-salient taxes may generate less resistance from voters during periods of general antitax sentiment, making salience a potentially valuable policy instrument during times in which it is

²⁷ Professors Aradhna Krishna and Joel Slemrod argue that, in many settings, the tax system is designed to minimize the perceived tax burden, but that in some situations the system serves to maximize the perceived burden on high-income families. See Aradhna Krishna and Joel Slemrod, *Behavioral Public Finance: Tax Design as Price Presentation*, 10 *Intl Tax & Pub Fin* 189, 189–90 (2003).

²⁸ See Finkelstein, 124 *Q J Econ* at 1002–05 (cited in note 23).

²⁹ See *id.* at 1004–05.

³⁰ See Marika Cabral and Caroline Hoxby, *The Hated Property Tax: Salience, Tax Rates, and Tax Revolts* *35–37 (National Bureau of Economic Research Working Paper No 18514, Nov 2012), online at <http://www.nber.org/papers/w18514.pdf> (visited Nov 3, 2014).

³¹ See *id.* at *37–38.

³² See *id.* at *22–27, 38–39.

³³ See Schenk, 28 *Yale J Reg* at 297–310 (cited in note 4).

difficult to raise revenue and the government is facing the prospect of a fiscal crisis. Professors David Gamage and Darien Shanske argue that categorical objections to reducing political salience are misguided, contending that democratic values do not necessitate using more politically salient taxes.³⁴

3. Legal salience.

In many contexts taxpayers reacting to a tax economically, by changing their consumption or investment decisions, or politically, by supporting elected officials whose fiscal policies reflect the taxpayers' preferences. There is a third context in which taxpayers can take actions that affect their tax liability. Many tax regimes, including those for federal and state income taxes and local property taxes, are enforced by administrative agencies that have processes for challenging, appealing, or otherwise adjusting taxpayer liabilities after they have been initially assigned.³⁵ Such processes are often initiated by the taxpayers themselves. As a result, the pattern of use for these processes reflects the idiosyncratic cost-benefit calculus of those taxpayers, incorporating their own beliefs, preferences, and circumstances. For a variety of psychological and economic reasons, some people are more likely to use legal processes and institutions than others. Such differences can result in disparate effects from even facially nondiscriminatory procedures.

As I show in Part II, the visibility or prominence of a tax affects the likelihood that taxpayers will use administrative remedies to reduce its burden. This effect is the legal salience of the tax. There is no necessary connection among the legal salience, market salience, and political salience of a tax. In particular, a tax that is salient for the purpose of market decisions may not be salient for political or legal decisions. This is because taking a political or legal action to mitigate the effect of a tax requires more information and resources than taking a market action. Consider the case of an excise tax. An excise tax is generally incorporated into the price of the good or service presented to the consumer and, consequently, has high market salience. All that the consumer needs to know to respond optimally to the tax is reflected in the price of the good. It doesn't matter what portion of the price is attributable to the tax, what portion is attributable

³⁴ See Gamage and Shanske, 65 *Tax L Rev* at 79–98 (cited in note 4).

³⁵ See Part II.A.1.

to the seller's costs, or what portion is attributable to the seller's profit. Put differently, a consumer's market choices will generally respond in the same manner to a fully salient tax increase and an economically equivalent price increase that benefits the seller. This will not be true of the taxpayer's political or legal decisions, because a tax that is embedded in the price of something will not prompt a taxpayer to seek political or legal remedies unless the taxpayer has reason to know that the price incorporates a tax.

This distinction is especially pertinent in the context in which I study legal salience. In this study, I identify the effect of property tax salience on the willingness of taxpayers to appeal their property assessments. I adopt a causal identification strategy based on evidence reported by Cabral and Hoxby, who report survey results showing that property taxes are less salient for homeowners whose property taxes are included in the monthly mortgage payments that they make to their mortgage servicers.³⁶ Property taxes are more salient for homeowners who pay the property tax directly to the taxing authority.³⁷ This finding has some intuitive appeal. Mortgagors typically make monthly payments to their mortgage servicers that include escrow contributions for mortgage and homeowners' insurance, principal and interest, and property taxes. By lumping all of these costs together into a single payment made to the mortgage servicer rather than the ultimate recipients, escrow obscures the components of the monthly payment and thereby reduces legal salience.³⁸ And the shock of large property tax bills is avoided by disaggregating what would generally otherwise be quarterly, semiannual, or annual property tax payments into smaller, monthly payments. My analysis examines the relationship between the

³⁶ See Cabral and Hoxby, *The Hated Property Tax* at *23–27 (cited in note 30). The first to speculate about the effect of mortgage escrow on tax salience was Professor Peter Ordeshook. See Peter C. Ordeshook, *Property Tax Consciousness*, 34 *Pub Choice* 285, 288–90 (1979). Ordeshook surveyed 320 taxpayers and found no statistically significant relationship between the taxpayers' error in recalling their property tax liability and whether they pay taxes out of escrow, after controlling for income and education. See *id.* at 286–90. However, his data limitations and comparatively rudimentary empirical analysis caution against drawing strong conclusions from the study.

³⁷ Homeowners with tax escrow report their taxes with greater error than those without, although this error is unbiased. See Cabral and Hoxby, *The Hated Property Tax* at *29–30 (cited in note 30).

³⁸ Although forthcoming regulations may require servicers to provide statements indicating to borrowers the portion of their monthly payments that is allocated to each of these costs, this has not been standard practice. See note 46.

use of mortgage escrow as a cause of tax (non)salience and the probability of filing an appeal, while controlling for other factors affecting the appeals decision.

There have been only two empirical studies of the role of assessment appeals on the distribution of the property tax burden. These studies show that tax appeals are correlated with neighborhood characteristics such as home values, the proportion of residents who own their home, and the share of African American and Hispanic residents.³⁹ Neither of these studies examines the effect of property tax salience on assessment appeals. Although any arbitrary factor driving the decision to use administrative procedures merits scrutiny for its distributional consequences, tax salience is a good place to start from a policy perspective because it is more easily manipulated by regulators than, for example, the opportunity cost of taxpayers' time or other individual-specific factors that affect the appeals decision. If the mechanism for manipulating legal salience is known by the tax authority, then its effects can be monitored to ensure that distributional objectives are not undermined by the inequitable use of administrative procedures. If that mechanism is not known, then legal salience may vary in an unpredictable way across taxpayers, affecting the allocation of the tax burden. This variation is the topic of the next Section.

B. Taxpayer Heterogeneity

Taxpayers differ in all sorts of ways. They vary in their preferences for consumption, saving, and investment. They differ in their personalities, abilities, patience, and willpower. They possess disparate beliefs about the past and their future prospects, and they live in widely divergent circumstances. Such differences provide information that society might like to use in making tax policy, setting the terms of redistribution, and devising rules that collect revenue while minimizing inefficiencies

³⁹ See generally Rachel N. Weber and Daniel P. McMillen, *Ask and Ye Shall Receive? Predicting the Successful Appeal of Property Tax Assessments*, 38 *Pub Fin Rev* 74 (2010); William M. Doerner and Keith R. Ihlanfeldt, *An Empirical Critique of the Property Tax Appeals Process* (unpublished manuscript, Jan 2012), online at http://artsci.wustl.edu/~cre/ihlanfeldt_paper.pdf (visited Nov 3, 2014). Professors Weber and McMillen also report evidence that a reduced likelihood of appeal is associated with higher frequencies of local sales or a recent sale of the property itself, suggesting that a richer informational environment could reduce the frequency of appeals by increasing assessor accuracy and property owners' knowledge of the local housing market. See Weber and McMillen, 38 *Pub Fin Rev* at 94.

associated with behavioral distortions. Many of these taxpayer differences are unobservable, however, and tax liability can typically be assigned only on the basis of observable or measurable characteristics.

When unobservable characteristics differ among taxpayers who are identical along the observable dimensions that the tax law takes into account, inequities can arise.⁴⁰ For example, variation in the legal salience of the property tax across homeowners can cause two properties, identical in every dimension specified under the law, to be taxed at different rates if one homeowner makes use of administrative procedures that reduce her tax burden while the other does not. Recent scholarship has argued that unobserved taxpayer heterogeneity presents opportunities as well as challenges for tax policy. In some circumstances, taxpayers can be induced to reveal information about themselves by selecting from a menu of tax-policy options, and the options themselves can be tailored to taxpayers who would choose them. Whether such an approach is necessary, or if there are instead more direct options for dealing with heterogeneity, depends on the underlying causes of that heterogeneity. In this Section, I describe some of the causes of legal-salience heterogeneity and discuss their implications.

1. Causes of tax-salience heterogeneity.

The salience of a tax depends on (1) the characteristics of taxpayers themselves, (2) the way that the government imposes the tax, and (3) the interventions of private market actors. Consequently, a tax may be more salient for certain taxpayers than for others because the taxpayers have different characteristics (such as educational attainment), because the tax is presented differently by the government, or because market actors vary in whether they take actions that heighten or diminish the prominence of the tax. Understanding how these factors interact is essential for identifying how legal salience affects the allocation of the tax burden and what tools are available for changing it. In what follows I refer to “tax-salience heterogeneity,” which is simply variation in the visibility or prominence of a tax across taxpayers for any of these reasons.

⁴⁰ How inequitable one finds such results depends on how well the observable factors specified by law capture the characteristics that provide the normative basis for taxation and what effects the unobservable characteristics have on the distribution of the tax burden.

To the limited extent that it has been discussed in the literature, tax-salience heterogeneity has generally been identified with differences among taxpayers themselves. For example, Professor Brian Galle identifies the opportunity cost of time, preferences for current consumption and saving, and the cognitive ability required to calculate the effects of taxes on after-tax prices as factors that vary across taxpayers and affect market salience.⁴¹ These factors affect the cognitive costs and benefits of taking taxes into account when making market decisions and thereby affect the likelihood that taxes will affect behavior. Some taxpayers ignore tax prices because it is rational to do so (in light of the costs of performing the necessary calculations). Other taxpayers neglect the effects of taxes because they are unaware of those effects, not because they deliberately decide not to compute them.⁴² For these taxpayers, other factors, such as the ability to pay for professional assistance in tax planning, play important roles in determining tax salience.⁴³

Differences in the way that a tax is imposed or collected can also create tax-salience heterogeneity. For example, collecting tolls for some highways electronically but collecting tolls for other highways in cash will make the toll less salient for drivers on the first highway than for drivers on the second.⁴⁴ Collecting income taxes by wage withholding from some taxpayers and not from others could cause the income tax to be more salient for those not subject to withholding. Requiring some homeowners to pay their property taxes through escrow accounts makes the tax less salient to them than to homeowners who pay their taxes directly to the local taxing authority. In July 2008, the Federal Reserve Board (“the Board”) issued final regulations requiring for the first time that lenders create escrow accounts on behalf of borrowers with certain “higher-priced” (that is, riskier) loans

⁴¹ See Brian Galle, *Hidden Taxes*, 87 Wash U L Rev 59, 70–77 (2009). Galle notes that if poorer people have higher discount rates, they may be more likely to pay the hidden tax as the value of saving what was spent on the tax will be less to them. Similarly, if the calculations are easier for richer people to perform, or they have access to professional counsel who can advise them about tax costs, the tax may be regressive. See *id.* at 100–04. Professor Jacob Nussim has argued that tax-exclusive pricing shifts the tax burden from the more to the less psychologically biased. See Jacob Nussim, *To Confuse and Protect: Taxes and Consumer Protection*, 1 Colum J Tax L 218, 244–47 (2010). See also Gamage and Shanske, 65 Tax L Rev at 77 (cited in note 4) (identifying “general cognitive ability” as affecting distribution of tax salience).

⁴² See Galle, 87 Wash U L Rev at 87–88 (cited in note 41).

⁴³ See *id.* at 104.

⁴⁴ See Finkelstein, 124 Q J Econ at 980–83 (cited in note 23).

that are secured by the borrowers' principal residences.⁴⁵ On March 2, 2011, the Board published proposed rules that would, among other things, lengthen the required escrow period from one to five years (and establish an even longer period in certain cases, such as when the borrower is delinquent or in default).⁴⁶ These regulatory changes will likely lead to wider use of mortgage escrow.⁴⁷

Finally, tax-salience effects can be created through the decisions of private market actors. Because tax salience affects market choices, sellers of taxed goods have incentives to highlight tax benefits (such as income tax credits and deductions) and downplay tax costs (such as personal-property taxes) that are associated with their products. The marketing activities of these actors are driven by their own profit-maximization calculi, and there will invariably be an element of selectivity in the populations that they target. This selectivity also can create tax-salience heterogeneity.

2. Consequences of legal-salience heterogeneity.

The central problem—and opportunity—posed by legal-salience heterogeneity is the effect that it has on the distribution of the tax burden. Because its importance has not generally been appreciated, its effects are unintended and may be at cross-purposes with some of the tax system's goals. Armed with an

⁴⁵ "Higher-priced" loans are those with an annual percentage rate (APR) at least 1.5 percentage points greater than an estimate of the average prime lending rate; these loans generally include so-called subprime and Alt-A loans. See 12 CFR § 226.35(a)(1). These regulations amended Regulation Z, the implementing regulation for the Truth in Lending Act, 15 USC § 1601 et seq. and were issued under the Board's grant of rulemaking authority under the Home Ownership and Equity Protection Act of 1994, Pub L No 103-325, 108 Stat 2190. See Federal Reserve System, Truth in Lending, Proposed Rule, 76 Fed Reg 11598, 11598 (2011).

⁴⁶ 76 Fed Reg at 11599. The proposed rules would implement certain changes to the Truth in Lending Act made by Title XIV of the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank), Pub L No 111-203, 124 Stat 1376 (2010). See 76 Fed Reg at 11598. Sections 1461 and 1462 of Dodd-Frank created the new § 129D of the Truth in Lending Act, which generally codifies the Board's 2008 regulations but also added disclosure requirements, lengthened the required escrow period, and increased the threshold APR for jumbo loans to become subject to mandatory escrow. *Id.*

⁴⁷ Forcing homeowners to save a portion of their income each month for property tax and insurance payments may make homeowners less likely to become delinquent on these payments. There is evidence that large lump-sum payments can have severe liquidity effects on households that lead to mortgage default. See Nathan B. Anderson and Jane K. Dokko, *Liquidity Problems and Early Payment Default among Subprime Mortgages* *4 (Finance and Economics Discussion Series 2011-09, Nov 2010), online at <http://www.federalreserve.gov/pubs/feds/2011/201109/201109pap.pdf> (visited Nov 3, 2014).

accurate understanding of what motivates people to seek administrative remedies, processes for seeking relief can be designed to further—rather than undermine—those goals. For this study, I was able to observe one cause of reduced legal salience: the use of mortgage escrow. If the cause of salience can be directly manipulated, the remedy for salience heterogeneity is relatively simple. When the causes are unobservable, designing a system that harnesses those differences in a desirable way is more complicated. However, recent legal scholarship has proposed creative ways that tax design and enforcement can take into account unobservable but normatively relevant characteristics by encouraging taxpayers to sort themselves into alternative regimes.

Professor Alex Raskolnikov has argued that tax enforcement can exploit differences among taxpayers in their motivations for tax compliance by presenting all taxpayers with a choice between two different enforcement regimes, each of which attracts a different sort of taxpayer according to those motivations. For example, a “compliance regime” characterized by a progovernment presumption for resolving gray areas of the tax law will be less desirable for aggressive taxpayers—whose tax planning involves exploiting legal uncertainty—than for those taxpayers who do not attempt to exploit this uncertainty. An alternative “deterrence regime” may be more attractive to precisely these aggressive taxpayers, even if it is characterized by higher penalties for tax avoidance. The incentives for compliance in the two regimes can be tailored to have the greatest effects on the sorts of taxpayers who elect to participate in those regimes.⁴⁸ Professor Lee Fennell has applied the same concept to a different problem, arguing that heterogeneity in willpower among taxpayers suggests that it may be possible to introduce elective tax regimes for sin taxes that would allow taxpayers to select the tax schedule that best helps them pursue their long-term interests in light of their particular ability to resist temptation. Like Raskolnikov, Fennell considers the possibility of “offering a choice between [] regulatory bundles” to affect the behavior of taxpayers with heterogeneous interests.⁴⁹

⁴⁸ See Raskolnikov, 109 *Colum L Rev* at 713–14 (cited in note 3).

⁴⁹ Fennell, 99 *Georgetown L J* at 1375 (cited in note 3). For illustrations of how self-sorting pertains to self-control issues, see Ted O’Donoghue and Matthew Rabin, *Studying Optimal Paternalism, Illustrated by a Model of Sin Taxes*, 93 *Am Econ Rev* 186, 186–87 (2003); Jay Bhattacharya and Darius Lakdawalla, *Time-Inconsistency and Welfare* *3–4 (National Bureau of Economic Research Working Paper No 10345, Mar 2004), online at <http://www.nber.org/papers/w10345> (visited Nov 3, 2014); Susanna Esteban

Just like characteristics such as individual willpower and motivations for tax compliance, tax salience is heterogeneous and typically unobservable to the tax authority. However, whereas the use of menus to sort taxpayers into different tax regimes on the basis of compliance motives or willpower remains only a possibility, tax administration already operates in line with tax-salience heterogeneity, sorting high-salience taxpayers into a group that avails itself of administrative remedies and low-salience taxpayers into a group that does not. However, because this effect is unintentional, the effects of that sorting on the efficiency and equity of the tax system have not been scrutinized.⁵⁰

and Eiichi Miyagawa, *Optimal Menu of Menus with Self-Control Preferences* *1–5 (Columbia University Department of Economics Discussion Paper No 0405-11, Dec 2006), online at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.168.4384&rep=rep1&type=pdf> (visited Nov 3, 2014). See also Lee Anne Fennell, *Revealing Options*, 118 Harv L Rev 1399, 1454–57 (2005); Weisbach, 2009 U Chi Legal F at 85–90 (cited in note 2) (arguing that commodity taxes or in-kind provision of certain goods may be desirable as a component of disability-law policy when disabilities are unobservable). Tax electivity, in general, is a well-studied topic. See generally, for example, Heather M. Field, *Choosing Tax: Explicit Elections as an Element of Design in the Federal Income Tax System*, 47 Harv J Leg 21 (2010). See also, for example, Erzo F.P. Luttmer and Richard J. Zeckhauser, *Schedule Selection by Agents: From Price Plans to Tax Tables* *2 (National Bureau of Economic Research Working Paper No 13808, Feb 2008), online at <http://www.nber.org/papers/w13808> (visited Nov 3, 2014).

⁵⁰ Unobserved taxpayer heterogeneity also affects canonical results in the economic theory of optimal taxation. Professor Louis Kaplow has demonstrated that unobserved differences in taxpayer characteristics can undermine standard arguments for uniform commodity taxation, the efficient provision of public goods, and taxation subsidies for activities generating externalities. See generally Louis Kaplow, *Optimal Policy with Heterogeneous Preferences*, 8 BE J Econ Analysis & Pol *1 (2008) (noting that optimal tax rules in public economics are usually derived in models with homogeneous preferences, and exploring how standard results are affected by preference heterogeneity). Applying these results in the salience context requires developing an understanding of how salience is correlated with normatively relevant taxpayer characteristics. However, research has only begun to explore the connection between tax-salience heterogeneity in market decisions and its relationship with these characteristics. The evidence on heterogeneity of cognitive biases and the relationship with income is scarce. But see Goldin and Homonoff, 5 Am Econ J: Econ Pol at 331–33 (cited in note 14) (reporting evidence that sales taxes imposed at the register are more salient for low-income than high-income consumers, implying that the optimal rate of a low-salience sales tax imposed at check-out is positive); Sendhil Mullainathan and Eldar Shafir, *Savings Policy and Decision-Making in Low-Income Households*, in Michael S. Barr and Rebecca M. Blank, eds, *Insufficient Funds: Savings, Assets, Credit, and Banking among Low-Income Households* 121, 129–33 (Russell Sage 2009) (arguing that the poor exhibit the same behavioral patterns as the more well-off but that the poor operate in a context characterized by a narrow margin for error, leading to different outcomes); Kelly Shue and Erzo F.P. Luttmer, *Who Misvotes? The Effect of Differential Cognition Costs on Election Outcomes*, 1 Am Econ J: Econ Pol 229, 245–46 (2009) (finding that communities with high levels of poverty exhibit significantly higher levels of “misvoting”).

II. A STUDY OF LEGAL SALIENCE: PROPERTY TAX APPEALS

In this Part, I present an empirical analysis of the property tax–appeals process in New York City that illustrates some of the causes and consequences of the legal-salience heterogeneity described above. I begin by describing the institutional context in which property tax appeals are made. Understanding these details is necessary to formulate a reasonable economic model of the appeals decision, which I provide in Part II.B. This theoretical model incorporates tax salience as a potential determinant of the decision to appeal. I describe in Part II.C how I collected data to evaluate the theoretical model. I also describe my approach for identifying the effect of tax salience on the use of the appeals process. The results of my analysis demonstrate that decreasing tax salience has a large and statistically significant negative effect on the probability that a homeowner will use the assessment appeals process. Other variables that one would expect to affect the appeals decision, such as the potential savings from a successful appeal, have effects on the probability of appeal that are otherwise consistent with a rational-taxpayer model.

A. Taxes, Tax Appeals, and Mortgage Escrow in New York City

1. Background.

In New York City, a property owner’s tax liability is the result of a complex computation that incorporates characteristics of the property and its use, characteristics of the owner, the Department of Finance’s (DOF) estimate of the property’s market value, and changes in the value of that property in prior years. One of the most important variables in this computation is the property’s assessed value. It is this component of the property tax computation that taxpayers can challenge by appealing to the New York City Tax Commission (“Commission”).⁵¹ Before turning to a detailed explanation of the appeals process, I begin by explaining how property tax liabilities are assigned in the first instance, focusing on the Class 1 properties that are the object of my empirical analysis.

⁵¹ The Commission also has the authority to change the tax class of the property and any exemptions to which the property is entitled. Tax Commission of the City of New York, *How to Appeal a Tentative Assessment* *2 (2014), online at <http://www.nyc.gov/html/taxcomm/downloads/pdf/tc600.pdf> (visited Nov 3, 2014). Nearly all appeals challenge a property’s assessed value. See *id.*

New York City's fiscal year runs from July 1 to June 30. The city fixes its expenditures and forecasts its revenues from sources other than the property tax. The difference between these two amounts is the revenue to be raised from the property tax.⁵² The amount that is billed to property owners is known as the levy, which is equal to the amount of revenue that must be collected plus a reserve for anticipated refunds, current-year collections levied in prior years, and uncollectible taxes.⁵³ For property tax purposes, real property is divided into four classes: Class 1 includes one-, two-, and three-family residential properties, residentially zoned vacant land, and small condominiums; Class 2 includes all remaining residential property, such as large rental buildings, condominiums, and co-ops; Class 3 includes property owned by utilities; and Class 4 consists of all other property, including property with commercial uses.⁵⁴ The share of the property tax levy that is billed to each class of property is relatively stable from year to year but has been adjusted slowly over time to better reflect the market value of the properties in each class.⁵⁵ Once the levy for each class is determined, the New York City Council fixes four different tax rates, one for each class. These rates are calculated by dividing the levy on each class by the billable assessed value for that class.⁵⁶

Between July and January of each fiscal year, all properties in the city are valued and assessed.⁵⁷ No later than January 18, the DOF publishes online a tentative assessment roll, which

⁵² City of New York, Department of Finance, Office of Tax Policy, *The New York City Property Tax FY 2013 Annual Report* *25 (Oct 2013), online at http://www.nyc.gov/html/dof/downloads/pdf/reports/reports%20-%20property%20tax/nyc_property_tax_fy13.pdf (visited Nov 3, 2014). Although the property tax appears, under the law, to be meant to fill a budget gap, because of political constraints it is rarely used that way. Instead, expenditures are adjusted to balance the budget.

⁵³ Id at *25–26. The property tax reserve includes items that affect property tax revenue but that are independent of the levy.

⁵⁴ Id at *25.

⁵⁵ See id. Each class's share of the levy is based on the share of the levy that such class represented in 1989 (the "base proportions"). The base proportions are adjusted by New York's Office of Real Property Tax Services to generate the "current base proportions." Id. These are then further adjusted "to reflect physical and other non-equalization (non-market) changes that are reflected on the current assessment roll." Id.

⁵⁶ New York City Council, *Budget Process* *19–20, online at <http://council.nyc.gov/html/about/budget.shtml> (visited Nov 3, 2014).

⁵⁷ See id at *20. Residential and commercial properties are valued by the DOF. New York City Office of Management and Budget, *Tax Revenue Forecasting Documentation: Financial Plan Fiscal Years 2012–2016* *19, online at http://www.nyc.gov/html/omb/downloads/pdf/methodology_2013_04.pdf (visited Nov 3, 2014). Utility property is valued by the state's Office of Real Property Tax Services. Id at *22.

includes each property's tax class, assessed value, and the portion of any such value that is eligible for exemption.⁵⁸ Each property owner is also sent a Notice of Property Value, which details how the taxable assessed value of the owner's property was determined. The notice includes the DOF's determination of the tax class to which the property belongs, its estimate of the market value of the property, any exempt portion of the property's value, and a description of how the market value was determined.⁵⁹

The tax on a property is calculated in several steps. First, the DOF estimates the market value of the property, generally either by reference to the sales of comparable properties within the prior year or by capitalizing the income and expenses associated with renting the property.⁶⁰ Second, this market value estimate is multiplied by the "assessment ratio," which is 6 percent for Class 1 properties and 45 percent for all other properties.⁶¹ This product would be the assessed value of the property were it not for special cap rules that limit the amount by which a property's assessed value can change from one year to the next. In the case of Class 1 properties, the assessed value of a property cannot increase by more than 6 percent in any one year or 20 percent over five years.⁶² After application of the cap rules, the total amount of any exemptions is subtracted from the assessed value to determine the taxable assessed value.⁶³ This amount is multiplied by the tax rate for the class to which the property belongs to determine the property tax liability. This liability may be reduced by abatements in certain cases, although these are rare for Class 1 properties.⁶⁴

⁵⁸ Tax Commission of the City of New York, *How to Appeal a Tentative Assessment* at *1 (cited in note 51).

⁵⁹ *Id.* at *1–3.

⁶⁰ For certain specialty properties, the city uses a cost-based valuation method. See City of New York, Department of Finance, *Determining Your Assessed Value*, online at http://www.nyc.gov/html/dof/html/property/property_val_assessment.shtml (visited Nov 3, 2014).

⁶¹ Tax Commission of the City of New York, *How to Appeal a Tentative Assessment* at *1 (cited in note 51).

⁶² *Id.*

⁶³ *Id.*

⁶⁴ See Office of Tax Policy, *Annual Report on Tax Expenditures: Fiscal Year 2013* *137 (NYC Finance Apr 11, 2014), online at http://www.nyc.gov/html/dof/downloads/pdf/13pdf/ter_2013_final.pdf (visited Nov 3, 2014) (indicating that only 445 one-, two-, and three-family residences citywide received the most common abatement in fiscal year 2013).

2. Property tax billing and mortgage escrow.

The DOF prepares Statements of Account (SOAs) for each property, generally on a quarterly basis. Each SOA is both a property tax bill and an account summary. All properties with assessed values of \$250,000 or less pay property taxes quarterly, while properties with assessed values greater than this amount pay semiannually.⁶⁵ SOAs are mailed a month before payments are due; the due dates are July 1, October 1, January 1, and April 1 for quarterly payers and July 1 and January 1 for semi-annual payers.⁶⁶ Property owners do not receive an SOA if they pay taxes through a bank or mortgage-servicing company or if they do not have an outstanding tax balance, unless they are responsible for other charges, such as sidewalk fees or emergency repairs.⁶⁷ Property owners paying their taxes through mortgage escrow do not receive SOAs but may view them on the DOF's website.⁶⁸

Ordinarily, a mortgage lender will create an escrow account when it originates a mortgage, after which a mortgage servicer will administer the account.⁶⁹ The mortgagor will make monthly contributions to this escrow account to pay property taxes, homeowner's insurance, and mortgage insurance. The servicer will then disburse amounts as tax and insurance bills are received.⁷⁰ Escrow accounts have historically been required for the first year after origination for mortgages insured by the Federal Housing Administration and Department of Veterans Affairs, but recent regulations have extended these requirements to most "higher-priced" mortgages.⁷¹ When not otherwise required, lenders typically require escrow for mortgages originated with a loan-to-value ratio greater than 80 percent, although there is some variation across lenders in their escrow practices.⁷² Business

⁶⁵ City of New York, Department of Finance, *Property Tax Bill Information and Payment*, online at http://www.nyc.gov/html/dof/html/property/property_bill_soa.shtml (visited Nov 3, 2014).

⁶⁶ City of New York, Department of Finance, *Due Dates*, online at http://www.nyc.gov/html/dof/html/property/property_bill_duedates.shtml (visited Nov 3, 2014).

⁶⁷ DOF, *Property Tax Bill Information* (cited in note 65).

⁶⁸ Id. ("We do not mail you a Property Tax Bill if your property taxes are paid through a bank or mortgage servicing company or if you have a zero balance.").

⁶⁹ See Consumer Financial Protection Bureau, *What Is an Escrow or Impound Account?*, Ask CFPB (June 23, 2014), online at <http://www.consumerfinance.gov/askcfpb/140/what-is-an-escrow-or-impound-account.html> (visited Nov 3, 2014).

⁷⁰ See id.

⁷¹ See notes 45–47 and accompanying text.

⁷² See Cabral and Hoxby, *The Hated Property Tax* at *11–12 (cited in note 30).

practices vary because of differences in the scale and focus of lenders' businesses, such as the kinds of loans that they make or whether they tend to operate in jurisdictions where the local assessors have the administrative capabilities to make escrow cost-effective. Under the Real Estate Settlement Procedures Act of 1974,⁷³ lenders may require mortgagors to contribute in excess of their annual insurance and estimated tax liabilities to provide a cushion of up to two months of escrow payments.⁷⁴ In rare cases, property owners may choose to establish their own tax-escrow accounts.

Escrow arrangements generally terminate upon the satisfaction of the mortgage for which they were created. In some circumstances property owners may be able to opt out of mortgage escrow, although such opt outs typically come at a price: the fee to forgo escrow is generally around 0.25 percent of the loan balance.⁷⁵ Lenders tend to prefer escrow arrangements because these arrangements give lenders control over the payment of property tax and insurance bills and allow them to prevent a tax lien from attaching to the property because of property tax delinquency. Lender practices about when homeowners may be permitted to opt out vary, with lenders generally requiring escrow so long as the loan-to-value ratio is above 80 percent.⁷⁶ In the case of government-insured loans, property owners are not required to maintain escrow throughout the life of the loan, so some lenders maintain an escrow account only for the first year. Escrow accounts in New York are terminated in accordance with New York State law.⁷⁷

⁷³ Pub L No 93-533, 88 Stat 1724, codified as amended at 12 USC § 2601 et seq.

⁷⁴ 12 USC § 2609.

⁷⁵ See Vickie Elmer, *Shrinking the Escrow*, NY Times RE2 (Feb 5, 2012).

⁷⁶ See K.C. Hernandez, *Mandatory Requirements to Refund an Escrow Account*, SFGate Home Guides, online at <http://homeguides.sfgate.com/mandatory-requirements-refund-escrow-account-100278.html> (visited Nov 3, 2014).

⁷⁷ Title 3-A of the New York Real Property Tax Law deals with tax-escrow accounts. The bank maintaining the escrow account must provide a report on the account at least annually to the account holder. NY Real Property Tax Law § 953(6). Within twenty-one days after final payment of the mortgage loan, if the mortgagor retains ownership of the property, the bank must send to the borrower a written statement stating that the escrow account has been or will be terminated and that the borrower will be obliged to pay taxes becoming due thereafter unless a new escrow account is established. NY Real Property Tax Law § 953(8).

3. Assessment appeals.

Property tax appeals have increased over time and accelerated following the recent housing-market collapse.⁷⁸ In New York City, the tax-appeals process in 2013 generated \$6.5 billion in assessment reductions and \$572,932,181 in tax reductions for those properties.⁷⁹ Because the city anticipates the effects of the tax-appeals process when setting the property tax rates for the coming fiscal year, the effect of assessment reductions is to increase rates, thereby shifting tax liability from those who successfully appeal their assessments to other property owners.

Property owners can file appeals for one-, two-, and three-family homes with the Commission between January 15 and March 15.⁸⁰ The Commission is an independent body that views its role as “help[ing] the City maintain the integrity of the property tax assessment rolls, the sound and equitable allocation of the property tax burden and promot[ing] public confidence in government and the tax system.”⁸¹ Its review process helps reduce the number of disputes litigated in court—disputes that can be costly for both the city and taxpayers. By revising assessments before the final roll is published, the city is also spared the expense of refunding tax overpayments.

A typical application requests review of a property’s assessed value, but applications can request review of any aspect

⁷⁸ The president of the Commission has noted “a growing trend of people filing [appeals,] especially with the down turn in the market.” Bob Hennelly, *Tight Financial Times Have More City Homeowners Appealing Tax Bills*, WNYC News (Mar 15, 2012), online at <http://www.wnyc.org/articles/wnyc-news/2012/mar/15/tight-financial-times-have-more-city-home-owners-appealing-tax-bills> (visited Nov 3, 2014). Class 1 appeals in New York City are relatively rare because the system of caps, discussed in Part II.A.1, keeps assessed values well below what they would be if based on market values. Appeals are more common in other parts of the country. See Alina Tugend, *Seeking Lower Property Taxes on a House of Sinking Value*, NY Times B5 (May 8, 2010) (noting that, in most places, about 5 percent of homeowners go through the grievance process).

⁷⁹ City of New York Tax Commission, *2013 Annual Report* *13–14 (2013), online at http://www.nyc.gov/html/taxcomm/downloads/pdf/annual_report.pdf (visited Nov 3, 2014). These tax reductions represent 3.1 percent of the city’s property tax revenues in fiscal year 2011. See *Distribution of the Burden of New York City’s Property Tax* *20 (Furman Center for Real Estate & Urban Policy 2011), online at http://furmancenter.org/files/sotc/Distribution_of_the_Burden_of_New_York_Citys_Property_Tax_11.pdf (visited Nov 3, 2014).

⁸⁰ City of New York Tax Commission, *2013 Annual Report* at *6–7 (cited in note 79). Other persons “aggrieved” by the assessment, such as a lessee of the entire parcel that is responsible for paying the taxes, also have legal standing to contest the assessment. Tax Commission of the City of New York, *How to Appeal a Tentative Assessment* at *2 (cited in note 51). The deadline to appeal is March 1 for all other properties. City of New York Tax Commission, *2013 Annual Report* at *7 (cited in note 79).

⁸¹ City of New York Tax Commission, *2013 Annual Report* at *3 (cited in note 79).

of the assessment, including the property's classification and whether it should have received an exemption that it did not receive.⁸² The Commission cannot increase a property's assessed value, but its policy is to advise the DOF "of clear instances of apparent underassessment for appropriate consideration in the next year."⁸³ Applicants must support their request for review with facts and arguments, and the burden of proof is on the taxpayer, who must show by a preponderance of the evidence that an adjustment is appropriate.⁸⁴ The Commission may review assessments for both the current and immediately prior fiscal years. Property owners may request that the DOF itself review the property's estimated fair market value,⁸⁵ but the DOF's website states that "[i]t is important to remember that asking for a Finance Review is not a substitute for appealing your Assessed Value with the Tax Commission."⁸⁶

There are four grounds on which a taxpayer may appeal her assessment: (1) misclassification (the property has been assessed in the wrong tax class); (2) excessiveness (the assessment does not reflect all of the exemptions to which the property is entitled, or a cap has been exceeded); (3) inequality (for instance, if a Class 1 property has been assessed at more than 6 percent of its market value); and (4) unlawfulness (the property is fully exempt).⁸⁷ The typical application seeks a reduction in the property's assessed value based on a claim of inequality, which is essentially a dispute about the property's market value.⁸⁸ A taxpayer in Class 1 will succeed on appeal if she can prove that her property's assessed value is more than 6 percent of its actual market value.

⁸² See Tax Commission of the City of New York, *How to Appeal a Tentative Assessment* at *2 (cited in note 51). Taxpayers may also request an in-person hearing. *Id.* at *3.

⁸³ *Id.* at *1.

⁸⁴ *Id.* at *2.

⁸⁵ 19 Rules of the City of New York § 37.06 (1992). These rules stipulate the procedures that property owners must follow when requesting DOF review of tentative property-value assessments.

⁸⁶ City of New York, Department of Finance, *What to Do If You Believe Your Notice of Property Value (NOPV) Has the Wrong Information*, online at http://www.nyc.gov/html/dof/html/property/property_val_appeals.shtml (visited Nov 3, 2014).

⁸⁷ City of New York Tax Commission, *2013 Annual Report* at *2 (cited in note 79).

⁸⁸ *Id.* at *2–3 (“[C]hallenges to the assessed value for properties not subject to limitations on assessment increases (Tax Class 1 and Tax Classes 2A, 2B and 2C) are, for almost all properties, a dispute over the value as determined by the Department of Finance.”).

The Commission may offer an assessment reduction, a change of tax class, or an exemption. Although more than 98 percent of all applicants are represented by a lawyer or other professional, about half of Class 1 applicants represent themselves.⁸⁹ Rather than provide affirmative arguments for its property assessments during Commission proceedings, the DOF typically relies on the presumption that its assessment was correct and leaves it to the property owners to overcome their burden of proof.⁹⁰ After the Commission makes an offer to adjust a taxpayer's assessment, the adjustment is made only if it is accepted by the taxpayer. Such acceptance must be accompanied by a signed copy of the Commission's standard written agreement, which requires withdrawing other judicial and administrative proceedings related to assessments for prior years in which the taxpayer has an interest.⁹¹ If the Commission's offer has been accepted by approximately May 21, the adjustment will appear on the final assessment roll published by the DOF around May 25. In this case, property tax bills for the following fiscal year will reflect the adjusted assessed value.⁹²

If the Commission's offer has not been accepted before the roll has been finalized, or if the offer relates to a prior year, the adjustment is implemented by remission; the DOF will recalculate the property tax liability for the property and issue a refund or credit to the taxpayer.⁹³ Taxpayers who do not accept an offer made by the Commission may seek judicial review of their assessment by filing a petition in New York Supreme Court by October 24 and serving the petition on the Commission.⁹⁴ Such cases very rarely proceed to trial.⁹⁵

⁸⁹ *Id.* at *7.

⁹⁰ See *id.* (“[T]he assessment set by the Department of Finance is presumed correct. The burden is on the applicant to offer substantial evidence to overcome the presumption, and then to prove by a preponderance of the evidence that the assessment should be reduced or otherwise corrected.”).

⁹¹ City of New York Tax Commission, *2013 Annual Report* at *10 (cited in note 79).

⁹² *Id.* at *10–11.

⁹³ *Id.* at *11.

⁹⁴ *Id.*

⁹⁵ See City of New York Tax Commission, *2013 Annual Report* at *14 (cited in note 79) (“[I]n 2013, there were 54 Article 7 petitions taken to trial and decided by the Courts.”). This Section discusses only the present, and very recent, state of the tax appeals process in New York City. For a description of the roots and history of tax appeals in New York City, see Mark A. Willis, *Tax Certiorari Proceedings and the Present Real Property Tax System in New York City*, 9 *Fordham Urban L J* 591, 600–12 (1981).

B. A Simple Model of Legal Salience

In the next Section, I report empirical evidence that the use of mortgage escrow reduces the likelihood that a homeowner will appeal her assessment. I also report that the expected savings from a successful appeal and the probability of winning that appeal increase the likelihood of appeal. These variables were not chosen at random from among the many that are included in my data; they emerge naturally from a very simple theoretical economic framework that guides my analysis. In the Appendix, I provide an outline of that framework, which aids interpretation of the results and provides justification for the variables that I use in my empirical analysis. Although the formalization of the framework is important because it helps make the assumptions, logic, and predictions of the model precise, the intuition about what motivates property owners in this framework is straightforward: a taxpayer will appeal her assessment if the expected *perceived* tax that would be saved in a given year from appealing is greater than the costs of appealing.⁹⁶

The expected benefit from appealing an assessment is equal to the probability of winning the appeal (p) multiplied by the reduction in taxes that the taxpayer would obtain from winning. This reduction in taxes is equal to the tax rate (τ) multiplied by the difference between her property's assessed value according to the DOF (AV) and her property's assessed value according to her own estimate (AV'). In a traditional model, the costs of appealing are subtracted from this amount to provide the net expected benefit from appealing. If this amount is greater than zero then the taxpayer is predicted to appeal, and not otherwise. The sole innovation that I make to the traditional framework is to allow the expected perceived tax saved from appealing to differ from the actual tax saved by introducing the variable θ , which captures the salience of the tax. If θ is less than one, then the tax is less than fully salient and the expected perceived tax savings from appealing are less than the expected actual savings from appealing. If θ is greater than one, then the tax is more than fully salient and the expected perceived tax savings are greater than the expected actual savings. $U(\textit{appeal})$ is the expected perceived tax savings from appealing, net of the costs of appealing.

$$U(\textit{appeal}) = \theta p \tau (AV - AV') - c > 0 \quad (1)$$

⁹⁶ I assume that the decision incorporates only current-period costs and benefits for the sake of simplicity.

Several predictions follow straightforwardly from the simple model in equation (1): A taxpayer is more likely to appeal as the probability of winning an appeal, the salience of the tax, and the tax savings from winning the appeal increase. The likelihood of an appeal decreases as the cost of appealing increases.

Although the model captures important features of the appeals decision, there are some interesting dynamic elements to the decision omitted from my framework. Because New York City's property tax law limits the rate at which a property's assessment can increase from one year to the next, a successful assessment appeal can reduce future, as well as current-year, taxes. By lowering the assessed value in the current year, a successful appeal also lowers the capped value in the next year, potentially resulting in a lower tax bill in that year as well. This effect will be especially pronounced during periods of rapid price appreciation. When prices are more stable, winning an appeal will tend to have an effect only on current-year taxes. Thus, the expected benefits of filing an appeal depend on expectations about future price appreciation.⁹⁷

The model that I use also assumes that prior appeals have no effect on subsequent decisions, except through the effect that a successful appeal would have on the assessed value in those years. Several of the variables in equation (1) could be affected in unmeasured ways by previous experience with the appeals process. For example, a taxpayer may become more effective at making her case before the Commission as she accumulates experience. Once familiar with the appeals process, a taxpayer may find it easier to navigate that process in subsequent years, lowering the cost of appealing. Appealing is also likely to make the taxpayer more aware of her property tax liability in subsequent years, possibly increasing its salience. On the other hand,

⁹⁷ This effect appears to be well known, at least among some tax-appeals practitioners. See Toluse Olorunnipa, *Fewer South Floridians Appeal Property Tax Bills*, Miami Herald (Sept 19, 2010), online at <http://www.ptagflorida.com/articles/2010/Fewer-South-Floridians-appeal-property-tax-bills-09-19-2010.htm> (visited Nov 3, 2014) (brackets in original):

[M]any tax appeal firms say now is an opportune time for homesteaded owners to challenge their county-assessed values, because locking in a low assessment this year will pay dividends in the future, when housing values eventually go up. Florida's Save Our Homes law limits the increase in assessed values to 3 percent annually for homesteaded owners. Sharpe, who is filing appeals for all of his personal properties, encourages his clients to challenge their assessments this year to take advantage of the Save Our Homes law. "Think about the additional advantage of the cap of 3 percent [moving forward]," he said. "It's like resetting the base."

experience with the appeals process could reveal it to be more costly than anticipated, making the taxpayer less likely to appeal the following year. An additional factor is the use of tax-appeals professionals, who could influence the intertemporal dynamics of the appeals decision by targeting homeowners who either have or have not recently appealed. Incorporating these factors would complicate the model considerably and I omit them to focus the salience issue, but these effects are worthy of future research.

C. Empirical Approach and Dataset Construction

1. Empirical approach.

The ideal way to identify the causal effect of mortgage escrow (and tax salience) on appeals would be to randomly assign mortgage escrow to half of the properties in the city and observe the difference in the frequency of appeals between properties with escrow and properties without escrow. This would ensure that escrow use was independent both of observable and unobservable characteristics of the property and of the property owner that could influence whether the owner is likely to appeal her assessment. Without randomization, such characteristics could easily confound attempts to identify the effect of escrow on appeals. To point out the obvious, escrow is generally used only if the property owner has a mortgage. As noted above, escrow tends to be required for government-insured mortgages and mortgages originated with a loan-to-value ratio of at least 80 percent.

The owners taking out these mortgages and the properties subject to these mortgages likely differ in relevant ways from the rest of the population. Properties purchased with a small down payment or a government-insured mortgage may be located in specific areas, and if homes in these areas are more likely to be overassessed because it is harder to find comparable sales on which to base the assessment, this can give rise to a spurious relationship between escrow and appeals. The difficulty of finding comparable sales can arise because the properties themselves have unusual characteristics, or because there is less turnover in the housing market and therefore less information on which the DOF can base its estimate of a property's value. Moreover, home purchasers who receive these sorts of mortgages are not a random sample of the population and may be more or

less likely to appeal their assessments because of differences in education, familiarity with the appeals process, or access to professional counsel on such matters. Individuals who opt out of escrow may also, on average, be more careful in attending to their personal finances, which may also affect how closely they examine their property tax liability and the likelihood that they will appeal.

Because of the unavailability of random assignment or some quasi-experimental method, I attempt to identify the effect of mortgage escrow on property tax appeals using a unique, property-level panel dataset that allows me to control for all time-invariant characteristics of the property and the property owner that could influence whether the owner uses mortgage escrow as well as whether she is more likely to appeal her assessment. For each individual property, I examine the relationship between changes in escrow use and changes in appeals. This “fixed-effects” approach constrains my analysis to those properties that both had escrow in at least one year and did not have escrow in at least one year and estimates the effect of salience by looking at the pattern of appeals decisions within individual properties rather than by comparing across different properties. The properties that I focus on are those for which the homeowner either paid off a mortgage or took out a new mortgage during the sample period. The key assumption that I make in this approach to conclude that escrow use causes a change in the probability of appeal is that there is no unobservable *time-varying* variable that affects both the decision to use escrow and the decision to appeal.

2. Data collection.

I compiled the dataset that I use to analyze property tax appeals from five sources. First, data on individual property characteristics and appeals were taken from New York City’s Real Property Assessment Database (RPAD). I extracted records for all one- to three-unit residences and residentially zoned vacant lots for fiscal years 2010–12.⁹⁸ I then merged the properties in the RPAD data with various geographic units to which they belong, such as census tracts and subborough areas, which are units defined by the US Census Bureau and that correspond roughly to

⁹⁸ As noted in Part II.A.1, New York City’s fiscal year runs from July 1 to June 30. The fiscal year is named by the calendar year in which it ends.

neighborhoods such as the Upper West Side of Manhattan or Bedford-Stuyvesant in Brooklyn. Second, data from the Commission were obtained for all appeals filed during the sample period. These data include any reduction in assessed value offered by the Commission and accepted by the property owner. If an offered assessment reduction was accepted, I coded the appeal as a “win” for the property owner, and if the Commission did not make a reduction offer or that offer was not accepted then it is coded as a “loss.” Third, each property/year record was matched to Zillow’s housing-price index for the zip code in which the property is located. Fourth, I used New York City’s Automated City Registration System, which tracks property record filings, to identify properties that transferred ownership during the sample period. I excluded these properties from the sample.⁹⁹

Finally, I obtained information on escrow use for fiscal years 2010–12 from individual SOAs. The DOF makes SOAs for every tax lot in the city available on its website. Among other things, these bills indicate whether the property owner pays her property taxes directly or whether they are paid out of mortgage escrow. I downloaded the final bill for each calendar year for each property in my sample—approximately two million individual property tax bills—and parsed these bills to extract information on escrow use.

Because I am interested in understanding the decisionmaking process of individual property owners, I restrict the sample to only those properties (1) that appear in the RPAD sample for all three years of the sample period, and (2) for which no transfer was recorded in the city’s registration system between January 2008 and March 2011. This helps to ensure that all appeals decisions made with respect to an individual property were made by the same property owner. The resulting dataset is a balanced panel following 609,088 properties over three years, resulting in 1,827,264 lots-per-year observations. The dataset provides a rich picture of the properties for which appeals were filed, the potential benefits of appealing, and the information necessary to estimate the model in equation (1). I describe below how I constructed variables in that equation from my data.

⁹⁹ The sale of a property could be correlated with both changes in escrow use and the probability of appealing, which would cause my estimate of the effect of mortgage escrow on appeals to be biased. I dropped 51,560 properties from the sample because of this restriction.

a) *Probability of winning on appeal.* I use two proxy measures of a taxpayer's subjective assessment of the probability that she will win on appeal: (1) the appeal win rate in the property's subborough area for the prior year, and (2) the appeal win rate in the property's zip code for the prior year. Although there is no way for a taxpayer to identify the win rate in her neighborhood with precision, this variable may be a good measure of the estimate that a taxpayer generates through casual information collection (for example, conversing with her neighbors or reading news articles). The win rate at a particular level of geography is equal to the number of properties for which an appeal was filed and an assessment reduction offer was accepted, divided by the number of properties for which an appeal was filed.¹⁰⁰

b) *Property tax salience.* I use tax escrow as a proxy for property tax salience. The tax-escrow variable is a dummy variable that takes on a value of 1 if the property owner pays her taxes out of escrow and 0 if not.

c) *Nominal tax rate.* Property owners do not know what the nominal rate for the upcoming fiscal year will be at the time that they decide to file an appeal. I use the nominal rate that is actually chosen by the city council for that year.

d) *Property owner's own determination of market value.* I cannot directly observe a property owner's belief about the market value of her property, so I use two alternative proxy measures of what that property owner thinks her property is worth. The first measure assumes that people estimate the current-year market value by using the DOF's determination of the property's value in the prior year and then adjusting it for subsequent changes in the overall level of housing prices in their zip code. I use Zillow's housing-price indices to measure changes in the level of housing prices. The second measure assumes that people estimate the value of their home by comparing it with the values of homes in their immediate vicinity. Specifically, I use the average DOF estimate of the value of a square foot of Class 1 property on the block on which a property is located, multiplied by the size of that property, as the property owner's estimate of her own property's market value.

e) *Other variables.* The DOF's determination of the property's current-year market value and the assessed value from

¹⁰⁰ Both the numerator and denominator include only properties that are in my dataset.

the prior year are both observable in RPAD. The property owner's cost of appealing is unobserved, and I assume that it includes a component that is constant over time and a random (unobserved) component that is uncorrelated with the observable determinants of appeals.

D. Results: Salience and Other Causes of Property Tax Appeals

1. Descriptive statistics: properties and property owners.

Table 2 reports summary statistics for various property-valuation variables for the properties in my dataset, as well as the probabilities of filing an appeal and winning an appeal that has been filed, by escrow status and year. In each year, properties that use escrow are less than half as likely to appeal as properties that do not use escrow. In 2010, for example, 0.37 percent of the owners of properties without escrow appealed their assessments, while 0.16 percent of the owners of properties with escrow appealed.¹⁰¹ Interestingly, the appeals win rate for properties that use escrow is *higher* than the win rate for properties without escrow, suggesting that the appeals from escrow properties are more meritorious on average than appeals from non-escrow properties.¹⁰² Rows 3–5 show that escrow properties have lower DOF-estimated market values, assessed values, and annual tax liabilities, on average, than non-escrow properties.

Rows 6–8 show the average change in the DOF's determination of market value, assessed value, and property tax liability, from year to year. For example, the average market value for non-escrow properties in 2008 was \$649,210. When the tentative assessments for those properties were released in January 2009, the average market value had fallen by \$27,656. From 2008 to 2010, properties with escrow experienced a steeper decline in market value and a smaller rebound than properties without escrow. A comparison across rows of changes in market values, assessments,

¹⁰¹ Rather than adopt New York City's fiscal year for purposes of reporting my results, I use the following conventions: References to 2010 refer to the fiscal year from July 2010 to June 2011. "Current" values refer to the values for that fiscal year. "Tentative" values refer to the values posted on the DOF's website in January 2011, applicable to the fiscal year from July 2011 to June 2012. Properties identified as having escrow in 2010 are those for which taxes were paid out of escrow as of the last bill in calendar year 2010. Properties with an appeal in 2010 are those that filed an appeal after receiving their tentative assessment in January 2011. Years 2008 and 2009 follow the same conventions.

¹⁰² Using simple equality-of-proportions tests, the difference is statistically significant at the 5 percent level for 2010, but not for 2008 or 2009.

and tax liabilities also reveals one of the peculiarities of New York City's tax system arising from the annual assessment caps: assessed values (and tax liabilities) can increase at the same time that market values fall.¹⁰³ From 2009 to 2010, for example, average market values for non-escrow and escrow properties fell by approximately \$18,500 while average tax liabilities for these two kinds of properties increased by \$156 and \$184, respectively.

Rows 9–12 contain estimates of the overvaluation of properties in my sample, using both measures of the owner's estimate of her property's market value. Using the Zillow-based measure of market value, escrow properties were more overvalued in 2008 than non-escrow properties, but less overvalued or more undervalued than escrow properties in 2009 and 2010. Compared with other properties on their blocks, escrow properties were overvalued and non-escrow properties were undervalued across all years. The final two rows show the mean tax savings that property owners in each column would have obtained from successfully persuading the Commission that their assessed values should be based on their estimates of their properties' market values. This is a counterfactual exercise for any property for which the assessment would be increased by adopting the property owner's estimate of market value, because the Commission cannot increase assessments. The negative numbers in these rows indicate that the average assessment would have increased if it had been based on the property owner's estimate of market value (and the Commission was not otherwise barred from increasing assessments). Using either measure of home values, the average tax savings from appealing is greater for the escrow than the non-escrow properties.

Table 2 illustrates that that there are differences between properties that have escrow and those that do not. Compared with non-escrow properties, properties that use escrow tend to (1) be worth less, (2) be overvalued relative to other properties on their blocks, (3) have a higher probability of winning on appeal, (4) have greater potential benefits from appealing, and (5) have had bigger decreases in market value accompanied by bigger

¹⁰³ This can occur when the capped value is far below 6 percent of the market value. Consider an example: In 2010, Property A has a market value of \$500,000 and an assessed value of \$15,000 (because it is a capped value). Suppose that in 2011 the property's market value falls to \$350,000. The property's assessed value in 2011 will be the lesser of $1.06 \times \$15,000$ and $0.06 \times \$350,000$. The first term, \$15,900, is smaller, so the assessed value in 2011 is \$15,900. The assessed value (and tax liability) of the property has increased as the market value has fallen.

increases in tax liabilities during the sample period. These facts highlight the importance of controlling for property-specific characteristics in an analysis of the effect of escrow on appeals, but they also make the higher appeals rate for non-escrow properties even more puzzling (if one ignores salience): facts (2)–(5) all would be expected to make owners of escrow properties *more* likely to appeal.¹⁰⁴

Tables 3 and 4 report summary statistics on property owners from New York City's 2008 and 2011 Housing and Vacancy Surveys. The surveys report various housing-unit and household characteristics and are conducted every three years to comply with New York State and New York City rent-regulation laws.¹⁰⁵ In Table 3 I report summary statistics for owner-occupied units in one- to three-unit buildings, excluding condos and co-ops.¹⁰⁶ Table 4 further restricts this sample to households with mortgages.

Table 3 shows that, relative to properties without escrow, households that pay their property taxes out of escrow are more likely to have a male head of household, residents who are Black, Hispanic, or Asian, and residents who are less likely to have been born in the United States. They are larger than households without escrow and more than twice as likely to have children under the age of eighteen living in the home. Households with escrow have slightly higher annual incomes, on a per capita basis, than those without escrow, a difference that is attributable to differences in wage income. Households without escrow derive more of their income from social security, retirement, and disability, while households with escrow have much higher wage incomes. There is also a striking difference in how long the two categories of homeowners have lived in their homes; the average year in which households using escrow moved into their homes is 1995, while households that do not use escrow moved into their homes more than fifteen years earlier, on average. This difference suggests the most important, obvious difference between households with escrow and those without

¹⁰⁴ The correlation between certain property characteristics and the use of escrow illustrates the fact that escrow use is not randomly distributed across properties as it would be in the sort of randomized, controlled experiment described in Part II.C.1. That correlation motivates the fixed-effects approach that I use here.

¹⁰⁵ See US Census Bureau, *New York City Housing and Vacancy Survey* (Sept 5, 2013), online at <http://www.census.gov/housing/nychvs> (visited Nov 3, 2014).

¹⁰⁶ I also restrict the sample to units in which the householder reports paying her property taxes directly or out of mortgage escrow.

escrow: 99 percent of homeowners with escrow have a mortgage, while only 32 percent of those without escrow have a mortgage.

Table 4 reports the same summary statistics for homeowners with mortgages. A comparison with Table 3 suggests that much of the difference between homeowners with escrow and homeowners without escrow is attributable to the differences between households with and without mortgages. However, even restricted to mortgagors, members of households with escrow are still more likely to be racial minorities, less likely to have been born in the United States, likely to have lived in their home for less time, and likely to have less valuable homes than non-escrow homeowners. Escrow and non-escrow homeowners also look much more similar in terms of their income, although non-escrow homeowners still earn a greater share of their income from passive sources.

Tables 3 and 4 illustrate that, in addition to differences in property characteristics between properties that do and do not use escrow, there are also differences in the owners of those properties, the most important being the difference between households that have a mortgage and those that do not. Some of these differences might well be expected to affect whether a property owner appeals her assessment. For example, homeowners who have lived in their homes longer may be more likely to be aware of the appeals process. Homeowners born in the United States may be more likely to be fluent in English and more likely to be confident about using an appeals process that is difficult to navigate.¹⁰⁷ Homeowners with escrow, on average, also have larger households, are more likely to have children, and are more likely to be in the workforce, possibly leaving them with less time to appeal their assessments. These descriptive statistics highlight the importance of property and household characteristics that could bias estimates of the effect of escrow on tax appeals if proper controls are omitted from the empirical model. As discussed in Part II.C.1, my approach permits me to control for all characteristics of the property and property owner that are fixed over the sample period and could affect the probability of appeal.

¹⁰⁷ All of the forms on the Tax Commission's website appear only in English. See New York City Tax Commission, *Forms and Instructions* (2013), online at <http://www.nyc.gov/html/taxcomm/html/forms/forms.shtml> (visited Nov 3, 2014).

2. Regression estimates.

I model the taxpayer's utility of appealing her assessment as follows. The decision to appeal depends on the probability of winning the appeal, the salience of the property tax, the value of a successful appeal, and the cost of appealing. I estimate the following econometric model:

$$y_{ist} = \beta p_{st-1} + \theta E_{it} + \gamma \tau_t (AV_{it} - AV'_{it}) + \rho Y_t + \alpha_i + \varepsilon_{it} \quad (2)$$

where y_{ist} takes a value of 1 if property owner i in neighborhood s appealed in year t , but otherwise is equal to 0. In my study, t could be the year 2008, 2009, or 2010. The tax-appeals win rate in the property owner's neighborhood (s) in the prior year is p_{st-1} , which I assume the property owner uses as her best estimate of the win rate in the current year. The neighborhood s refers to either the property's zip code or its subborough area, depending on the regression specification. E_{it} is the tax-escrow dummy variable. It is equal to 1 if escrow is being used and 0 if it is not. τ_t is the nominal tax rate in year t . AV_{it} and AV'_{it} are the assessed values of the property based on the DOF's actual estimate of the property's market value, and the determination that it would have made had it used the taxpayer's estimate of the property's value.¹⁰⁸ Y_t is a variable with a value of 1 if the observation is in year t and a value of 0 otherwise. This variable captures the average effect of anything that affected appeals for all homeowners in that year. The coefficients in the model (β , θ , γ , ρ) are estimated in the regression procedure. I model the unobserved costs and benefits of appealing as having both individual-specific (α_i) and idiosyncratic (ε_{it}) components and assume that the idiosyncratic component has a logistic distribution. Because the individual-specific effect is likely correlated with the use of escrow and the other variables on the right-hand side of the regression equation, I condition on that individual fixed effect rather than assuming that it is random, estimating what is known as a conditional-fixed-effects logit model.

Table 5 reports regression coefficient estimates for the model on the entire sample of properties. Specification (1) assumes that property owners form their beliefs about the value of their

¹⁰⁸ The model has the same general form as other econometric models of the effect of "fiscal illusion." See, for example, Wallace E. Oates, *On the Nature and Measurement of Fiscal Illusion: A Survey*, in Geoffrey Brennan, Bhajan S. Grewal, and Peter Groenewegen, eds., *Taxation and Fiscal Federalism: Essays in Honour of Russell Mathews* 65, 68 (Australian National 1988).

property using the Zillow housing-price index, and specification (2) assumes that they use the mean value of Class 1 properties on their block (as determined by the DOF). Specifications (3)–(6) differ from specifications (1) and (2) in that they use the win rate in the property owner's zip code (rather than the win rate in the property owner's subborough area) from the prior year to measure the property owner's expectations about the probability of winning an appeal. Specifications (5) and (6) differ from the first four specifications by replacing the tax-savings variables with separate variables for the amount of overassessment,¹⁰⁹ and the current-year tax liability.¹¹⁰

The effect of mortgage escrow on the probability of appeal is negative and statistically significant at the 0.1 percent level in all specifications. This statistical result means that it is extremely unlikely that the negative relationship between escrow and tax appeals is observed by sheer chance, and that one can have a great deal of confidence that there is a negative relationship between escrow use and the likelihood of appeal. I also find that the probability of appeal increases with the tax savings from a successful appeal using both measures of market value. The effect of the win rate in the subborough area is positive but not statistically significant at conventional levels, but when expectations about the probability of winning are measured using win rates at the zip code level, the effects are positive and statistically significant. In specifications (5) and (6), the probability of appeal is increasing in the expected tax liability for the current year, but there is no effect of overvaluation on the probability of appeal, although the coefficient has a positive sign. It is not surprising that overvaluation itself does not have a significant effect on the probability of appeal. As described in the Appendix, unless 6 percent of the homeowner's estimate of her property's value is less than the capped value from the prior year, it will not be rational to appeal no matter how much the DOF overestimates the property's true market value.

Table 6 reports coefficient estimates from the same regressions but excludes all properties in Manhattan. Class 1 properties are comparatively rare in Manhattan (making up less than 1 percent of the entire sample), and because of their sparseness the Zillow housing-price index and the block-mean variables

¹⁰⁹ This variable is defined as $MV'_{it} - MV_{it}$.

¹¹⁰ This variable is defined as πAV_{it} .

may not be good estimates of property owners' valuations of their homes. The effect of escrow on appeals remains statistically significant in all specifications, as does the effect of tax savings, using both measures of market value. The effect of the probability of winning, measured at the zip code level, is statistically significant in three out of four specifications. As with the whole sample, overvaluation itself has no effect on appeals, but expected tax liability has a positive and significant effect.¹¹¹

The easiest way to understand the size of these effects is to compare their relative magnitudes by taking the ratio of the coefficients for any two variables.¹¹² For example, the specifications in Tables 5 and 6 contain a range of estimates for the effect of escrow. Dividing these coefficients by the coefficients for the effect of tax savings on appealing tells us how important escrow is as compared with the actual tax savings from a successful appeal in motivating the appeals decision. Specification (4) in Table 6 reports the most conservative estimate of the effect of escrow: paying taxes directly, rather than out of escrow, increases the probability of appeal as much as a \$7,000 increase in the tax savings from a successful appeal.

3. Summary of results.

The results of the regression analysis are consistent with the predictions of the simple economic model outlined in Part II.B. The probability that a property owner will appeal her assessment increases with each of the factors affecting the expected perceived benefits of appealing: the tax savings from a successful appeal, the probability of a successful appeal, and the salience of the property tax. Put another way, the results show that after controlling for all of the fixed characteristics of the property and the property owner that could affect the decision to appeal—the amount by which the property has been overassessed and the owner's estimate of the likelihood of winning in a

¹¹¹ As a robustness check, six linear probability models were estimated with the same covariates as the logit specifications, with the addition of subborough area/year fixed effects to capture any neighborhood-specific shocks that varied across years. Escrow has a negative and statistically significant effect in all six of these models.

¹¹² The regression coefficient estimates can be interpreted as the effect of the variables in the regression on the utility from appealing. Because the effect of the utility from appealing on the probability of appealing is nonlinear (as it must be if the model's predicted probabilities are to always be between zero and one), the effect of any one variable on the probability of appeal depends on the values of the other variables, which can make it difficult to interpret the size of the coefficients.

given year—and any factor affecting the likelihood of appealing in a given year that is common to all property owners, using mortgage escrow has a large and statistically significant negative effect on the probability that a taxpayer will appeal her property assessment. The descriptive statistics reported in Tables 3 and 4 provide evidence about the households that are most likely to bear higher taxes as a result of the use of mortgage escrow: they are more likely to be working families with children and to be comprised of racial minorities and immigrants.

III. POLICY IMPLICATIONS

To point out the obvious, using mortgage escrow is not supposed to increase your taxes. But because escrow reduces the legal salience of the property tax, which reduces the probability of appeal, taxpayers using escrow are more likely to remain over-assessed and bear a heavier share of the tax burden. These property owners face an additional burden as the tax saved by those who successfully appeal is effectively transferred through increased property tax rates to those who do not. This dynamic exists in other areas of tax law. The interaction of a taxpayer-initiated–tax-adjustment process with the idiosyncrasies of taxpayers’ circumstances results in a redistribution of the tax burden that has gone unnoticed by policymakers and is unmoored from any normative criterion.

Whether any particular redistribution is desirable depends on the characteristics of the taxpayers who benefit from the enforcement procedures and the characteristics of the taxpayers who do not; the allocation of tax liability after such redistribution could be better or worse than a system in which errors go uncorrected. Consequently, when possible, evidence about the causes and effects of differential tax enforcement should be taken into account when identifying the distribution of the tax burden and the tools for altering it.¹¹³ In this Part, I use the case of

¹¹³ A related argument has been made by Professor Wojciech Kopczuk, who argues that when certain forms of tax avoidance are more accessible to low-ability taxpayers, lax enforcement against such tax avoidance can have desirable redistributive effects, achieving redistribution without the adverse incentive effects that would be required by changing the marginal tax rate structure. See Wojciech Kopczuk, *Redistribution when Avoidance Behavior Is Heterogeneous*, 81 J Pub Econ 51, 63–66 (2001). In a similar spirit, Professors Leandra Lederman and Ted Sichelman have argued that probabilistic enforcement of tax laws can also have desirable effects. See Leandra Lederman and Ted Sichelman, *Enforcement as Substance in Tax Compliance*, 70 Wash & Lee L Rev 1679, 1719–24 (2013).

the property tax to illustrate the effects that a system of taxpayer-initiated–tax-adjustment schemes can have on tax allocation.

A. Accounting for Tax Enforcement

A real property tax is designed to tax the value of real property. Under an ideal property tax system, the assessor would accurately determine the values of properties and then tax liabilities would be assigned on the basis of those valuations.¹¹⁴ In reality, assessors make errors, overvaluing some properties and undervaluing others, and tax liabilities are thereby misallocated. One can imagine several ways of reducing these errors, such as investing in more accurate property-valuation methods or increased assessment audits. Many jurisdictions rely on taxpayer-initiated appeals processes to correct those errors. One consequence of relying on taxpayers in this way is that arbitrary factors that affect the decision to seek administrative relief can alter the distribution of the tax burden.

Of course, the fact that the appeals process introduces an element of arbitrariness into the assignment of property tax liabilities does not mean that jurisdictions ought to eliminate property tax appeals. After all, successful appeals reduce the overtaxation of those properties that were erroneously overassessed to begin with, itself a source of arbitrary variation in tax liabilities. Determining whether the tax allocation following the appeals process is preferable to an allocation reflecting only assessor error requires carefully examining the two outcomes and scrutinizing the underlying factors affecting appeals. A simple example will help illustrate. Table 1 summarizes four different enforcement scenarios. In each scenario, there are four different property owners: A, B, C, and D. Assume that in all four scenarios the four property owners each own a property with a true market value of \$100, and suppose that the government must raise a fixed sum of \$40. Assume also that the property taxes due for a particular property are equal to the tax rate set by the government multiplied by the assessed value of the property, and that the assessed value of a property is equal to 100 percent

¹¹⁴ I use “ideal” here in the very limited sense that there are no random errors in the assignment of tax liabilities to properties so that there is perfect enforcement of the substantive tax laws. An “ideal” tax system may not be optimal because, under certain circumstances, random taxes could be welfare improving. See Joseph E. Stiglitz, *Utilitarianism and Horizontal Equity: The Case for Random Taxation*, 18 *J Pub Econ* 1, 4–19 (1982).

of the property's market value. Because the amount of tax revenue to be collected is fixed at \$40, the tax rate set by the government will vary inversely with the aggregate assessed value of the four properties.

TABLE 1. PROPERTY OWNER

Scenario	Value	A	B	C	D	Tax Rate
I. Ideal	Assessment	\$100	\$100	\$100	\$100	10.00%
	Tax	\$10	\$10	\$10	\$10	
II. Assessor Error	Assessment	\$100	\$50	\$125	\$125	10.00%
	Tax	\$10	\$5	\$12.50	\$12.50	
III. Error with Appeals	Assessment	\$100	\$50	\$100	\$100	11.43%
	Tax	\$11.43	\$5.71	\$11.43	\$11.43	
IV. Error with Select Appeals	Assessment	\$100	\$50	\$100	\$125	10.67%
	Tax	\$10.67	\$5.33	\$10.67	\$13.33	

In scenario I, the “ideal” scenario, the assessor accurately assesses the properties at \$100 each. Because the aggregate property value is \$400, the government will set a tax rate of 10 percent and each taxpayer will pay \$10 in taxes.

Scenario II illustrates the case in which the assessor makes some errors in her assessments, correctly estimating the value of A's property but undervaluing the property of B and overvaluing the properties of C and D. Because the assessor's errors balance out so that the aggregate assessed value of the four properties is identical to the aggregate value in scenario I (\$400), the government will again set a tax rate of 10 percent to raise the necessary \$40 in revenue. Relative to the ideal, C and D will each pay \$2.50 too much in property taxes and B will pay \$5 too little.

Scenario III illustrates what might be expected to happen to the allocation of tax liabilities arising from assessor error in scenario II if taxpayers are permitted to appeal their assessments and it is assumed that the appeals system perfectly corrects those errors brought to the attention of the appeals tribunal and is used by everyone with an incentive to appeal. Because A is accurately assessed, she has no incentive to appeal and her assessment will remain \$100. Similarly, because property owner B is underassessed, she has no incentive to report the assessor's error and will not appeal; her assessment will remain \$50. Property owners C and D, on the other hand, will appeal and their assessments will

be corrected to reflect their true values: \$100 each. Because the aggregate amount of taxable property value has fallen relative to scenario II (from \$400 to \$350), the tax rate in scenario III must be greater than the tax rate in scenario II to raise the same amount of revenue. The changing tax rate serves as a mechanism that effectively shifts property tax liability from C and D to A and B, causing A to be overtaxed but bringing B's tax liability more closely in line with her liability in the ideal scenario. Even though they are accurately assessed after their appeals, C and D remain overtaxed on account of the persistent undervaluation of B's property, which causes the tax rate to be higher than it would otherwise be.

Scenario IV illustrates the case of New York City's property tax. Suppose that the appeals process is not used by everyone with an incentive to do so. For example, suppose that C is a longtime homeowner who pays her property taxes directly to the government and is aware of her property tax liability, whereas D has recently taken out a mortgage and pays her property taxes out of mortgage escrow. As a result, D's property taxes are less salient to her and she does not appeal her assessment. In this case, the reduction in C's taxes resulting from a successful appeal is passed to A, B, and D through the increase in the property tax rate, causing B's liability to become closer to her liability under the ideal scenario but causing A to be overtaxed and D to be still more overtaxed.

It is not immediately obvious how we might rank the outcomes in scenarios II, III, and IV in order of preference. Adopting a system of unbiased appeals in the presence of assessor error makes the liabilities of B, C, and D closer to their ideal liabilities but causes A to be overtaxed (scenario II versus scenario III). Adopting a system of selective appeals improves the accuracy of B's and C's taxes but causes A and D to be overtaxed (scenario III versus scenario IV). Relative to a system of unbiased appeals, a system of selective appeals brings the liabilities of A and C closer to their ideals but does worse for B and D. I consider two approaches for evaluating these four scenarios. The first way to evaluate these outcomes is as departures from the presumptively optimal ideal system and to view the enforcement issue as fundamentally a problem of minimizing errors. The second way to evaluate these outcomes is by explicit reference to an underlying normative criterion, such as welfare maximization.

1. Error reduction.

The first approach to ranking these outcomes views the enforcement problem as one of error reduction. To be concerned with how well-enforced the property tax law is—that is, how closely actual liabilities align with liabilities that would be assigned if the law were perfectly enforced—we require a measure of closeness. There are a couple of natural ways of measuring the “loss” or “penalty” associated with each error of misallocated taxes, both of which assign a positive penalty to an error, regardless of whether that error is an over- or under-assessment. One measure would be to simply sum across all four property owners the absolute difference between their tax liability in that scenario and what their liability would be under the ideal scenario. A system of unbiased appeals fares best using this measure. Scenario III is worse than the ideal scenario by \$8.58 in tax-liability differences; scenario IV would be worse than scenario III by a further \$0.76; and scenario II would be the worst, differing from the ideal by \$10 in tax-liability differences. An alternative measure is to sum all of the squared differences between actual and ideal tax liabilities across taxpayers. This measure would lead to the same ranking of the four outcomes as the first but differs in two important ways: it is affected by the distribution of enforcement errors across taxpayers and amplifies large deviations in individual liabilities from the ideal.¹¹⁵

The central shortcoming of approaching the problem as one of error reduction is that there is no natural normative framework to guide the choice between these different measures. Yet, the magnitude and distribution of assessment errors has meaningful consequences for the distribution of income and welfare under the property tax. For this reason alone, the error-reduction approach seems inadequate. Moreover, the error-reduction approach presupposes that the “ideal” outcome is also the appropriate normative target against which the others should be measured. This need not be the case. As I illustrate in the following Section, a tax regime with enforcement errors that

¹¹⁵ For example, consider scenario II.A (not represented in Table 1) in which the tax liabilities of A, B, C, and D are \$10, \$5, \$10, and \$15, respectively. Measured using the sum of absolute differences, this scenario is as bad as scenario II; both scenarios are worse than the ideal to the extent of \$10 in tax-liability differences. Measured using the sum of squared differences, however, scenario II.A is worse than the ideal by \$50 in squared tax-liability differences while scenario II is worse than the ideal by only \$38 in squared liability differences.

are selectively corrected by taxpayers through the use of administrative procedures could be preferable to the “ideal,” depending on the characteristics of the taxpayers who use the procedures.¹¹⁶

2. Evaluating the tax law as it is enforced.

The second approach reframes the problem from one of error reduction in enforcement to a more basic question of how to choose the optimal system of taxation in light of the expected enforcement effects.¹¹⁷ Factors that are not specified in the law can drive a wedge between the allocation of liabilities as they are assigned by statute and the allocation that actually arises. Depending on what these factors are, the actual allocation could be more or less desirable than the one that would arise in the case of perfect enforcement. Thus, whereas conventional analysis of the property tax would ask whether it is fair, efficient, or otherwise desirable to assign property liabilities on the basis of property values (and any other observable characteristics specified under the law), this approach asks whether property tax liabilities should be assigned on the basis of market values after taking into account the effects of the enforcement mechanisms. By shifting focus to an evaluation of these four scenarios as instantiations of property tax law under different enforcement regimes, we can bring to bear the conceptual apparatus that is typically used to evaluate the substantive tax law. For example, we can evaluate the outcomes from within a welfarist tradition that assigns rankings to the outcomes by reference to the well-being of the taxpayers themselves.¹¹⁸ To illustrate how

¹¹⁶ These characteristics will generally be unobservable to the taxing authority, meaning that they cannot simply be directly incorporated into tax law.

¹¹⁷ Recent research in economics has made a similar argument in the case of complexity. See Henrik Jacobsen Kleven and Wojciech Kopczuk, *Transfer Program Complexity and the Take-Up of Social Benefits*, 3 *Am Econ J: Econ Pol* 54, 55 (2011) (treating complexity “as a policy instrument that is chosen alongside benefit levels and eligibility rules in the design of a program”).

¹¹⁸ An alternative approach would be to analyze the problem as one of horizontal equity. In its most platitudinal form, the concept of horizontal equity has considerable intuitive appeal: equals should be treated alike. Of course, abiding by this rule requires specifying the dimensions along which individuals or corporate taxpayers are relevantly “equal.” There are important questions about the normative significance of horizontal equity. See, for example, Louis Kaplow, *Horizontal Equity: New Measures, Unclear Principles* *1–3 (Harvard Law School John M. Olin Center for Law, Economics, and Business Discussion Paper No 279, Mar 2000), online at http://www.law.harvard.edu/programs/olin_center/papers/pdf/279.pdf (visited Nov 3, 2014) (arguing that horizontal equity stands in the way of the advancement of human welfare). But see Brian Galle, *Tax Fairness*, 65 *Wash & Lee L Rev* 1323, 1328 (2008) (arguing that horizontal equity has value

such an analysis might proceed, I begin by comparing scenarios I and II.¹¹⁹

Suppose that the assessor error in scenario II is entirely random, so that it is uncorrelated with any characteristics of the taxpayers. In fact, for simplicity, assume that the four taxpayers are completely identical in all respects (including income). What are the consequences for those taxpayers of the random variation in the property tax? First, the variation increases income inequality among the four taxpayers; B will have a higher after-tax income than A, who in turn will have a higher after-tax income than C and D. Having assumed that the four taxpayers are identical, and making the additional assumptions that there is diminishing marginal utility of income to the individuals and that the welfare of the four taxpayers is valued equally by society, the effective transfer of after-tax income from C and D to B will be welfare reducing in the aggregate; social welfare will be higher under scenario I than under scenario II. Viewed *ex ante*, the assessor error effectively imposes a random tax on the property owners. In addition to the \$10 tax imposed on the true values of their properties, they face a 50 percent probability of paying a \$2.50 tax and a 25 percent probability of receiving a \$5 rebate (and a 25 percent chance of paying no additional tax). The imposition of risk on individuals through a random tax tends to be welfare reducing for risk-averse taxpayers.¹²⁰ For these reasons, scenario I will generally be preferable to scenario II.

Making the same assumptions as before, scenario III represents an improvement in social welfare from scenario II but is worse than scenario I. To see this, note that in scenario II the marginal utility of a dollar is greater for C and D than for A and

as an independent normative criterion because it shows respect for past policy decisions and facilitates revenue raising); Musgrave, 43 *Natl Tax J* at 113–14 (cited in note 16) (arguing that horizontal equity should be viewed as an independent norm, not just derivative of vertical equity); David Elkins, *Horizontal Equity as a Principle of Tax Theory*, 24 *Yale L & Pol Rev* 43, 46 (2006) (discussing several possible justifications for horizontal equity and concluding that the principle is best justified under “a theory of social justice that accepts the morality of the market distribution”).

¹¹⁹ I ignore any spatial issues arising in the study of optimal taxation in urban environments. For example, if the marginal utility of income is correlated with distance from the city center, it may be optimal to redistribute income in a manner that does not equalize utility, even among households with identical preferences. See David E. Wildasin, *Spatial Variation of the Marginal Utility of Income and Unequal Treatment of Equals*, 19 *J Urban Econ* 125, 126 (1986); J.A. Mirrlees, *The Optimum Town*, 74 *Swedish J Econ* 114, 121–24 (1972).

¹²⁰ See Kaplow, *Horizontal Equity* at *17 (cited in note 118).

B because the four taxpayers are identical, they have diminishing marginal utility of income, and C and D are taxed more heavily. The outcome in scenario III can be obtained by transferring tax liability from C and D to A and B, implicitly transferring income in the opposite direction, from taxpayers with relatively low marginal utility to taxpayers with higher marginal utility for income. This is an improvement from a social welfare perspective. The introduction of an unbiased appeals process does not, however, eliminate the partially random nature of the tax distribution. In scenario III, no taxpayers are overassessed, but the (random) underassessment of taxpayer B causes the tax rate to be higher than it would otherwise be. The result is as if taxpayer B had been chosen at random and a portion of her property tax liability was shifted to the other taxpayers. On an ex ante basis this could be viewed as a random tax in which each taxpayer faces a 75 percent chance of paying \$1.43 in tax and a 25 percent chance of receiving a rebate of \$4.29.¹²¹ The random tax component of the tax distribution continues to impose undesirable tax risk on the taxpayers but, under conventional assumptions about the taxpayers' attitudes towards risk, the random tax in scenario III is preferable to the random tax in scenario II.¹²² For these reasons, scenario III is generally preferable to scenario II but less desirable than scenario I from both ex ante and ex post perspectives.

Under the same assumptions, the outcome in scenario IV appears to generate less social welfare than scenario III, so we might think that we should prefer a system of unbiased appeals to one of selective appeals.¹²³ On an ex ante basis, the taxpayers face a random tax for which they will pay \$0.67 with a 50 percent probability, pay \$3.33 with a 25 percent probability, and receive a \$4.67 rebate with a 25 percent probability. Under conventional economic assumptions about risk preferences, taxpayers will generally prefer the random tax that they face in

¹²¹ This discussion assumes that both C and D appeal and abstracts from the costs associated with an appeal. More precisely, taxpayers would face (1) a 50 percent chance of paying the lesser of \$2.50 (if they choose not to appeal) and \$1.43 plus the cost of the appeal, (2) a 25 percent chance of paying \$1.43, and (3) a 25 percent chance of receiving the \$4.29 rebate.

¹²² The random taxes in scenarios II and III have the same mean, but the tax in scenario III has lower variance.

¹²³ Without additional assumptions about individuals' utility from income, we cannot say for certain whether the outcome with selective appeals generates greater social welfare than the outcome in scenario II.

scenario III to this random tax, so the system of unbiased appeals is preferable when viewed from this perspective as well. But this analysis ignores a crucially important characteristic of the outcome in scenario IV: it was generated by a nonrandom process that caused tax liabilities to be allocated on the basis of individual characteristics that are not generally observable by the tax authority—that is, the variables that affect the appeals decision. These same factors may provide information that the tax authority would like to use in determining the allocation of the tax burden but cannot because that information is unobservable. Whereas tax liability in scenarios I, II, and III is allocated in a way that is unrelated to the characteristics of the taxpayers, the outcome in scenario IV reflects these differences. Whether this improves or worsens the de facto assignment of tax liability from a welfarist perspective depends on the characteristics driving appeals.

Appeals are affected by the salience of the property tax and the psychic and monetary benefits and costs of appealing.¹²⁴ We can infer that the perceived net benefits to D of appealing her assessment are less than those for C, perhaps because the opportunity cost of D's time is greater, D is less familiar with the appeals process or is unaware of it, or D's property taxes are less salient to her. If the opportunity cost of D's time is greater than C's because D is more highly compensated and the taxing authority would like to tax those with greater ability to pay, or if D is more likely to default on her property tax payments in the future, then imposing a higher tax burden on D while she is current on her taxes might be desirable. Alternatively, if access to professional advice or expertise in navigating administrative procedures are important determinants of the appeals decision, and these characteristics tend to be possessed by households that the government would like to tax more heavily, then the outcome is perverse in assigning a higher liability to D. In any particular context, identifying which variables drive the pattern of enforcement is an empirical question that must be answered on a case-by-case basis.

¹²⁴ Although mortgage-escrow use may be observable to the tax authority in some circumstances, other factors affecting salience and the perceived costs and benefits of appealing generally will not.

* * *

The example explored in this Section illustrates a few general points. First, mechanisms of enforcement can affect the distribution of the tax burden. Second, it is possible for the tax distribution arising from imperfect enforcement to be *preferable* to one arising from perfect enforcement when the system of imperfect enforcement gives effect to unobserved taxpayer characteristics through the use of taxpayer-initiated administrative procedures. Third, determining whether a particular enforcement regime is superior to one of perfect enforcement is difficult and informationally demanding. In particular, it is necessary to know how the variables that affect the decision to use procedures are related to the taxpayer characteristics that society would like to tax. However, this is not an insurmountable obstacle, as demonstrated in Part II, in which I identified (1) legal salience as an important variable in the property tax–appeals context and (2) some taxpayer characteristics associated with legal salience.

B. Applications to Other Administrative Procedures

One way that legal salience may play an important role in affecting tax liabilities is through influencing the take-up of tax credits and other tax expenditures. To obtain these tax benefits, households and businesses have to file tax returns and sometimes satisfy additional documentation and application requirements. The legal salience of these tax benefits is the effect of their visibility or prominence on the use of the procedures for claiming them. It seems likely that tax benefits that are owed from the government to the taxpayer are less salient than taxes that are owed by the taxpayer to the government. In general, opportunity costs (the cost of not claiming a tax benefit in this case) are not regarded as equivalent to out-of-pocket costs,¹²⁵ and there is some evidence that the mortgage-interest deduction and charitable-contribution deduction, specifically, have low salience.¹²⁶ There is also evidence to suggest that the lack of visibility of the Earned Income Tax Credit (EITC) explains, in part,

¹²⁵ See Richard Thaler, *Toward a Positive Theory of Consumer Choice*, 1 *J Econ Behav & Org* 39, 43–47 (1980).

¹²⁶ See Goldin and Listokin, *Tax Expenditure Salience* at *10–11 (cited in note 10). The authors have also noted that tax expenditures may have low market salience, which implies that their desired effects on, for example, home ownership or charitable giving, may be muted. *Id.* at *11–12.

the fact that many potential EITC recipients do not file a federal income-tax return and claim the credit.¹²⁷ Thus, the legal salience of the EITC could be a target of policymakers desiring to increase take-up of the EITC or other tax-expenditure programs, in addition to the other factors that are known to affect EITC take-up,¹²⁸ such as the complexity of preparing a return and understanding the program,¹²⁹ and the stigma associated with receiving government benefits.

Similar issues arise in the corporate-tax context. For example, the Government Accountability Office (GAO) estimates that between 4 and 12 percent of eligible employers claimed the Small Employer Health Tax Credit for 2010.¹³⁰ Although some of the explanation for the low take-up is that the credit was an inadequate incentive for many small employers to provide health insurance, the GAO reported that the complexity of the credit, arising from eligibility, data collection, and computational requirements, deterred many small employers from claiming it.¹³¹ More than one year after Congress authorized the credit, approximately 50 percent of small businesses were unaware of it.¹³²

¹²⁷ See Saurabh Bhargava and Dayanand Manoli, *Why Are Benefits Left on the Table? Assessing the Role of Information, Complexity, and Stigma on Take-up with an IRS Field Experiment* *4 (unpublished manuscript, 2011), online at <http://econweb.umd.edu/~davis/eventpapers/BhargavaBenefits.pdf> (visited Nov 3, 2014) (arguing that low EITC take-up is primarily due to low awareness of the program, incomplete information about benefits and eligibility, and informational complexity).

¹²⁸ Take-up is an active area of research in economics. See generally, for example, Janet Currie, *The Take Up of Social Benefits* (National Bureau of Economic Research Working Paper No 10488, May 2004), online at <http://www.nber.org/papers/w10488> (visited Nov 3, 2014); Kory Kroft, *Takeup, Social Multipliers and Optimal Social Insurance*, 92 *J Pub Econ* 722 (2008); Dahlia K. Remler, Jason E. Rachlin, and Sherry A. Glied, *What Can the Take-up of Other Programs Teach Us about How to Improve Take-up of Health Insurance Programs?* (National Bureau of Economic Research Working Paper No 8185, Mar 2001), online at <http://www.nber.org/papers/w8185> (visited Nov 3, 2014); Richard K. Caputo, *EITC & TANF Participation among Young Adult Low-Income Families*, 4 *Nw J L & Soc Pol* 136 (2009) (concluding that EITC and TANF are underutilized and that take-up is correlated with age, parenthood, marital status, prior program participation, race, and gender, and arguing that the poorest are not taking advantage of EITC because of a lack of computers and access to outreach websites).

¹²⁹ For more on the application burden of the EITC to low-income households, see Jonathan P. Schneller, Adam S. Chilton, and Joshua L. Boehm, *The Earned Income Tax Credit, Low-Income Workers, and the Legal Aid Community*, 3 *Colum J Tax L* 176, 186–94 (2012).

¹³⁰ See Government Accountability Office, *Small Employer Health Tax Credit: Factors Contributing to Low Use and Complexity* *9 (GAO-12-549, May 2012), online at <http://www.gao.gov/assets/600/590832.pdf> (visited Nov 3, 2014).

¹³¹ See *id.* at *12.

¹³² *Id.* at *15.

Exploring how the salience of deductions and credits affects the take-up of those tax expenditures and what that might imply about the optimal design of those expenditures is a promising area of research.¹³³

Legal salience might also be a factor in deciding to use procedures to reduce or delay payment of federal income taxes. Professor Shu-Yi Oei has discussed these procedures, and the fact that they have distributional consequences, in two related articles.¹³⁴ Oei argues that tax collection reallocates tax burdens as the costs of noncollection are passed to other taxpayers (current or future) through increased rates, reduced government expenditures, or greater borrowing.¹³⁵ Once the reality of this necessary fiscal adjustment is appreciated, the peculiar way that New York City's property appeals process redistributes taxes does not look so peculiar after all. The anticipatory increase in tax rates that mitigates the effect of tax appeals on city revenues is simply a more direct and mechanical way of balancing the city's budget than through an unpredictable hodgepodge of current and future tax increases or spending cuts.

One such procedure is the "offer in compromise." The IRS is authorized under § 7122 of the Internal Revenue Code to enter into arrangements that forgive some of the taxpayer's tax debt

¹³³ A related concern is the effect of the complexity of the Internal Revenue Code on the cost of claiming tax benefits. This cost can often outweigh the benefits of the expenditure itself, and the cost can vary across companies of different sizes. See John D. McKinnon, *Firms Pass Up Tax Breaks, Citing Hassles, Complexity*, Wall St J A1 (July 23, 2012) (reporting that the cost of tax compliance per employee is approximately twice as high for companies with fewer than twenty employees as for companies with 20–499 employees and that "executives, particularly at small and medium-size companies, complain that many of the tax deductions are either too cumbersome or too confusing").

¹³⁴ See generally Shu-Yi Oei, *Getting More by Asking Less: Justifying and Reforming Tax Law's Offer-in-Compromise Procedure*, 160 U Pa L Rev 1071 (2012); Shu-Yi Oei, *Who Wins When Uncle Sam Loses? Social Insurance and the Forgiveness of Tax Debts*, 46 UC Davis L Rev 421 (2012). Neither article explores in any detail the decision to use these procedures or heterogeneity.

¹³⁵ See Oei, 46 UC Davis L Rev at 425 (cited in note 134) ("[T]he costs of non-collection may be imposed upon compliant taxpayers and the public in the form of higher taxes; decreased government provision of goods, services, and social assistance; or macroeconomic impacts resulting from increased government borrowing."). See also James Alm, *What Is an "Optimal" Tax System?*, 49 Natl Tax J 117, 122 (1996) (noting that tax evasion influences tax rates and public expenditures that affect other taxpayers); Joel Slemrod, *Cheating Ourselves: The Economics of Tax Evasion*, 21 J Econ Persp 25, 41 (2007) (noting that "[t]ax evasion affects the distribution of the tax burden as well as the resource cost of raising taxes" and that even given evasion, "government programs could be financed in a number of other ways, such as raising tax rates or broadening the income tax base, and a tax reduction could be financed by cuts in overall spending").

to the government if certain criteria are met.¹³⁶ The opportunity to seek a compromise with the IRS on the amount of outstanding tax liability can be very valuable to a taxpayer. At the same time, many taxpayers are unaware of the option.¹³⁷ Oei notes that:

In order for an offer to be processed and approved, it must first be submitted by the taxpayer. Although certain IRS initiatives have explored how to proactively identify those taxpayers most likely to benefit from the procedure, those initiatives have not changed the underlying structural reality—the taxpayer initiates the filing.¹³⁸

Although Oei discusses some of the considerations that may be relevant to a taxpayer in deciding whether to make an offer in compromise, little is known empirically about what drives that decision. Other procedures that taxpayers can avail themselves of to reduce or delay payment of their tax liability include the right to apply for an installment agreement to govern the payment terms,¹³⁹ to seek an extension of the time to pay, and to change a prior year's return to obtain a refund.

CONCLUSION

In this Article, I introduced the term “legal salience” to describe the effect that the psychological prominence of a tax has on whether a taxpayer will use legal means to reduce the burden of that tax. For the many tax regimes that permit taxpayer-initiated administrative procedures to reduce tax liabilities, we should expect that the legal salience of the tax will affect the de facto allocation of the tax burden. I report evidence of just such an effect, showing that property owners for whom the property

¹³⁶ See Oei, 160 U Pa L Rev at 1077 (cited in note 134).

¹³⁷ See *id.* at 1106 (“In the Act’s legislative history, Congress expressed its desire that the IRS do a better job of informing taxpayers that the OIC procedure is available to resolve tax debts.”); *Internal Revenue Service Restructuring and Reform Act of 1998: Conference Report to Accompany HR 2676*, HR Conf Rep No 105-599, 105th Cong, 2d Sess 289 (1998) (“[T]he IRS should make it easier for taxpayers to enter into offer-in-compromise agreements, and should do more to educate the taxpaying public about the availability of such agreements.”); Government Accountability Office, *Tax Administration: IRS Should Evaluate the Changes to its Offer in Compromise Program* *13 (GAO-02-311, Mar 2002), online at <http://www.gao.gov/new.items/d02311.pdf> (visited Nov 3, 2014) (describing IRS efforts to inform the public of offer-in-compromise options, including “outreach and education efforts”).

¹³⁸ Oei, 160 U Pa L Rev at 1121 (cited in note 134) (citation omitted).

¹³⁹ See 26 USC § 6159.

tax has low salience are less likely to appeal their property assessments, leaving them more likely to remain overassessed and overtaxed. In New York City, these property owners tend to be certain mortgagors, who are more likely to be racial minorities, immigrants, and working families with children.

This study illustrates three points of general applicability: (1) the use of taxpayer-initiated administrative procedures affects the distributions of tax burdens; (2) the tax distributions that result after these procedures have shifted the tax burden can be much better than, or much worse than, the initial distribution, depending on what motivates taxpayers to use those administrative procedures; and (3) although rigorously evaluating the effects of administrative procedures on the tax distribution is informationally demanding, it can be done. Legal scholars have an important role to play in understanding these patterns and alerting lawmakers to the unexpected effects of processes and procedures on the allocation of the tax burden.

These points open up new avenues of tax-policy considerations. Perhaps the first question is what lawmakers ought to do when taxpayer-initiated procedures result in an undesirable shift in the tax burden. Is substantive tax law the right place to address these effects, or are they less costly to address through a reform of the procedures themselves? In addition to enriching the tax-policy discussion, there are theoretical implications of a more nuanced view of the role that taxpayers play in determining the allocation of the tax burden through self-help procedures. It is typical in both political philosophy and public economics to evaluate tax systems from an ideal perspective, assessing the fairness or efficiency of a system of taxation under the assumption that the substantive rules accurately and finally determine the allocation of the tax burden. In this world, taxes are collected from only those who owe them, and transfers are made to only those who are entitled.¹⁴⁰ Scrutinizing standard

¹⁴⁰ See Kroft, 92 *J Pub Econ* at 722 (cited in note 128) (“One of the central assumptions in the theory of social insurance provision is that all agents who are eligible for benefits claim them.”). At the same time, the literature on tax law compliance and enforcement is voluminous. For a summary of theoretical and normative work on these topics, see Joel Slemrod and Shlomo Yitzhaki, *Tax Avoidance, Evasion, and Administration*, 3 *Handbook of Pub Econ* 1423, 1426–45 (2002). There has also been research exploring the effects of self-reporting on law enforcement, particularly in the environmental-regulation context. See, for example, Louis Kaplow and Steven Shavell, *Optimal Law Enforcement with Self-Reporting of Behavior*, 102 *J Polit Econ* 583, 587–90 (1994) (incorporating self-reporting into an economic model of law enforcement); Robert Innes, *Self-Reporting in Optimal Law Enforcement When Violators Have Heterogeneous Probabilities*

conclusions after taking into account the sometimes surprising ways that taxpayers themselves shift that burden may lead to a reappraisal of the efficiency and equity of these systems.

of Apprehension, 29 J Legal Stud 287, 290–96 (2000) (introducing differences across individuals in the probability of apprehension to the model of self-reporting); Robert Innes, *Remediation and Self-Reporting in Optimal Law Enforcement*, 72 J Pub Econ 379, 383–88 (1999) (exploring the effects of adding remediation to a model of enforcement with self-reporting); Robert Innes, *Violator Avoidance Activities and Self-Reporting in Optimal Law Enforcement*, 17 J L, Econ & Org 239, 246–54 (2001) (studying self-reporting enforcement regimes when individuals take actions to avoid apprehension).

APPENDIX: A SIMPLE FRAMEWORK FOR THE PROPERTY TAX–
APPEALS DECISION

In each year t , a property owner incurs a set of housing-related costs, including property taxes, property insurance, maintenance, and, in the case of a mortgage, mortgage insurance and principal and interest payments. In any year, for any of the individual housing-related costs, a taxpayer can take an action (with its own cost) that reduces that housing cost with some probability. For example, the property owner could take the time to investigate refinancing options for her mortgage to obtain a lower interest rate or shop for more inexpensive property or mortgage insurance. I focus on the decision to appeal the property's assessment. At the beginning of each year, a property owner can appeal her assessment by taking the action $a_t \in \{0, 1\}$ ($a_t = 1$ if the property owner appeals) that, for cost $c_t > 0$, changes her property's market valuation from MV_t to MV'_t , with probability p_t . If the appeal is successful, her property tax liability will change from T_t to T'_t . The cost of appealing could include the time spent learning about the appeals process, completing the paperwork, conducting research, attending an in-person hearing, and hiring a professional appraiser.¹⁴¹

I incorporate salience by allowing that property owners may not accurately perceive the amount of their property taxes. I assume that perceived property taxes are equal to θT_t , where the parameter $\theta \geq 0$ represents the salience in year t of tax T in year t . A higher value of θ corresponds to a more salient tax. I assume that the taxpayer's utility is linear in property taxes and the costs of appealing, so that every year the taxpayer solves the following problem (time subscripts are suppressed):¹⁴²

$$\min_a a[p\theta(T' - T) + c] + \theta T$$

A taxpayer will appeal by choosing $a_t = 1$ in a given year if and only if the expected perceived tax savings from appealing exceed the cost of appealing. In New York City, the tax due on a

¹⁴¹ The Commission recently imposed a \$175 fee on applications for which the assessed value of the property is at least \$2 million. This is relevant for only the smallest handful of luxury homes in the city. Prior to this there had not been any other filing fee. City of New York Tax Commission, *2013 Annual Report* at *7 (cited in note 79). Most property tax–appeals representatives work on a contingency basis so their fees are not a cost of appealing, although those fees would reduce the expected return.

¹⁴² I assume here that the minimization problem for property taxes is separable from the other decisions that the property owner faces.

property is equal to the nominal tax rate τ multiplied by the assessed value of the property AV_t . The assessed value of a property is the lesser of 6 percent of its market value or 106 percent of its assessed value in the previous year:

$$T_t = \tau_t AV_t = \tau_t \min\{0.06 MV_t, 1.06 AV_{t-1}\}$$

Define T'_t and AV'_t analogously as the tax due and assessed value of the property following a successful appeal:

$$T'_t = \tau_t AV'_t = \tau_t \min\{0.06 MV'_t, 1.06 AV_{t-1}\}$$

Substituting these two definitions into the taxpayer's decision problem, the model predicts that the taxpayer will appeal in year t if and only if the utility from appealing is greater than zero:

$$U(\text{appeal}) = p_t \theta_t \tau_t (AV_t - AV'_t) - c_t > 0 \quad (1)$$

or equivalently,

$$p_t \theta_t \tau_t [\min\{0.06 MV_t, 1.06 AV_{t-1}\} - \min\{0.06 MV'_t, 1.06 AV_{t-1}\}] - c_t > 0 \quad (1a)$$

A taxpayer is more likely to appeal as the probability of winning an appeal, the salience of the tax, and the tax savings from winning the appeal increase. The likelihood of an appeal decreases as the cost of appealing increases. Formulation (1a) reveals several additional predictions, best understood by thinking about three cases. First, when 106 percent of last year's assessed value (the "capped value") is less than both 6 percent of the current-year market value as determined by the assessor and 6 percent of the lowest market value that the property owner could successfully argue for on appeal, such as can frequently occur during periods of rapid price appreciation, the taxpayer will not appeal, regardless of whether the assessor has overvalued the property. That is simply to say that if the taxpayer's tax liability would not be reduced even if she convinced the Commission that her property had been overvalued, there is no benefit to appealing. In fact, the annual Notice of Property Value counsels owners in precisely this manner.¹⁴³ Second, when the capped value is

¹⁴³ Property owners are advised that their assessment will not be reduced unless they can demonstrate that the value of their property is less than the "effective market value" reported on the Notice. *What to Do if You Believe Your Notice of Property Value (NOPV) Has the Wrong Information* (NYC Finance), online at http://www.nyc.gov/html/dof/html/property/property_val_appeals.shtml (visited June 5, 2014). The effective market value of the property is the amount that, when multiplied by 6 percent, is equal to the assessed value. Thus, for a property with an assessment that is subject to the cap,

greater than 6 percent of the assessor's determination of market value, the benefit of a successful appeal is equal to the full tax-effected value of the reduction in market value, or $\tau_t \times 0.06(MV_t - MV_t')$. Finally, if the capped value is greater than $0.06MV_t'$ but less than $0.06MV_t$, then the potential benefit of a reduction in market value is $\tau_t(1.06AV_{t-1} - 0.06MV_t')$. Consequently, the amount of home price appreciation from year to year can affect the benefits and, hence, probability of appeal, with the probability being greatest during periods of low appreciation and lowest during periods of high appreciation.

the effective market value in year t is equal to $(1.06/0.06)AV_{t-1}$. My description of the language in the text is mathematically equivalent.

TABLE 2. PROPERTY-VALUATION SUMMARY STATISTICS BY
ESCROW USE AND YEAR

Variable	Stat	2008		2009		2010	
		No Escrow	Escrow	No Escrow	Escrow	No Escrow	Escrow
Probability of Appeal	Mean	0.32%	0.15%	0.29%	0.12%	0.37%	0.16%
	SD	5.62%	3.87%	5.39%	3.46%	6.09%	3.95%
Probability of Appeal Win	Mean	10.42%	11.16%	13.40%	14.09%	10.75%	14.23%
	SD	1.82%	1.29%	1.98%	1.30%	2.00%	1.49%
Current FMV	Mean	649,210	580,797	622,193	544,821	606,783	524,775
	SD	867,080	345,294	894,666	328,503	902,396	329,559
Current Assessed Value	Mean	20,255	20,032	20,771	20,615	21,424	21,265
	SD	22,347	11,167	23,036	11,586	23,992	11,917
Current Tax Liability	Mean	3,281	3,244	3,549	3,523	3,720	3,692
	SD	3,619	1,809	3,936	1,980	4,166	2,069
FMV Change	Mean	-27,656	-32,920	-18,519	-18,414	6,476	-36
	SD	297,547	84,121	445,945	55,726	352,318	99,477
AV Change	Mean	473	672	567	733	506	500
	SD	3,245	2,314	3,094	1,825	3,266	2,129
Tax Liability Change	Mean	262	293	156	184	88	87
	SD	603	407	553	322	567	370
Over- valuation (Zillow)	Mean	18,597	20,094	-1,068	-5,200	17,882	17,609
	SD	157,077	93,697	195,447	64,671	173,596	96,131
Over- valuation (Block)	Mean	-3,577	5,049	-6,388	5,475	-7,439	6,215
	SD	455,387	143,155	442,036	147,920	406,179	157,907
Tax Savings (Zillow)	Mean	-2,347	-1,754	-2,411	-1,785	-2,269	-1,484
	SD	4,788	2,203	4,271	2,127	4,808	2,343
Tax Savings (Block)	Mean	-2,718	-1,922	-2,609	-1,693	-2,659	-1,623
	SD	5,919	2,290	6,740	2,409	6,536	2,572
	N	290,753	310,779	294,345	314,507	289,502	319,350

TABLE 3. NEW YORK CITY HVS HOUSEHOLD SUMMARY
STATISTICS BY ESCROW USE AND YEAR

Variable	Stat	2008		2011	
		No Escrow	Escrow	No Escrow	Escrow
Male HH	Mean	51.22%	53.63%	51.03%	53.71%
	SE	0.76%	0.74%	0.66%	0.65%
Move-In Year	Mean	1978	1994	1979	1995
	SE	0	0	0	0
US Born	Mean	48.40%	33.60%	49.20%	33.61%
	SE	0.76%	0.70%	0.66%	0.61%
Unit Value	Mean	474,157	456,407	501,541	477,934
	SE	4,718	4,340	4,662	4,254
Mortgage	Mean	30.78%	98.55%	31.67%	98.88%
	SE	0.71%	0.18%	0.62%	0.14%
% White	Mean	60.59%	41.39%	60.25%	40.71%
	SE	0.75%	0.73%	0.65%	0.64%
% Black	Mean	18.75%	29.84%	18.28%	29.52%
	SE	0.60%	0.68%	0.51%	0.59%
% Hispanic	Mean	9.09%	15.19%	9.15%	15.25%
	SE	0.44%	0.53%	0.38%	0.47%
% Asian	Mean	10.66%	12.93%	11.47%	13.72%
	SE	0.47%	0.49%	0.42%	0.44%
% Child under 18	Mean	23.05%	50.08%	22.58%	49.33%
	SE	0.64%	0.74%	0.55%	0.65%
People in Household	Mean	2.59	3.36	2.61	3.40
	SE	0.02	0.02	0.02	0.02
Income per Person	Mean	28,582	31,292	30,531	32,055
	SE	496	578	558	514
All Wage Income	Mean	49,825	77,751	51,590	80,387
	SE	1,050	1,063	957	1,010
All Social Security	Mean	6,890	2,097	7,333	2,234
	SE	136	87	127	80
All Retirement/ Disability	Mean	4,626	1,960	4,964	2,005
	SE	217	134	192	118
	N	4,513	4,982	5,947	6,375

TABLE 4. NEW YORK CITY HVS HOUSEHOLD SUMMARY
STATISTICS BY ESCROW USE AND YEAR, HOUSEHOLDS WITH
MORTGAGES

Variable	Stat	2008		2011	
		No Escrow	Escrow	No Escrow	Escrow
Male HH	Mean	54.71%	53.69%	54.40%	53.75%
	SE	1.37%	0.74%	1.17%	0.65%
Move-In Year	Mean	1990	1994	1991	1995
	SE	0	0	0	0
US Born	Mean	41.97%	33.42%	44.17%	33.47%
	SE	1.36%	0.70%	1.17%	0.62%
Unit Value	Mean	498,249	457,258	517,628	478,832
	SE	9,264	4,388	8,610	4,292
Mortgage	Mean	1,507	1,334	1,680	1,574
	SE	81	42	64	34
% White	Mean	45.88%	41.16%	46.55%	40.53%
	SE	1.37%	0.73%	1.17%	0.64%
% Black	Mean	22.51%	29.89%	22.26%	29.56%
	SE	1.15%	0.68%	0.98%	0.60%
% Hispanic	Mean	13.89%	15.28%	13.44%	15.32%
	SE	0.95%	0.54%	0.80%	0.47%
% Asian	Mean	16.26%	13.00%	16.50%	13.78%
	SE	1.00%	0.50%	0.87%	0.45%
% Child under 18	Mean	47.21%	50.35%	45.24%	49.52%
	SE	1.37%	0.74%	1.17%	0.65%
People in Household	Mean	3.38	3.37	3.36	3.41
	SE	0.04	0.02	0.04	0.02
Income per Person	Mean	76,115	78,148	78,162	80,722
	SE	2,164	1,071	1,924	1,017
All Wage Income	Mean	76,115	78,148	78,162	80,722
	SE	2,164	1,071	1,924	1,017
All Social Security	Mean	2,842	2,039	3,233	2,191
	SE	182	87	173	80
All Retirement/ Disability	Mean	2,503	1,929	2,828	1,982
	SE	279	134	254	118
	N	1,456	4,914	1,949	6,307

TABLE 5. CONDITIONAL-FIXED-EFFECT-LOGIT ESTIMATES OF THE CAUSES OF APPEALS, WHOLE SAMPLE

	(1)	(2)	(3)	(4)	(5)	(6)
Escrow	-0.503*** (0.147)	-0.509*** (0.144)	-0.502*** (0.147)	-0.504*** (0.145)	-0.520*** (0.146)	-0.516*** (0.148)
Tax Savings (Zillow)	0.018* (0.008)		0.018* (0.008)			
Tax Savings (Block)		0.058*** (0.017)		0.059*** (0.016)		
Overvaluation (Zillow)						2.63e-6 (7.89e-4)
Overvaluation (Block)					8.17e-04 (8.50e-4)	
Tentative Tax Bill					0.176*** (0.027)	0.182*** (0.030)
SBA Win Rate	0.414 (0.414)	0.251 (0.399)				
Zip Code Win Rate			0.507* (0.250)	0.572* (0.243)	0.683** (0.245)	0.630* (0.252)
2009	-0.306*** (0.059)	-0.331*** (0.057)	-0.316*** (0.057)	-0.362*** (0.056)	-0.465*** (0.056)	-0.412*** (0.059)
2010	0.123 (0.064)	0.096 (0.061)	0.105 (0.058)	0.048 (0.055)	-0.083 (0.058)	-0.027 (0.062)
Property Fixed Effects	Y	Y	Y	Y	Y	Y
N	6771	7311	6697	7238	7253	6697
Pseudo R ²	0.018	0.020	0.019	0.022	0.029	0.027
Log Likelihood	-2432.3	-2620.4	-2403.8	-2590.1	-2575.8	-2382.9

Notes: Standard errors are given in parentheses. Tax savings and liabilities are per thousand dollars. Overvaluations are per ten-thousand-dollar increment.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

TABLE 6. CONDITIONAL-FIXED-EFFECT-LOGIT ESTIMATES OF THE CAUSES OF APPEALS, MANHATTAN EXCLUDED

	(1)	(2)	(3)	(4)	(5)	(6)
Escrow	-0.485** (0.148)	-0.518*** (0.146)	-0.484** (0.148)	-0.514*** (0.147)	-0.540*** (0.149)	-0.501*** (0.150)
Tax Savings (Zillow)	0.040** (0.015)		0.039* (0.015)			
Tax Savings (Block)		0.074*** (0.020)		0.074*** (0.020)		
Overvaluation (Zillow)						0.001 (0.001)
Overvaluation (Block)					0.002 (0.002)	
Tentative Tax Bill					0.300*** (0.041)	0.293*** (0.041)
SBA Win Rate	0.340 (0.419)	0.270 (0.405)				
Zip Code Win Rate			0.441 (0.253)	0.588* (0.247)	0.647** (0.249)	0.563* (0.256)
2009	-0.294*** (0.060)	-0.347*** (0.058)	-0.305*** (0.059)	-0.381*** (0.056)	-0.508*** (0.058)	-0.439*** (0.062)
2010	0.143* (0.065)	0.093 (0.063)	0.124* (0.059)	0.043 (0.057)	-0.117 (0.061)	-0.044 (0.065)
Property Fixed Effects	Y	Y	Y	Y	Y	Y
N	6537	6996	6475	6935	6950	6475
Pseudo R ²	0.019	0.022	0.020	0.023	0.036	0.033
Log Likelihood	-2345.0	-2503.5	-2321.2	-2477.3	-2449.8	-2289.3

Notes: Standard errors are given in parentheses. Tax savings and liabilities are per thousand dollars. Overvaluations are per ten-thousand-dollar increment.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$