The Effect of Property Reassessments on Fiscal Transparency and Government Growth: Evidence from Virginia

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Abstract

An important concern to the efficiency of public finance systems is that voters suffer from various "fiscal illusions" that can politicians can exploit to expand the public sector. This paper contributes evidence of this effect on a public finance system through the revenue elasticity hypothesis, which is a form of fiscal illusion in which voters confuse tax rates with tax burdens in the approval of public spending. The applied empirical setting is Virginia cities and counties from 2001 to 2011, where the timing of mass property reappraisals is exogenous but known to local policymakers in setting the annual budget. The results indicate that mass reappraisals, which reduce tax rates, do cause property tax increases, as do reappraisals that will result in future tax rate increases. These revenue shocks are then smoothed into expenditures through the management of assets, indicating that policymakers prefer the spending to be drawn from future cash reserves rather than from immediate projects that might draw attention to the source of fiscal illusion.

JEL codes: H71, H77, H27

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Evidence from Virginia

Justin M. Ross

I. Introduction

The conventional view of real property tax that is taught in most American public finance textbooks states that, unlike the case with taxes on flows of exchanges, the valuation of the taxable property stock (i.e., property assessment) is irrelevant to the revenue it produces. Barring special legislation that seeks to link property values to property tax revenues, the primary purpose of property assessment is simply to maintain a distribution of the tax burden that is proportional to the share of property assets across taxpayers. The nominal property tax rate, as Netzer (1964, 207) explains, "is essentially a residual, derived by determining the level of expenditures, subtracting state aid and other non-property tax revenues from budget outlays, and comparing the remainder with assessed values. . . . Assessed values are no more 'actual' as determinants of property tax yield than are a number of other factors." Of course, this process is often confusing to the public, perhaps because the more frequent exposure to tax rates on market exchanges (e.g., sales or income taxes) results in an emphasis on monitoring rates as a signal for public revenue growth.[1] There has been mounting empirical evidence (e.g., Mikesell 1978, 1980; Bloom and Ladd 1982; Ladd 1991; Ross and Yan 2013; Brien 2014; Ihlanfeldt and Willardsen 2014) against this residual view of property reassessment as a budget-neutral

[1] This situation is nicely summarized in Fisher's (2007, 323) textbook on state and local public finance: "In other words, a general rise in property values allows local governments to increase property tax collections without increasing tax rates. Not surprisingly, some individuals are led to conclude that the assessment increase caused the tax increase. This view is not correct because each local government with property tax authority controls and selects, either explicitly or implicitly, the amount of property tax revenue to levy." Similar statements can be found in the public fiscal administration textbook by Mikesell (2011, 474) and in a public budgeting guide by Huddleston (2005, 29).

process, and researchers are finding instead a propensity for property tax revenues to grow with these events.

This paper is intended to extend the literature on property reassessment and property revenue into a broader test of the effect of fiscal illusion on public-sector growth. Fiscal illusion posits an asymmetry between citizens and their government representatives that results in the growth of government.[2] The theory states that public-sector agents will seek out instruments that cause taxpayers to underestimate the cost of government and increase budgets beyond what would have been approved if this cost were fully perceived. There are numerous hypotheses within this theory over the specific mechanisms for raising funds and distributing them. On the expenditure side, public choice theory generally predicts that politicians will favor visible spending programs for which they can take credit, but scholars have pointed out that this hypothesis is less likely to be true if the expenditure draws visibility to the revenue side (e.g., Turnbull 1998). There are several hypothesized mechanisms in fiscal illusion theory by which fiscal resources could be raised, including the use of public debt and the complexity of the tax system, among others. The administration of the property tax in local public budgeting is particularly well suited for testing the revenue elasticity hypothesis of fiscal illusion.[3] This hypothesis posits a mechanism in which taxpayers confuse tax rates for tax bills, and as a result, growth in the tax base is more apt to become new spending rather than a reduction in the tax rate. As Oates (1975, 141) explains:

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[2] This view of fiscal illusion is typically attributed to Puviani ([1903] 1973) and was rediscovered by Buchanan (1960, 1967). A clear articulation of this intellectual history can be found in Da Empoli (2002).

[3] The term *revenue elasticity hypothesis* is borrowed from a literature review by Dollery and Worthington (1996), which categorized many studies of fiscal illusion according to distinct hypotheses that were repeatedly tested in the literature. Other categories identified by the Dollery and Worthington include the *renter illusion* and the *flypaper effect*. Although Dollery and Worthington coined the term *revenue elasticity hypothesis*, earlier literature stemming from Oates (1975, 1988) referred to the same hypothesis as the *income elasticity hypothesis*, because most of the attention was directed at the income tax before scholars broadened the phenomenon to test it in other tax instruments.

> What the proposition under study seems to imply is that people will not object to increases in public expenditure if they can be funded with no increase in tax rates (that is, from increments to revenues resulting solely from growth in income), but they will not support an expanded public budget if it requires a rise in tax rates. This suggests what people care about is not their tax *bill*, but rather their tax *rate*. Viewed this way, the hypothesis simply is not consistent with our conventional description of rational behavior; it implies that consumer-taxpayers are subject to a kind of "fiscal illusion." (original emphasis)

One of the empirical challenges of the revenue elasticity hypothesis is that it usually results in legislative transaction costs that are difficult for researchers to observe; hence, the lack of rate changes in response to base growth might be rational adherence to voter preferences rather than indulgence in the voters' misperceptions of government cost (Wagner 1976).[4] Although state policymakers may incur separate deliberation costs for expenditures and appropriate tax rates, the residual rule in local government has no such distinct legislative costs because the rates are automatically calculated on the basis of the adopted budget, which rules out these transaction costs as a competing explanation for rate persistence.

Another challenge to identification is that tax base expansion may be related to income growth, and if public services are a normal good, there is an a priori reason to expect a positive correlation without invoking theories of fiscal illusion. This paper seeks to meet this challenge by studying the public finances of Virginia county governments from 2000 to 2011.[5] It argues that the institutional history of Virginia provides a case for treating mass reappraisals, also known as *property reassessments*, as exogenous changes to the visibility of the property tax in a manner that is informative to the theory of fiscal illusion. The results provide insight into the

[4] Between legislative transaction costs and omitted variable bias concerns, Oates (1988, 76) suggested that it may not be possible to conclusively validate the revenue elasticity hypothesis. However, many studies have followed Oates's (1975) approach of estimating tax base elasticities by using differing governments, control variables, and time periods—an approach resulting in mixed evidence on the phenomena (e.g., Craig and Heins 1980; DiLorenzo 1982; Baker 1983; Feenburg and Rosen 1987; Heyndels and Smolders 1994; Dollery and Worthington 1995; Bilquees 2004; Hansen and Cooper 2005).

[5] For convenience, this paper refers generically to Virginia "counties," but in fact several independent cities in Virginia have county status, and this paper therefore treats them as counties.

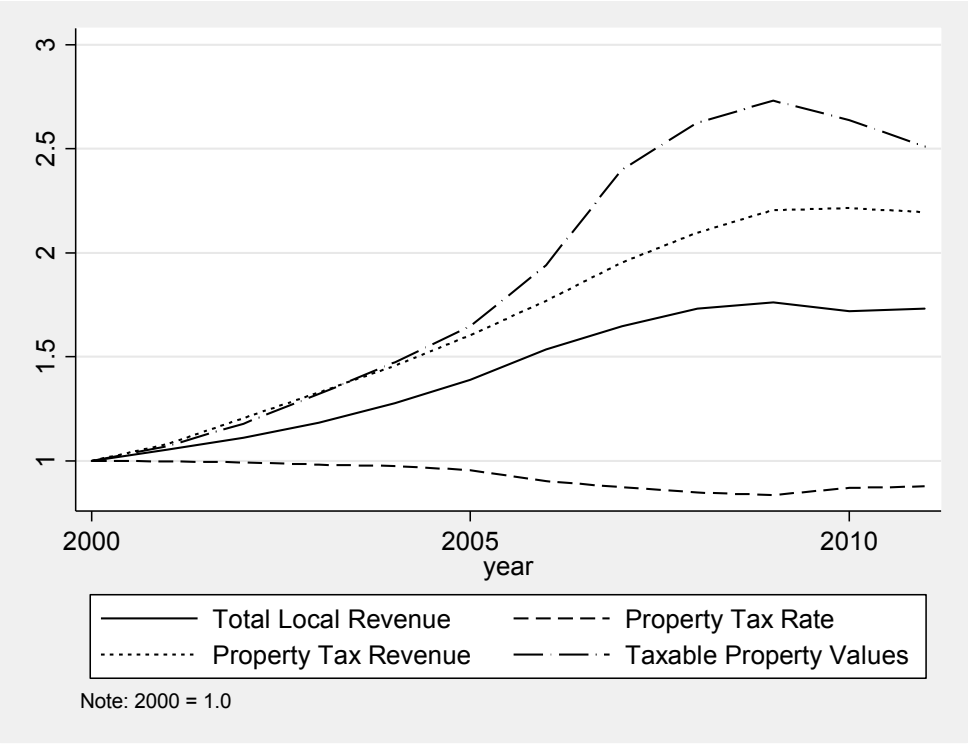
implied mechanisms of fiscal illusion because they can allow for testing on the extent to which the less visible instrument is used, as well as the extent to which it actually results in public-sector growth. This analysis is done by testing for changes in the timing of property tax levies, allowing for shifting between revenue instruments, and ultimately detecting how these changing resources are translated into new expenditures.

In addition to providing empirical evidence to an important theory of public economics, this paper is relevant to applied policy. Several states apply additional scrutiny to local governments following a reassessment of their nominal property tax rate. Pennsylvania, for instance, has an "antiwindfall" provision whose specific intention is to prevent local governments from collecting additional revenues from rate adjustments by imposing a special tax rate growth limitation.[6] Louisiana similarly has a "millage rollback" rule that establishes an adjusted maximum property tax rate following a reassessment. Concerns over incomplete rate adjustment have also been a source of pressure for property tax reform. In 2006, the city of Annapolis considered legislation to limit property tax revenue increases when assessment increases generated large revenue increases despite small property tax rate reductions.[7] Virginia, the subject of this study, has no similar policy directed at postreassessment rate adjustment or property tax limits of any kind, but there is anecdotal evidence of public concern in the form of newspaper editorials, letters to the editor, and other journalistic material.[8] Figure 1 provides some basic support for these concerns, because growth in

[6] See Weiss and Junker (2012) for a legal review of the antiwindfall statutes in Pennsylvania.
[7] According to McGowan (2006), "the [Annapolis] city budget has risen by about 12 percent, to $62.2 million for the fiscal year ending June 30, even as the council has reduced the tax rate each year. . . . But rising property assessments have kept the city flush with property tax revenue."
[8] For example, in 2006 the *Washington Post* held a forum on property tax assessments in Northern Virginia. The transcript of this forum (Gardner 2006) summarizes several accusations of local governments hiding tax increases in the aftermath of assessment. Some relevant quotes include "it seems like Fairfax County is seeking/sneaking a tax increase by not cutting the tax rate more" and "the real problem here isn't rising assessments, but the unchanging tax rate."

revenues has risen with taxable property values while the property tax rate has shown only a slight downward trend.

Figure 1. Growth of Mean Virginia County Fiscal Indicators, 2000–2011



Section II reviews the previous research on the revenue elasticity hypothesis and the literature on residual view adherence to highlight the contributions of this paper. Section III outlines the empirical approach for hypothesis testing, with the results of the analysis presented in section IV. Policy implications and suggestions for future research are presented in the concluding section.

II. Literature Review

The contours of the contemporary theoretical literature motivating empirical research in fiscal illusion are largely defined in Brennan and Buchanan (1980) and Oates (1975, 1988). A review of the broader empirical work on fiscal illusion is beyond the scope of this paper, but such efforts can be found in Dollery and Worthington (1996) and Facchini (2014). This literature review will survey relevant studies on the residual view of the property tax and highlight their respective abilities to contribute as a test of fiscal illusion.

Studies of the residual view, which considers the property tax rate to be the residual arithmetic of the property tax levy divided by taxable assessed values, have been conducted by researchers interested in the strategic fiscal behavior of local government. For example, Brien (2014) examines adherence to the residual view for maintaining public expenditure stability among Georgia counties and school districts from 1985 to 2010. The residual view implies that decreases in nonproperty tax revenues will automatically be offset by higher property tax levies; however, Brien (2014) finds this to be the case in only about one-third of the units studied even though Georgia has no significant limitations on the property tax.[9] Ihlanfeldt and Willardsen (2014) present evidence of a strategic use of the property tax rate in Florida among local governments from 1995 to 2011. Their study seeks to discern whether local governments with greater monopoly power over their tax base are less apt to follow the residual view that assessed value growth should be offset by property tax rate reductions. They also allow for their model to adjust tax rates asymmetrically in the direction of changes in the base because their monopoly

[9] Interestingly, Brien (2014) finds that adherents to the residual view tend to be rural areas and areas with lower income per capita, whereas urban and higher-income areas see property tax levies that fluctuate along with the base property values that were used in determining the property tax rate. This result is perhaps consistent with Ihlanfeldt and Willardsen's (2014) hypothesis that urban areas have greater monopoly power and can therefore be less responsive to changes in the property tax base.

power theory predicts lower residual view adherence when the base is in decline. Their results indicate asymmetric rate adjustments that are revenue growing during property tax base declines.

Both the Brien (2014) and Ihlanfeldt and Willardsen (2014) studies present evidence that governments set their rates strategically in some manner, but it is not apparent that this strategic behavior is evidence of fiscal illusion, and neither study makes such a claim. Florida, for example, has numerous state limitations on the growth in assessed values and the ability of local governments to draw property tax revenues. As a result, this strategic behavior might be a means for Florida local governments to satisfy local preferences that deviate from what is permitted under state-imposed controls. Similarly, for the Brien (2014) study, nonproperty revenue to some extent can reflect an exporting of the tax burden onto nonresidents through sales taxes revenues, and state government aid fluctuations may result in income effects that stimulate additional demand for local public services.

The study of residual view deviance as fiscal illusion includes research in which mass reappraisals are the key variable of interest, and such studies look at states without tax or expenditure limitations. Two early studies by Mikesell (1978, 1980) provide some of the earliest evidence that the residual view is weak in this respect, albeit with data limitations. Mikesell's (1978) study of aggregate property tax levies in the state of Indiana between 1950 and 1978 shows that property tax revenues did not grow significantly more in years where mass reappraisals occurred. Mikesell's (1980) research uses a cross-section of Virginia counties to study the effect of mass reassessments on effective property tax rates. In the study, some specifications indicate a positive correlation that implies incomplete tax rate adjustments.

Bloom and Ladd (1982) use a panel of Massachusetts cities and towns from 1960 to 1978 to study the effect of mass reassessments on levy growth. The study includes area and year fixed

effects but is unable to control for any other potential confounding factors such as contemporaneous income or population growth. Bloom and Ladd find that the year of a property mass reassessment is associated with a 12.1 percent increase in the property tax levy growth rate that is statistically significant. In addition to the study's lack of control variables, an additional concern with the study is that the local governments could initiate their own mass reassessment, which would lead to a positive endogeneity bias. Ladd (1991) followed up with a similar study of North Carolina local governments. The 1991 study lacks discretion on the timing of the governments' mass reappraisals. It finds that reassessment years are associated with a statistically significant 3.1 percent increase in property tax levy growth. Like the earlier Bloom and Ladd study, this study also lacks any control variables beyond area and year fixed effects, but it does split the sample by population growth and per capita income levels. Both studies also allowed for the assessment to have lead and lagged effects to distinguish between possible long- and short-run effects, but both studies find only contemporaneous effects with the mass reassessment.

Ross and Yan (2013) improve on the previous research with a study of mass reappraisals in Virginia counties from 2000 to 2008. This study offers variation in the years in which the different counties executed a mass reappraisal and includes many control variables (e.g., changing tax prices, income growth, market value of property value growth) that may also explain growth in property tax revenues. The results indicate that for a unit with the mean level of property tax levy that experiences a 20 percent increase in assessed values—the mean increase in a reassessment year—about 10 percent of that increase translates into new property tax revenues. This finding supports the concern that property reassessments provide an opportunity for fiscal illusion in the property tax.

This paper brings together many different elements of the previous literature. Like Ross and Yan (2013), it takes advantage of the unique institutional environment offered by Virginia that allows for the effect of a mass reappraisal on property tax levies to be interpreted as being the result of fiscal illusion. Ross and Yan (2013), however, study only the property tax levy without considering the spending side, the effects on alternative revenues, or the changes in the timing of property tax levies. Like Bloom and Ladd (1982) and Ladd (1991), this paper considers the various alternative responses to fiscal illusion by extending the model to include leads and lags to test for alternative responses that would allow a pre- and postassessment effect to differ from the contemporaneous effect of the reassessment. In addition, this paper allows the response to the reassessment to be asymmetric as in the residual view research by Ihlanfeldt and Willardsen (2014), which has not previously been applied to the fiscal illusion strand of research.

III. Fiscal Illusion Theory and Empirical Testing

Model Specification

Fiscal illusion is based on the premise that the public sector may be expanded beyond what voters would demand; therefore, this paper will start from a conventional model of median voter demand for public goods as given by Borcherding and Deacon (1972) and Bergstrom and Goodman (1973). This model assumes a decisive voter in county i who receives utility from consuming private goods (X_i) and public goods (g_i). If we let G_i represent total public good provision, the individual level of public good consumption is specified as a function of rivalry with the county population (N_i) as $g_i = N_i^{-\gamma} G_i$. The decisive voter allocates his or her wealth (W_i) between these two types of goods on the basis of the price of private consumption and its share of the tax burden (T_i), thus yielding a budget constraint of $W_i = P_x X_i + T_i P_g G_i$.

Substituting $G_i = g_i N^{\gamma}$ into the budget constraint results in a demand equation of the form $g_i = g_i(W_i, P_x, T_i, P_g, N)$. Introducing a demand-shifting vector for voter characteristics (V_i) and assuming input prices to public service production to be invariant within the state allows for a constant elasticity demand function to be defined as $g_i = V_i(T_i N_i^{\gamma})^{\rho} W_i^{\mu}$. Defining $\lambda = (1+\rho)\gamma$ and substituting $g_i = N_i^{-\gamma} G_i$ into the left-hand side allows this expression to be written as

$$G_i = V_i T_i^{\rho} N_i^{\lambda} W_i^{\mu}. \quad (1)$$

The log-log form of equation 1 can then be estimated using linear regression methods. Median voter wealth is assumed here to be a multiplicative function of income (Y_i), the fair market value of their real property (H_i), and intergovernmental transfers (I_i) of the form $W_i^{\mu} = Y_i^{\eta} H^{\pi} I^{\theta}$, with the intuition that the marginal propensity to spend on services may differ in the two sources. Substituting this function into equation 1 and adding a temporal dimension results in the following logged empirical demand function for government services:

$$lnG_{it} = \beta lnV_{it} + \rho lnT_{it} + \lambda lnN_{it} + \eta lnY_{it} + \pi lnH_{it} + \theta lnI_{it} + \varepsilon_{it}, \quad (2)$$

where an error term (ε_{it}) arises from idiosyncratic preferences or optimization error. The approach of this paper will be to treat property mass reappraisals as events that change the relative visibility of the property tax and that are best suited to the study of fiscal illusion as an explanation of the growth in government size. This approach motivates an empirical study of year-over-year changes in fiscal variables as opposed to the levels that would inform a study on the size of government. Year-over-year changes, indicated with Δ in updating equation 2 to 3, also square with the common view among practitioners that budgets are updated incrementally from the previous year.

$$\Delta lnG_{it} = \beta \Delta lnV_{it} + \rho \Delta lnT_{it} + \lambda \Delta lnN_{it} + \eta \Delta lnY_{it} + \pi \Delta lnH_{it} + \theta \Delta lnI_{it} + \varepsilon_{it}. \quad (3)$$

The intuition implied by critics of the residual view is that property reassessments offer an opportunity for the government to collect more revenue than it otherwise would according to a median voter demand specification such as equation 3 because voters errantly monitor posted nominal property tax rates rather than actual property tax bills. That is, if a mass reassessment increases the taxable property base, then the arithmetic of the residual rule calculation to meet voter demand should decrease the property tax rate so that revenues remain unchanged. But if voters monitor the tax rate rather than the actual budgets, then growth in the taxable base can produce additional revenues at the old rates.

The residual view studies of fiscal illusion have largely been conducted in eras of rising property values, and dummy variables to indicate the use of a mass reappraisal could be interpreted as indicating a reduction in property tax visibility because a levy-constant tax rate would always be decreasing. Recent history, however, has afforded more opportunities to study environments with declining property bases, and recent residual view studies of strategic government responses (Ihlanfeldt and Willardsen 2014; Brien 2014) have considered the possibility of asymmetric rate adjustments. That is, it is possible that strategic responses to increases in rate visibility differ from strategic responses to decreases.

These considerations of the role of property reassessment will be appended as demand-shifters to equation 3 and will serve as the main variables of interest. If a mass reappraisal increases the taxable property base, then there is a decrease in rate visibility (DRV) of property in the sense that the shrinking rate is less representative of the level of revenues it supports. If the base is assessed at a lower value, then the visibility of the tax increases (IRV) because the residual calculation requires an increase in the tax rate. Both DRV and IRV are dummy variables

with the omitted category being the absence of a mass reassessment.[10] For brevity, all the independent variables of equation 3 will be collapsed into a representative vector (Z_{it}):

$$\Delta \ln G_{it} = \omega \Delta \ln Z_{it} + \sum_{j=-1}^{1} \alpha_{t+j} DRV_{it+j} + \sum_{j=-1}^{1} \gamma_{t+j} IRV_{it+j} + \varepsilon_{it}. \quad (4)$$

The mass reappraisal dummy in equation 4 allows for a leading, contemporaneous, and lagged effect to account for the possibility of intertemporal shifts in the timing of public-sector growth.[11] In the absence of fiscal illusion, all coefficients on DRV and IRV will be zero. These coefficients become nonzero, however, if politicians respond to anticipated changes in the visibility of the tax. Consider these instances in which the property tax will become more visible because of the reassessment: (a) politicians may reduce or delay spending projects until the time period in which the property tax loses visibility ($\alpha_{t-1} < 0$, $\alpha_t > 0$, $\alpha_{t+1} = 0$); (b) they may add projects only in years in which the property tax loses visibility ($\alpha_{t-1} = \alpha_{t+1} = 0$, $\alpha_t > 0$); (c) or they may accelerate future planned projects earlier into the reduced visibility period (α_{t-1}, $\alpha_t > 0$, $\alpha_{t+1} < 0$).

Much of this intuition can be applied when reduced taxable values are expected to increase the visibility of the property tax: increased visibility may cause an acceleration of projects before the heightened visibility occurs ($\alpha_{t-1} > 0$, $\alpha_t < 0$, $\alpha_{t+1} = 0$); it may cause projects to be canceled in the reduced visibility period only ($\alpha_{t-1} = \alpha_{t+1} = 0$, $\alpha_t < 0$); or it

[10] Using the total dollar change in log form results in very small elasticities requiring different scaling across the different dependent variables to display the substantive effects. Using dummy variables avoids this awkward reporting and provides the equivalent result as if it were evaluated at the mean dollar-change level, thereby allowing for simpler interpretation without loss of the main inference.

[11] In the previous literature, Mikesell (1978) and Ross and Yan (2013) examine only the contemporaneous reassessment indicators; Bloom and Ladd (1982) and Ladd (1991) include pre- and post-year dummy variables. In Virginia, an assessment will typically be completed in the first six months of the calendar year, with notices delivered midyear to allow time for taxpayers to appeal. The new values from an assessment completed in January to June of 2014 would be used in setting the tax rate for the budget adopted in May 2015. So the "contemporaneous" effect for the budget adopted in May 2015 is that a mass reassessment occurred in calendar year 2014. Note also that the final budget is adopted at a time when assessments are not finalized but are nearly so; hence, officials likely have a pretty good guess as to the effect on the tax rate.

may delay projects that would otherwise occur in the assessment year to transition into a higher state of property tax visibility (α_{t-1}, $\alpha_t < 0$, $\alpha_{t+1} > 0$).

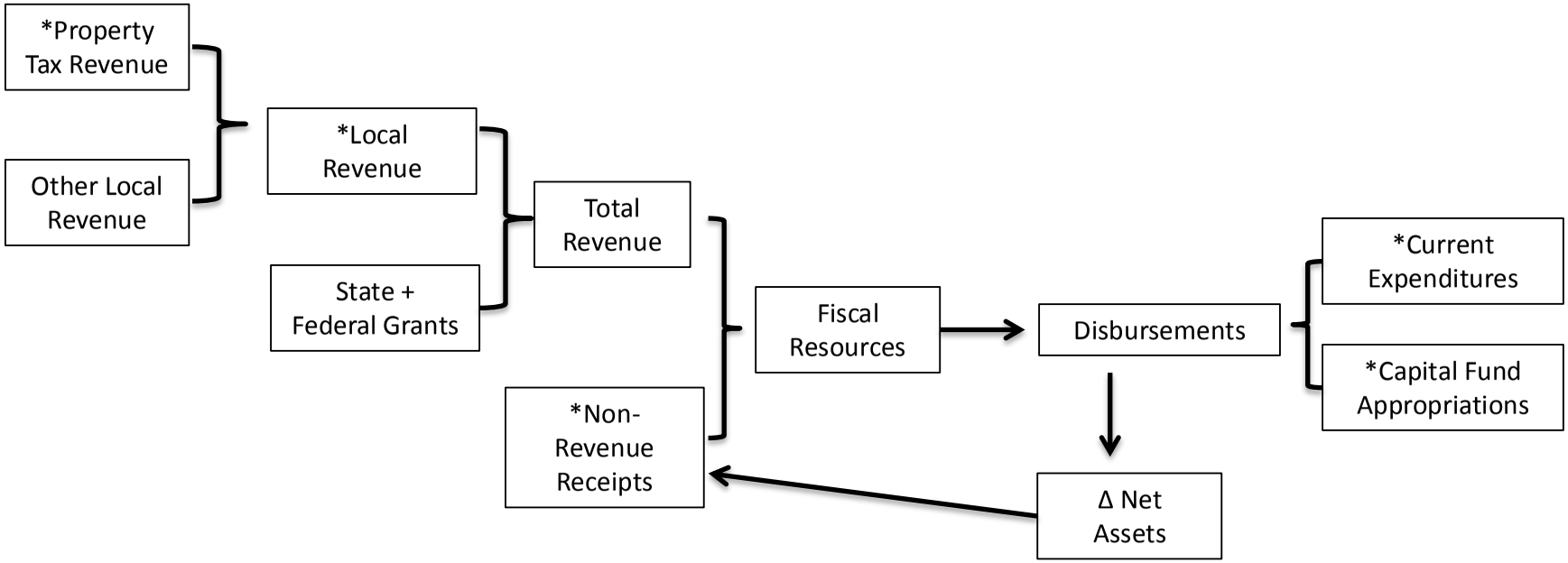
Finally, this intuition might differ between the revenue and the expenditure sides of the budget, particularly with respect to the timing of the changes. For example, Turnbull (1998) has pointed out that voters may have incomplete information on both spending and tax rates that can cause changes in the timing of both. The intuition is that if a tax increase can be hidden in one year, then later expenditures might be viewed as tax neutral. In the context of this study, if politicians seek to exploit uncertainty over tax rates in assessment years, then highly visible spending projects might invite additional scrutiny that could undermine their attempts.

We now turn to the definition of the dependent variable in equation 4. Because the quantity of government services (G_{it}) is typically unknown, the median voter demand literature proxies for these services by using expenditures. By contrast, property tax levies have been the focus of the fiscal illusion from property reassessment (i.e., Mikesell 1978; Bloom and Ladd 1982; Ladd 1991; Ross and Yan 2013) because such levies are the area of the local government budget most directly manipulated in response to the assessment. Regression analysis provides inferences at the margin, however, and there are a number of margins for adjustment in American local governments where the property tax levy can be adjusted to meet any expenditure that is institutionally or democratically permitted. Implicitly, the property tax levy in government budgeting can be used to independently fund the last dollar of expenditures, offset a reduction in nonproperty revenues, or adjust the government's net asset balance sheet. As such, this paper will use several other nonproperty tax fiscal concepts from public budgeting as dependent variables.

Figure 2 provides a stylized local budgeting model that is useful for generalizing anticipated cash flows as they would appear in financial data.[12] Property tax revenue is determined by local officials as a complement to other sources of local revenues that stem primarily from excise taxes, user charges, and fees. Intergovernmental grants complement these revenues to form total revenues. Finally, the local government may obtain cash from additional nonrevenue sources that are expected to be nonrecurring in nature. These sources can include assets that can be liquidated, such as rainy-day savings or government property. The combination of these available resources is then disbursed into different appropriations for current or capital expenditures,[13] or it can be used to purchase new assets or pay down existing liabilities, thereby increasing the stock of net assets.[14] Revenues that are not budgeted for current expenditures or capital projects can be saved in various assets (e.g., rainy-day funds). When withdrawals from these assets occur, the cash appears in the flows as nonrevenue receipts. In practice, these flows affecting the net asset component are the most difficult fiscal concept to meaningfully observe from end-of-year financial statements because assets and liabilities can also be acquired through current expenditures and capital project activities.[15] In figure 2, an asterisk indicates dependent variables that will be used in an attempt to determine the full fiscal implications of a change in the visibility of the property tax.

[12] This representation is influenced by Virginia data as they appear in local government comparative reports. Accounting systems of different states may track the links between cash receipts and disbursements differently, depending on their budgeting processes and controls.
[13] The commonplace term *current expenditures* is used in this paper, but Virginia reports actually use the term *operations and maintenance* to describe these expenditures.
[14] The Virginia local government comparative reports that serve as the data source for this research do not track stocks of assets or liabilities.
[15] This problem in part highlights the difficulty with constructing diagrams such as that in figure 2, as one could argue that there may be some means for practitioners to establish links between all possible boxes in the diagram.

Figure 2. Stylized Illustration of Local Government Budgeting System in Virginia



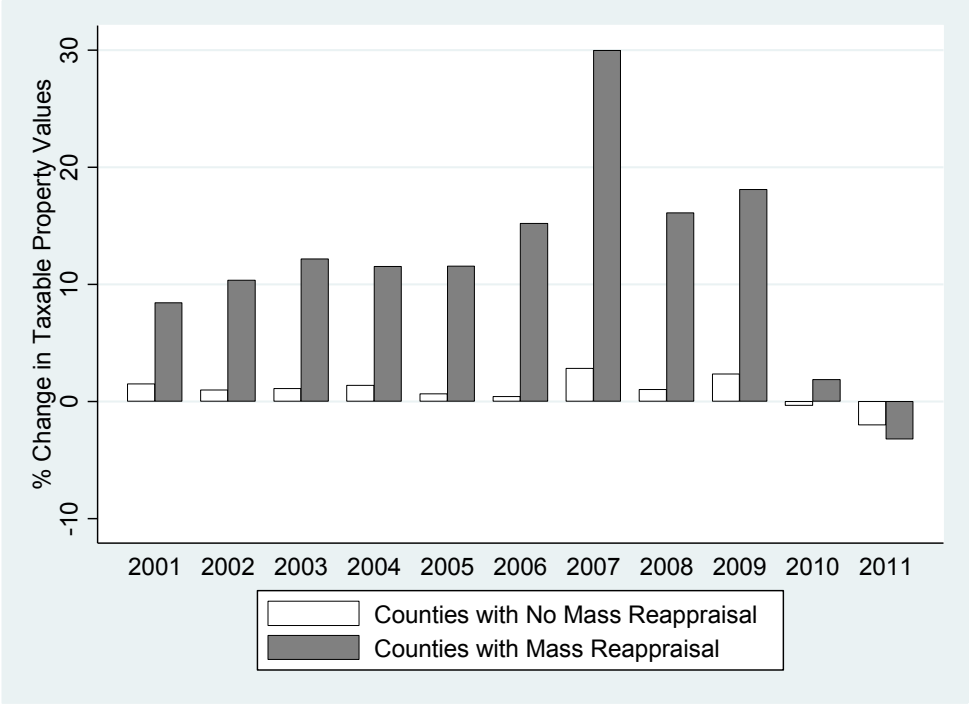
* The fiscal concept is used as a dependent variable in at least one regression appearing in tables 2 and 3.

Toward Causal Inference: Virginia Institutional Details and Selection of Control Variables

If the DRV and IRV variables mimicked random assignment, there would be no need for the inclusion of control variables in Z of equation 4 for causal inference. The predominant concern is that DRV and IRV will be correlated with factors that also determine growth in the public sector. An example would be that mass reassessments are initiated when they provide the opportunity to appropriately update the tax rolls after significant new development efforts, which would result in endogeneity bias from reverse causality. Virginia offers a useful institutional arrangement for this concern. State legislation from 1984 requires local governments to adopt a cycle ranging from one to six years for reassessing property (Code of Virginia sections 58.1-3250–3271). As a result, in a given year, a county reassesses if that year falls in the cycle. Usefully, the assessment is foreseeable to the policymakers, but it is not subject to their discretion and subsequently rules out the possibility of reverse causation in the initiation of an assessment. This historical selection of an assessment cycle is a strong reason to expect that the mass reappraisals will be exogenous to other events in the sample period. Although local governments may have selected into more frequent assessment cycles in 1984 in a manner that correlated with growth, those historical expectations are time-invariant factors that can be swept away with county fixed effects.

Another potential concern is endogeneity from omitted variables that are coincidentally correlated with both mass reappraisals and public-sector growth. A promising approach to addressing this concern is to control for the actual fair market value of property, which is distinct from the taxable value of property used in calculating the tax rates. Tax rolls can change between years in instances where there are changes in exemptions, new building developments, and establishment of nonprofits or other exempt property, but the overwhelming amount of change in taxable value occurs following a mass reappraisal, as can be seen in figure 3. Virginia also tracks

Figure 3. Year-over-Year Growth in Taxable Property Values, 2001–2011



data on the fair market value of properties through annual assessment-to-sale price comparison studies. This approach allows for a control of the market value of the property that is distinct from the taxable value of property. Taxable values used for calculating rates differ from fair market value because of taxpayer deductions, exemptions, assessment inaccuracies, and (in the case of nonannual assessments) the amount of time between mass reappraisals. Furthermore, the taxable values are derived from the assessed values that were on the books in the year prior to the year when the budget was adopted, which drives an additional correlation between the visibility of the property tax rate and fair market property values. For these reasons, a pairwise correlation between the annual growth rates for fair market value and real taxable value is just 0.027. Fair market values should be strongly correlated with contemporaneous events that are difficult to observe and that would influence voter demand for public services related to the property market.

This correlation provides a strong motivation for including fair market property value growth as a control variable, which is of direct concern to the exogeneity of the mass reappraisal timing.

In addition to a control for the growth of the fair market value of property in Z of equation 4, among the shift variables included for voter characteristics are the share of the population under the age of 19, the share of the population over the age of 65, the total population, and racial fractionalization. All these variables are common in regression of the median voter demand for public goods (e.g., Alesina, Baqir, and Easterly 1999; Lind 2007; Fletcher and Kenny 2008). The Virginia Department of Housing and Community Development changed the definition of *median household income* effective 2008; therefore, a slope-modifying interaction variable is also included. The tax price (T) included in Z and initially introduced in equation 1 can ideally be defined as the ratio of the median property value to the total property value to capture the median voter's share of the tax base. Unfortunately, data on median property values are available only in decennial census years; therefore, median income as a fraction of total personal income is used as a proxy, which has a pairwise correlation above 0.8 in the two years in which both the employed and ideal measures are available. In addition, four counties were removed from the analysis because their boundaries changed as the result of city-county consolidations, thereby reducing the cross-sectional number of observations to 131. All data sources, descriptions, and summary statistics are reported in appendix table A1.

IV. Estimation Results and Findings

The estimation of equation 3 begins with the revenue side of the budget process before proceeding to track the effects on the rest of the fiscal system. These results are presented in table 1 and begin with the property tax levy as the dependent variable, which is the fiscal

Table 1. Regression Results for Growth in Revenue Variables

	Δln(property tax revenue)		Δln(total revenue)		Δln(property tax revenue/total revenue)	
Decrease rate visibility next year	0.009	−0.009	0.001	−0.012	0.006	−0.002
	(0.006)	(0.009)	(0.005)	(0.008)	(0.006)	(0.009)
Decrease rate visibility this year	0.042***	0.043***	0.013***	0.013**	0.035***	0.036***
	(0.007)	(0.007)	(0.005)	(0.005)	(0.007)	(0.007)
Decrease rate visibility last year	0.005	0.008	−0.002	0.000	0.005	0.006
	(0.006)	(0.005)	(0.004)	(0.004)	(0.006)	(0.006)
Increase rate visibility next year	0.042***	0.039***	0.020*	0.016	0.034**	0.033**
	(0.014)	(0.015)	(0.011)	(0.011)	(0.014)	(0.014)
Increase rate visibility this year	−0.004	0.004	−0.003	−0.001	−0.005	0.000
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Increase rate visibility last year	−0.004	−0.002	−0.005	−0.006	0.007	0.009
	(0.014)	(0.013)	(0.010)	(0.010)	(0.012)	(0.013)
Control variables?	No	Yes	No	Yes	No	Yes
Within-R^2	0.138	0.168	0.267	0.279	0.103	0.119
Between-R^2	0.102	0.187	0.012	0.191	0.047	0.009
Overall-R^2	0.132	0.168	0.246	0.271	0.094	0.100

* ($p < 0.1$), ** ($p < 0.05$), *** ($p < 0.01$).

Note: Sample size is 131 cross-sectional groups over 10 years for total sample size of 1,310. All specifications include area and year fixed effects. Standard errors are reported in parentheses. See appendix table A3 for full specification of control variables.

variable directly affected by the change in visibility during property reassessment. The variables of interest in equation 3, DRV and IRV, are notated in the tables according to their effect on the visibility of the property tax rate. All specifications include county and year fixed effects, with standard errors clustered by county. Because there is good reason ex ante to believe that the institutional environment of Virginia results in counties initiating a mass reappraisal at times that are uncorrelated to current events relevant to the local finance system, each specification is presented both with and without control variables to observe the sensitivity of the variables of causal interest to the inclusion of these controls. Appendix table A2 provides the results of the full specification; however, the specification is a reduced form supply-and-demand equation, so

nothing in the study design permits a causal interpretation of these other variables. For example, the relationship between capital expenditures and fair market value of real estate is negative during the period, which likely indicates preapproved infrastructure projects in areas with significant housing busts rather than the causal effect of housing prices on demand for capital projects. The only purpose of these variables is to pick up any potential correlations with omitted factors that might confound the desired interpretation of the variable of interest.

The results for property tax revenue in table 1 demonstrate very little sensitivity to the inclusion of control variables. If the initiation of a mass reassessment is correlated with other growth factors, there will likely be substantive differences in the size of the effect of the coefficients. If mass appraisals are uncorrelated with these demand factors, only the standard error will be affected. The results indicate that if a mass reappraisal increases the taxable base—and therefore decreases the visibility of the tax by a reduced rate—the most significant effect occurs in the year in which these assessed values are implemented. The estimates indicate that a decrease in rate visibility increased the property tax growth rate by 4.3 percent, which is about two-thirds of a standard deviation in this variable.[16] There is no significant effect in the following or preceding periods to suggest that the levy has changed in response to the decrease in rate visibility caused by the assessment. When there is an increase in rate visibility, however, there is an effect in the year before the adoption of the taxable values that is almost comparable in size. If the rate is going to increase in year t because of a reduced reassessment, there is an increase in property tax revenue during year $t-1$ of 3.9 percent, with no significant offsetting effect in the years that follow. In other words, because raising property tax revenue is going to be more visible in the next period,

[16] The calculation is 0.043/0.066 = 0.65. Note that a more precise calculation of the size of a dummy variable coefficient's effect can be observed when using the exp()-1 transformation (Halvorsen and Palmquist 1980), but in this case, the difference is approximate to a rounding error and is therefore ignored.

local officials are more inclined to raise the rate in the immediate period. This inclination is evidence of fiscal illusion influencing the fiscal management of government.

Looking at the total local government revenues in table 1, one sees that the fiscal illusion findings from the property tax continue to persist. When the previous results for property tax revenue included control variables, nonproperty tax revenue was among the independent variables. To avoid producing a tautological replication of the property tax results, the specification for total revenue omits nonproperty tax revenue; otherwise, the model specifications are the same. If a mass reappraisal of the tax base is going to lower the rate and reduce the property tax's visibility, then local revenue growth will be about 1.3 percent larger in the period in which those new values are implemented. The size of this effect is statistically significant at the 95 percent confidence level and represents about 22 percent of a standard deviation in local revenue growth.[17] Local revenue growth also increases if the rate becomes more visible in the next fiscal year, although the statistical significance of this result is sensitive to the inclusion of control variables. The smaller size of the effect of local revenues is not particularly surprising because property tax revenues represent about one-half of all local revenues collected. However, it is clear that higher property tax revenues are not immediately offset elsewhere with reductions in other taxes, user fees, or program charges. This finding is further confirmed in a robustness check regression that uses property tax revenue as a share of total revenue, where the same variables emerge as positive and statistically significant.

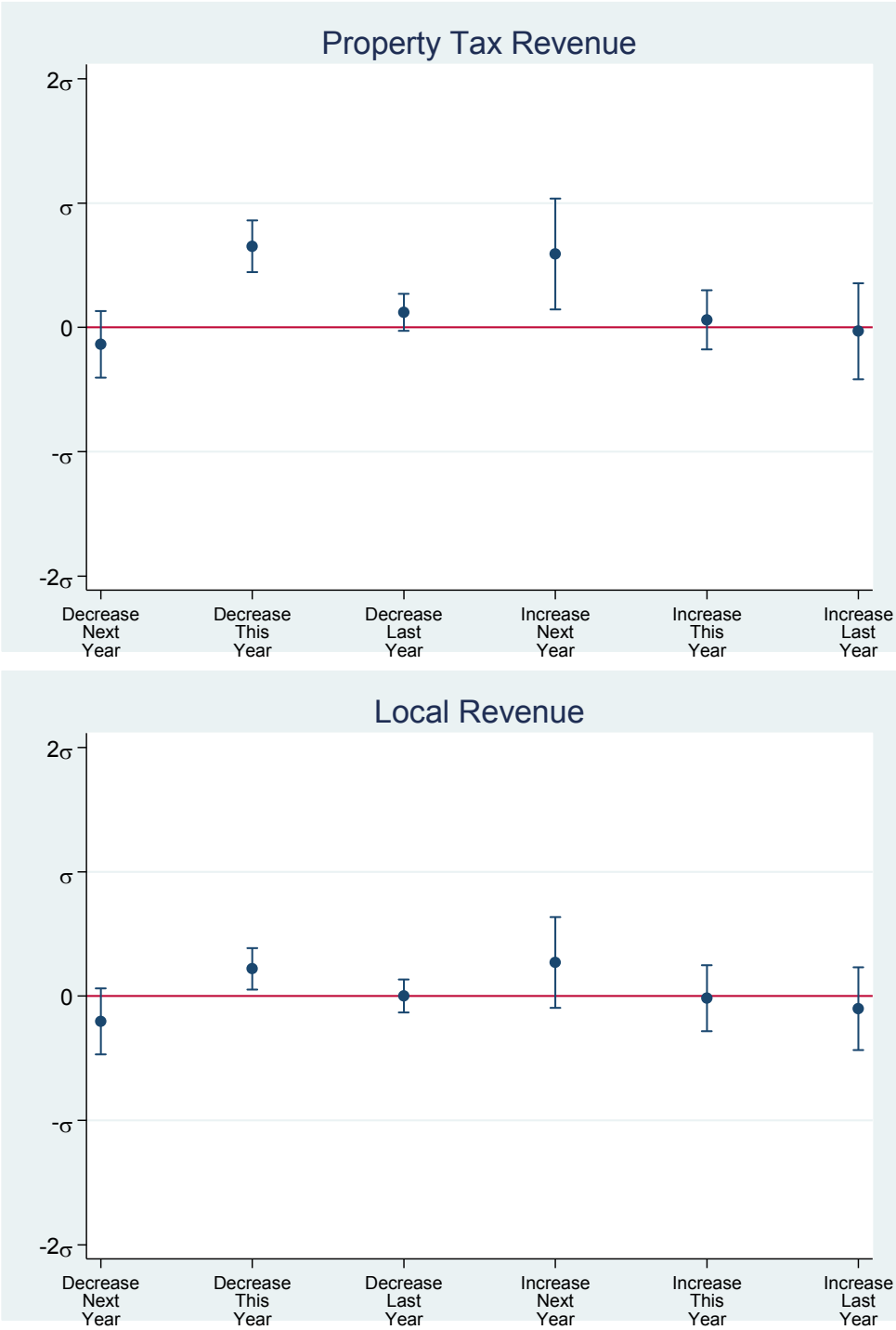
For the purpose of this research, finding no statistically significant difference from zero is important because attention is paid to potentially offsetting effects. If mass reappraisals are found to stimulate public-sector growth in one time period by a statistically significant margin and then to decrease it in the next period by an amount that is similar in size of the effect but not

[17] The calculation is 0.013/0.059 = 0.22.

statistically significant, the imprecision of the estimated coefficient may produce an invalid inference. For this reason, figure 4 provides confidence intervals and point estimates for the variables of interest for the results in table 1 to provide context for the relative size and precision of the estimates. Although subjective, a reasonable basis for the scaling is the standard deviation in the dependent variable of the regression. For each point estimate in figure 4, the graph is centered on zero and extends for two standard deviations of the dependent variable of interest. Looking at the revenue results in figure 4, one sees that the effects that appear statistically insignificant from zero are small effects that are estimated with reasonable precision.

In table 2, attention is redirected from revenues to disbursements and nonrevenue receipts that reflect asset management. Because the previous results demonstrated that it is the property tax levy that is manipulated with the implementation of new assessments, the current and capital expenditures specifications control for nonproperty revenues so that the coefficients can be interpreted as the effects arising from assessment-induced changes in the property tax levy. As in table 1, each dependent variable specification is estimated with and without control variables to demonstrate that the variable of interest is not significantly influenced by model specification. Point estimates for coefficients other than the variable of interest are reported in appendix table A3, but again there is no causal interpretation of these variables. Because capital expenditures are much more volatile than current expenditures, with standard deviations of 202 percent and 5 percent, respectively, they are reported separately rather than using an aggregate measure of total expenditures. As one can see, none of the coefficients for the variables of interest appears to be statistically significant, in stark contrast to the results on the revenue side in table 2. Figure 5 demonstrates that these results are precisely estimated zero effects, particularly for the variables that were statistically significant on the revenue side.

Figure 4. 95 Percent Confidence Interval for the Visibility Effects of Property Reassessment by Measure of Public Revenue Growth



Note: Computed from point estimates and standard errors in table 1. *Y*-axis is scaled using the standard deviation (σ) of the dependent variable of interest, which also appears in the summary statistics in table 1.

Table 2. Regression Results for Disbursements and Nonrevenue Receipt Growth

	Δln(current expenditures)		Δln(capital funds)		Δln(nonrevenue receipts)	
Decrease rate visibility next year (UP_{t+1})	0.006	0.008	−0.012	0.312	0.733	1.035
	(0.004)	(0.007)	(0.214)	(0.267)	(0.649)	(0.802)
Decrease rate visibility this year (UP_t)	0.004	0.004	−0.016	−0.015	0.508	0.455
	(0.004)	(0.004)	(0.192)	(0.200)	(0.725)	(0.719)
Decrease rate visibility last year (UP_{t-1})	0.001	0.002	0.099	0.061	1.444**	1.396**
	(0.004)	(0.004)	(0.228)	(0.227)	(0.563)	(0.570)
Increase rate visibility next year ($DOWN_{t+1}$)	0.005	0.007	0.333	0.420	−2.148*	−2.256**
	(0.008)	(0.007)	(0.344)	(0.353)	(1.149)	(1.139)
Increase rate visibility this year ($DOWN_t$)	0.007	0.007	−0.001	−0.109	0.006	−0.164
	(0.009)	(0.009)	(0.263)	(0.288)	(0.860)	(0.858)
Increase rate visibility last year ($DOWN_{t-1}$)	−0.014	−0.014	−0.462	−0.503	0.667	0.672
	(0.011)	(0.011)	(0.451)	(0.459)	(1.026)	(1.028)
Control variables?	No	Yes	No	Yes	No	Yes
Within-R^2	0.211	0.252	0.019	0.035	0.012	0.016
Between-R^2	0.104	0.255	0.000	0.003	0.001	0.001
Overall-R^2	0.196	0.246	0.019	0.032	0.010	0.010

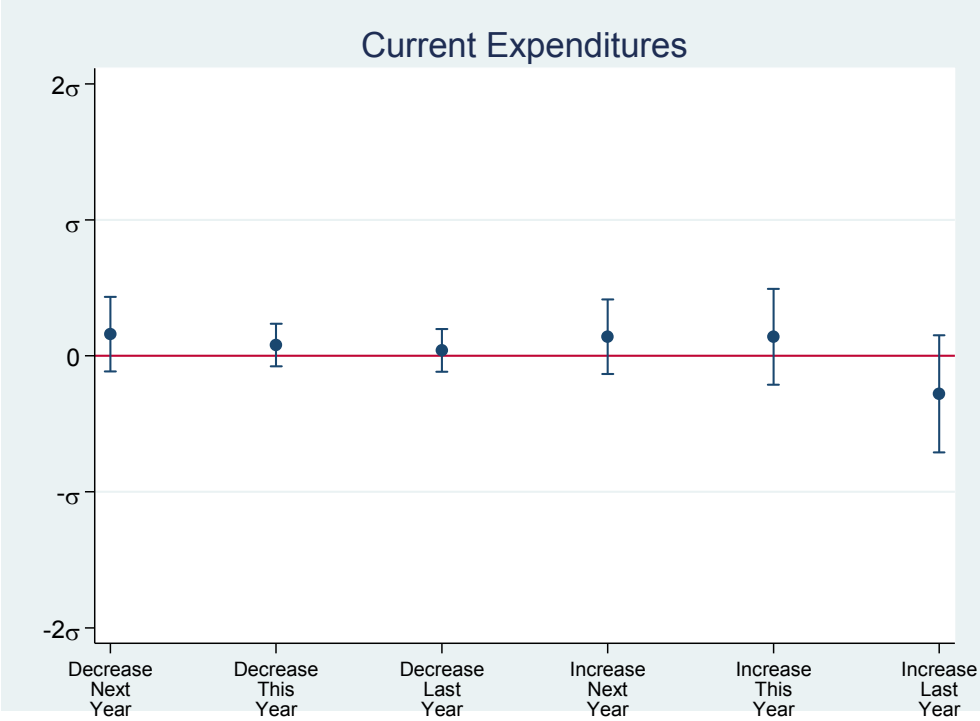
* ($p < 0.1$), ** ($p < 0.05$), *** ($p < 0.01$).

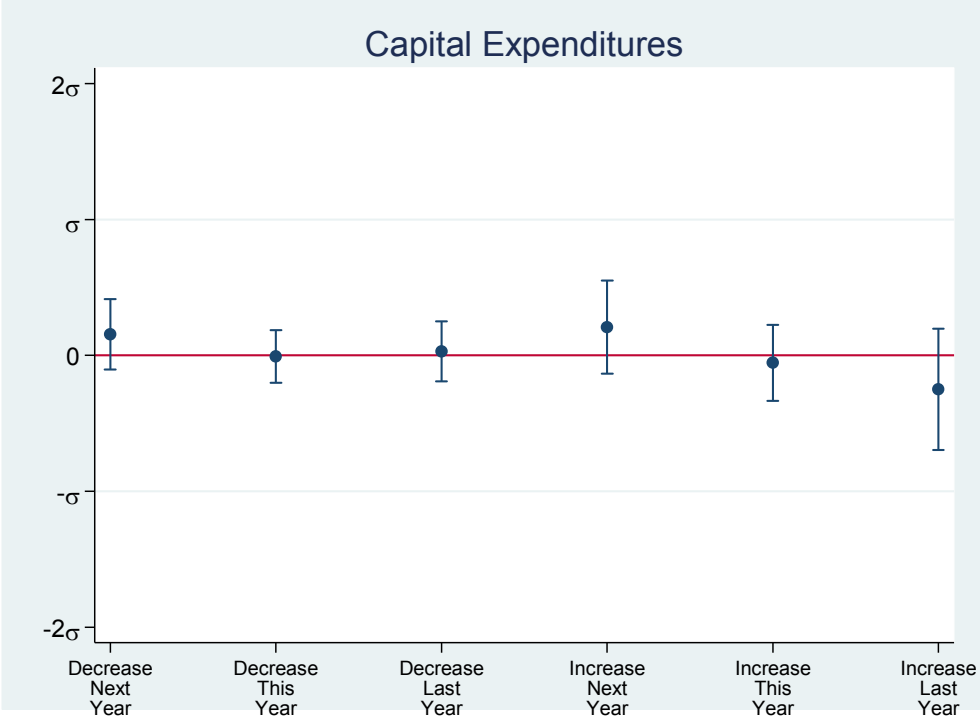
Note: Sample size is 131 cross-sectional groups over 10 years for total sample size of 1,310. All specifications include area and year fixed effects. Standard errors are reported in parentheses. See appendix table A2 for full specification of control variables.

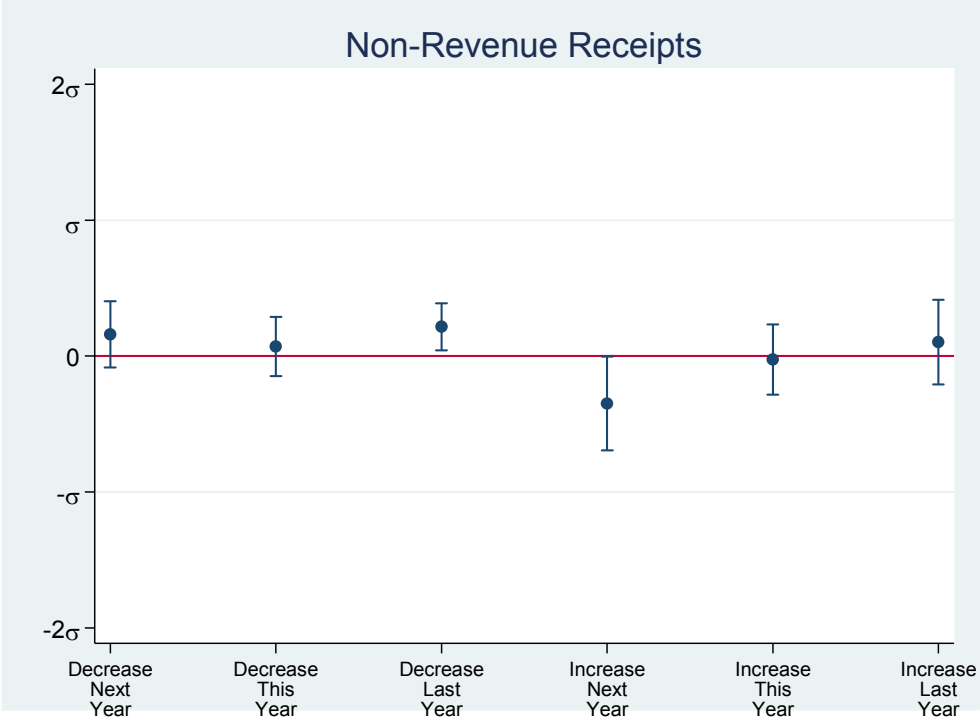
If assessment-induced property tax revenue increases are accompanied by neither current nor capital expenditures, then the resources are being used to purchase assets or to pay down liabilities. This finding is difficult to directly observe from the data because these variables can be influenced through other current or capital expenditures but can be indirectly inferred from nonrevenue receipts. Nonrevenue receipt growth is the last dependent variable of table 2 and is the result of fiscal resources coming from nonrecurring sources, including withdrawals from rainy-day funds or sales of property or other assets. To control for the influence of the reassessments elsewhere on the direct components of the revenue system, this specification controls for total revenues. In this specification, there is no standard fiscal reason for property reassessment to influence nonrevenue receipts, yet when the mass reappraisal

reduces the visibility of the property tax, greater nonrevenue receipts result in the year after the new rates go into effect. Specifically, if a mass reappraisal lowered rates in the previous year, nonrevenue receipts increase by about 140 percent, which is about 21 percent of the standard deviation of this variable. One explanation could be that the additional revenues are disbursed into accounts that can be drawn on in the next year. Tellingly, if a mass reappraisal is going to make the property tax more visible in the next year, then nonrevenue receipts will be 220 percent lower than they otherwise would have been. This finding suggests that local governments are more hesitant to make these types of withdrawals if it will be more difficult to access the property tax next year.

Figure 5. 95 Percent Confidence Interval for the Visibility Effects of Property Reassessment on Expenditure and Nonrevenue Receipts Growth







Note: Computed from point estimates and standard errors in table 2. *Y*-axis is scaled using the standard deviation (σ) of the dependent variable of interest, which also appears in the summary statistics in appendix table A1.

Summary of Findings

The estimation results indicate that property reassessments substantively increase public-sector revenues through increases in the property tax. When reassessments reduce the visibility of the property tax burden by lowering the rate, a one-time leveling up of property taxation occurs in the period when the new property values are used in calculating the property tax rate. There is no evidence that this amount is offset in other years or with reductions in other revenue sources. However, there is also no evidence to indicate that a corresponding jump occurs in current or capital expenditures. If there is no substantive effect on expenditures, then the remaining area that the revenues can flow into is assets. This possibility would explain the observed behavior in nonrevenue receipts, which is consistent with asset withdrawals in the year following an assessment that reduced visibility of the property tax. In other words, the findings suggest that when the property tax loses visibility, there is a contemporaneous increase in property tax revenues that is funneled into assets and withdrawn the next year. This finding indicates that the revenue increases are smoothed into spending over time, rather than introduced through similar shocks, perhaps as a means to avoid visible projects that draw attention to funding sources.

When property reassessments are going to increase the visibility of the tax with higher rates in the next fiscal year, local governments raise the property tax levy in the current year in anticipation. There is a concurrent reduction in the pace at which assets are drawn down, but no other change in future property taxes or other local revenues is found. This finding suggests that the anticipated difficulty of raising property taxes in the future causes local governments to level up the property tax before the visibility of the rate increases; it also makes them more conservative in depleting their reserve assets.

These findings are consistent with the government managing its property tax in a manner consistent with fiscal illusion to grow the public sector. Politicians seek to raise property revenue when the tax becomes less visible, as well as when future visibility is expected to increase. These additional property tax revenues are not offset with reductions in other revenues, and they seem to be deposited into assets for future withdrawals. Although politicians may generally prefer spending projects to be visible, this observation does not seem to be the case in Virginia when the slack funds are derived from reassessment-induced fiscal illusion. Perhaps, as Turnbull (1998) has suggested, the finding of smoothed spending through fiscal management occurs because politicians are less inclined toward visible expenditures when the revenue source is derived from an exploitable form of voters' fiscal illusion. Another possibility is that the additional resources are simply serving a general preference for expenditure smoothing in local governments, which is a possibility that has received mixed empirical support elsewhere in the literature (e.g., see Wang and Hou 2012; Ross, Yan, and Johnson 2015).

V. Conclusions

This paper seeks to produce a comprehensive study of the effect of fiscal illusion on the growth of the public sector by selecting a specific fiscal illusion mechanism, the revenue elasticity hypothesis, where exogenous visibility shocks are linked both to a specific tax instrument and to different components of the public finance system. The research covers Virginia county governments from 2000 to 2011 and the implementation of mass reappraisals that alter the tax rate needed to support government revenue. The results indicate that property tax revenues increase when taxable property values increase—a finding that is consistent with incomplete rate adjustment and fiscal illusion. The increased property tax revenues persist as an increase in total revenue, but they do not become associated with increased expenditures on current or capital

government activities. Instead, the evidence suggests that these revenues are diverted into assets and withdrawn the following year, perhaps because spending from reserves draws less scrutiny than spending from an incomplete property tax rate adjustment. When property values decline in the forthcoming year, property tax revenues increase while withdrawals from assets decrease, thus suggesting that both strategies are used to cope with a property tax that is about to become more visible to the taxpayer.

The results of this study suggest that special postassessment property tax rate controls, like those that exist in Pennsylvania and Georgia, may be an important form of taxpayer protection in the presence of rising property values. Such findings also support the potential merit for truth-in-taxation laws that require more clarity and visibility in announcements of the fiscal implications of budget choices. Further study of these policies would provide insight into their effectiveness.

Although Virginia's institutional characteristics have proved useful for the purpose of this study, particularly in causal identification and as a test of fiscal illusion, these traits may undermine external validity. Indiana, for example, places limits on the growth rate in the property tax levy and restricts property tax burdens as a percentage of their assessed values. California requires a fixed 1 percent tax rate and then implements a series of limits on the growth in assessed values. Furthermore, this study focused on local governments in a federal system, which may behave differently than state or federal governments or more centralized public finance systems. Regardless, this paper provides proof of concept underlying the general fiscal illusion concerns raised by the revenue elasticity hypothesis.

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Appendix

Table A1. Variable Descriptions, Sources, and Summary Statistics

Variable label	Description	Mean	Standard deviation
Δln(property tax revenue)[(a)]	General property taxes from real property	0.049	0.066
Δln(local revenue)[(a)]	Total revenue raised from local sources	0.028	0.059
Δ(property tax revenue share)[(a)]	General property taxes as a share of total revenue sources, including state and federal grants	0.023	0.064
Δln(current expenditures)[(a)]	Total expenditures on the maintenance and operation of government	0.028	0.050
Δln(capital expenditures)[(a)]	Total expenditures on capital projects	−0.048	2.018
Δln(nonrevenue receipts)[(a)]	Cash receipts from nonrecurring sources	0.143	6.471
Decrease rate visibility next year	Mass reappraisal occurs in the next period,[(b)] and the taxable value of real property[a] will increase from previous year	0.182	0.386
Decrease rate visibility this year	Mass reappraisal occurs in the current period,[b] and the taxable value of real property[(a)] will increase from previous year	0.376	0.484
Decrease rate visibility last year	Mass reappraisal occurred in the previous period,[(b)] and the taxable value of real property[(a)] increased	0.189	0.391
Increase rate visibility next year	Mass reappraisal occurs in the next period,[(b)] and the taxable value of real property[(a)] will decrease from previous year	0.034	0.180
Increase rate visibility this year	Mass reappraisal occurs in the current period,[(b)] and the taxable value of real property[(a)] will decrease from previous year.	0.053	0.223
Increase rate visibility last year	Mass reappraisal occurred in the previous period,[(b)] and the taxable value of real property[(a)] decreased	0.020	0.140
Δln(nonproperty tax revenue)[(a)]	Local revenue from nonproperty tax sources	0.013	0.078
Δln(fair market value of property)[(b)]	Estimated fair market value of real property	0.062	0.133
Δln(median tax price)	Median household income[(c)] divided by total personal income[(d)]	0.019	0.168

continued on next page

Variable label	Description	Mean	Standard deviation
Δln(population)[(e)]	Population	0.008	0.015
Δln(median income)[(d)]	Median adjusted gross income	0.044	0.163
Median income post-2007	Dummy variable that is slope modifier for "median income" variable to take into account the change in definition used in household income	0.035	0.160
Δln(share of population under 19)[(e)]	Share of population under age 19	−0.006	0.011
Δln(share of population over 65)[(e)]	Share of population over age 65	0.010	0.018
Δln(racial fractionalization)[(e)]	Herfindahl-Hirschman Index of population by race	−0.003	0.007

Sources:
(a) Annual Comparative Reports of Local Government Revenues and Expenditures from Virginia Auditor of Public Accounts.
(b) Virginia Assessment Sales Ratio Studies from Virginia Department of Taxation.
(c) Virginia Department of Housing and Community Development's Commission on Local Government's annual report on "Comparative Revenue Capacity, Revenue Effort, and Fiscal Stress."
(d) Bureau of Economic Analysis.
(e) US Census Bureau.

Note: Sample size is 1,310. Year-over-year change indicated by "Δ" and natural log by "ln()".

Table A2. Full Results of Table 1

	Δln(property tax revenue)		Δln(local revenue)		Δ(property tax revenue/total revenue)	
Decrease rate visibility next year (UP_{t+1})	0.009	−0.009	0.001	−0.012	0.006	−0.002
	(0.006)	(0.009)	(0.005)	(0.008)	(0.006)	(0.009)
Decrease rate visibility this year (UP_t)	0.042***	0.043***	0.013***	0.013**	0.035***	0.036***
	(0.007)	(0.007)	(0.005)	(0.005)	(0.007)	(0.007)
Decrease rate visibility last year (UP_{t-1})	0.005	0.008	−0.002	0.000	0.005	0.006
	(0.006)	(0.005)	(0.004)	(0.004)	(0.006)	(0.006)
Increase rate visibility next year ($DOWN_{t+1}$)	0.042***	0.039***	0.020*	0.016	0.034**	0.033**
	(0.014)	(0.015)	(0.011)	(0.011)	(0.014)	(0.014)
Increase rate visibility this year ($DOWN_t$)	−0.004	0.004	−0.003	−0.001	−0.005	0.000
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Increase rate visibility last year ($DOWN_{t-1}$)	−0.004	−0.002	−0.005	−0.006	0.007	0.009
	(0.014)	(0.013)	(0.010)	(0.010)	(0.012)	(0.013)
Δln(nonproperty tax revenue)		0.093**				
		(0.039)				
Δln(fair market value of property)		0.075***		0.054***		0.035
		(0.023)		(0.019)		(0.023)
Δln(median tax price)		0.057		−0.014		0.104
		(0.106)		(0.087)		(0.099)
Δln(population)		0.212		0.228		−0.186
		(0.208)		(0.174)		(0.262)
Δln(median income)		−0.314**		0.011		−0.419***
		(0.132)		(0.110)		(0.138)
Median income post-2007		0.266***		0.005		0.322**
		(0.095)		(0.067)		(0.126)
Δln(share of population under 19)		0.089		0.024		0.307
		(0.182)		(0.145)		(0.263)
Δln(share of population over 65)		−0.084		0.079		−0.063
		(0.187)		(0.162)		(0.248)
Δln(racial fractionalization)		0.481		0.820**		0.106
		(0.375)		(0.330)		(0.395)
Within-R^2	0.138	0.168	0.267	0.279	0.103	0.119
Between-R^2	0.102	0.187	0.012	0.191	0.047	0.009
Overall-R^2	0.132	0.168	0.246	0.271	0.094	0.100

* ($p < 0.1$), ** ($p < 0.05$), *** ($p < 0.01$).

Note: Sample size is 131 cross-sectional groups over 10 years for total sample size of 1,310. All specifications include area and year fixed effects. Standard errors are reported in parentheses.

Table A3. Full Results of Table 2

	Δln(current expenditures)		Δln(capital funds)		Δln(nonrevenue receipts)	
Decrease rate visibility next year (UP_{t+1})	0.006	0.008	−0.012	0.312	0.733	1.035
	(0.004)	(0.007)	(0.214)	(0.267)	(0.649)	(0.802)
Decrease rate visibility this year (UP_t)	0.004	0.004	−0.016	−0.015	0.508	0.455
	(0.004)	(0.004)	(0.192)	(0.200)	(0.725)	(0.719)
Decrease rate visibility last year (UP_{t-1})	0.001	0.002	0.099	0.061	1.444**	1.396**
	(0.004)	(0.004)	(0.228)	(0.227)	(0.563)	(0.570)
Increase rate visibility next year ($DOWN_{t+1}$)	0.005	0.007	0.333	0.420	−2.148*	−2.256**
	(0.008)	(0.007)	(0.344)	(0.353)	(1.149)	(1.139)
Increase rate visibility this year ($DOWN_t$)	0.007	0.007	−0.001	−0.109	0.006	−0.164
	(0.009)	(0.009)	(0.263)	(0.288)	(0.860)	(0.858)
Increase rate visibility last year ($DOWN_{t-1}$)	−0.014	−0.014	−0.462	−0.503	0.667	0.672
	(0.011)	(0.011)	(0.451)	(0.459)	(1.026)	(1.028)
Δln(nonproperty tax revenue)		0.147***		2.198		
		(0.039)		(1.346)		
Δln(total revenue)						1.222
						(7.546)
Δln(fair market value of property)		−0.008		−1.297**		−1.195
		(0.017)		(0.580)		(2.228)
Δln(median tax price)		−0.058		−3.404		−4.647
		(0.077)		(3.151)		(10.970)
Δln(population)		0.052		4.405		−6.751
		(0.172)		(6.556)		(21.650)
Δln(median income)		0.061		7.277		5.083
		(0.104)		(5.392)		(13.744)
Median income post-2007		−0.008		−4.696		−0.720
		(0.069)		(4.895)		(10.514)
Δln(share of population under 19)		−0.034		−7.063		7.648
		(0.146)		(7.956)		(20.779)
Δln(share of population over 65)		−0.125		−6.086		30.067
		(0.181)		(5.431)		(18.385)
Δln(racial fractionalization)		0.046		1.563		14.562
		(0.323)		(12.175)		(36.556)
Within-R^2	0.211	0.252	0.019	0.035	0.012	0.017
Between-R^2	0.104	0.255	0.000	0.003	0.001	0.001
Overall-R^2	0.196	0.246	0.019	0.032	0.010	0.012

* ($p < 0.1$), ** ($p < 0.05$), *** ($p < 0.01$).

Note: Sample size is 131 cross-sectional groups over 10 years for total sample size of 1,310. All specifications include area and year fixed effects. Standard errors are reported in parentheses.