Assessing Assessors*

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Property tax revenues – the largest discretionary source of revenue for local governments - adjust at a pace that is inconsistent with the growth and decline of property values in the US. We show that this form of revenue smoothing may be rooted in the political economy of municipalities, cities, and school districts. In particular, we show an asymmetry of property tax re-assessments: they spike during positive markets (increasing tax revenue), but do not show the same sensitivity to negative markets (which would decrease tax revenue collected). Measures of local budget constraints are positively related to the mark-up of a property's total dollar assessment values relative to its eventual transaction price. Additionally, the individuals that staff local property assessment offices appear to hold sway in the property assessment process. We find that local tax assessors: 1.) have tax assessments on their own properties that are significantly lower than neighboring properties; and 2.) these tax assessments also grow significantly more slowly than neighbors. We further find a link between this assessment gap of tax assessors own properties and the tax-maximizing municipality behaviors we document.

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I. Introduction

Outside of federal and state transfers, property taxes are the largest source of revenue for local governments (US Census Bureau, 2023). These annual taxes are collected in proportion to individual property values - scaling to a taxpayer's price of real estate asset. In principle, this is meant to proxy for a large component of the average taxpayer's wealth (real estate), and this tax exposes public budgets to the fluctuations of the housing market, where prices are inherently volatile. During the 2008 Financial Crisis that coincided with a housing market downturn, for instance, the financial media and many economic analysts speculated on the potential waves of municipal bankruptcies that would trigger from the implicit effect of declining housing prices on property taxes.[1]

In this analysis, we first evaluate the connection between the financial fluctuations of the housing market and local property tax revenues. We show that, despite the prevailing mandate to adhere to mark-to-market valuations, municipally assessed property prices — the precise values used to determine tax burdens — are resistant to economic fluctuations captured in the corresponding real estate indices and regional transaction prices. In multivariate regressions, 1% market implied return on house values translates to a less than a 0.1% change in the dollar of assessment values. The standard proxies of property returns can only explain 0.22% of the variation in property assessment growth. This pattern is robust to controlling for policies that may restrict assessment values and total property tax revenue across states. In fact, states with the most freedom to assess in accordance to market values have tax revenues that are the least responsive to changes in market prices.

The degree of disagreement between assessment and market values is connected to local government finances. Properties sales for amounts significantly below tax roll assessment values are

[1] For instance, in an April 2009 speech to the Bank of International Settlements, the former Federal Reserve Chair, Ben Bernanke, implied that absent these key local property tax revenues, "States and municipalities are scrambling to find the funding to provide critical services." (https://www.bis.org/review/r090415a.pdf). Gordon et. al (2017) then analyze this as contributing factor in the bankruptcies of a number of municipalities in CA surrounding the financial crisis.

the largest in areas of high local deficits, suggesting that assessment values are propped up in part by the budgetary demands of the municipal authorities. The probability that an existing house will be reassessed, barring any in-kind transaction, is also positively related to market returns, providing evidence that reassessments are conduct to increase the tax base, and less to match assessment values to (declines in) market prices.

Smooth tax revenues can be a boon to municipal, county, and school district government- insulating their budgets against the volatility of the financial markets; however, if such patterns are unexplained by the legal tenets that explicitly govern such revenues nor the financial prices that form their basis, then the circumstances under which it occurs must be investigated cautiously. Given that declines in market prices poorly translate into the declines in any property tax revenues, we analyze the institutions that govern local real estate assessments.

Local assessment offices hold considerable sway over the attribution of real estate wealth to individuals and businesses. To observe this, we hand collect a panel of assessor identities from the various county websites and public databases between 2012 and 2020. We show that the identity of the assessment office has significant explanatory power over the accuracy of assessment values against actual sales. A head assessor, or a collection of possible head assessors, explains up to 15% of the variation in assessment accuracy. These changes are statistically significant- F-statistics on the goodness of fit rejects the null hypothesis that these assessors are unrelated to the accuracy of property assessments at the p-value of 0.01%. These low-profile, seemingly unimportant positions have considerable power over allocating individual tax burdens and fine-tuning assessment accuracy.

The final assessment value- and their implied tax burdens- therefore can be a combination of market values, the financial demands of the local authority, and the local authority's own personal preference and incentives. To dissect this mishmash of determinants, we take our analysis onto the personal properties of the individual assessors themselves. Using public records parsed from LexisNexis, we collect the personal property addresses of our panel of assessors, the assessors' individual characteristics and backgrounds, and several predetermined sets of comparable neighboring properties. We find that during our sample period, the assessors' primary property had experienced 0.712% lower growth in assessment values compared to their LexisNexis defined neighbors and 0.955% lower growth compared to other single household properties in the same county of their authority. These differences are quantitative large- composing 18% to 24% of the average assessment growth for all single home properties- and statistically significant. We further use hedonic regressions of changes in yearly assessment value on assessor ownership indicators. These regressions control for past property values, square footage, number of living rooms, and other available property characteristics, and indicators of linkage to assessors remain statistically significant and economically meaningful.

Finally, we relate the measurable property tax benefits accrued to individual assessors to the average county level assessment markups. Counties managed by assessors who obtain the most personal tax benefits typically also have the highest assessment markup against transaction prices. Our results indicate a tradeoff mechanism between the concentration of power and the provision of benefits and services.

Local authorities have tremendous flexibility in property value assessments despite the pervasive mandate for them to capture market prices. This flexibility in effect allows for revenue smoothing that insulates local budgets from the financial volatilities of the real estate market. We show that this revenue smoothing isn't costless, and have significant distributional effects on individuals tax burdens. We use this setting to dissect the combination of objectives in local governance, capturing a new channel of the trade-off between the individual and public incentives that shapes the political economy of municipal finance.

II. Relevant Literature and Institutional Details

Our work primarily links the expanding literature on local taxes and real estate assessments- in particular its features and redistributive effects- to the traditional literatures on public finance, public auditing, and the foundations of political economy.

A large literature ranging from academic studies and to popular press investigations examine the microdata of municipal property assessments. These works conclude that assessment offices typically place regressive burdens on the taxpayer (Paglin and Fogarty, 1972; Engle, 1975; Black, 1977; Clapp, 1990; Berry, 2021; and Amornsiripanitch, 2021), manifest in racial gaps (Kahrl, 2016; Atuahene and Berry, 2019; and Avenancio-León and Howard, 2022), and are associated with numerous cases of quid-pro-quo corruption (Newman, 2002; and Lagunes and Huang, 2015).

This body of evidence suggests that assessment offices have flexibility in influencing property assessment values and distributing tax burdens. Ours paper expands the frontier of this literature by providing a novel benchmark for analysts and policy makers to assess assessors- we provide the valuation of assessor's own homes as a measurable proxy of assessor power.

Furthermore, given our findings on distributive effects and measurable assessor influence, the key contribution in our paper is to link the power of these offices to the foundations of political economy. Assessors, while mandated to assign market prices, are implicitly hired and funded to increase the property tax base for the local governments (Geoffrey, 2022). We show that there is a tradeoff between the costs of allocating power into these offices, which allow for the accrual of personal gains to the assessor, and the benefits that these offices provide to local revenue and budgets.

Public finance and political economy, due to the limited availability of data and the lack of comparability between different governmental backgrounds, have focused on the national setting and the institutional divisions of power within a federal regime (Persson, Roland, and Tabellini, 2000; Acemoglu, Johnson, and Robinson, 2001; and Acemoglu, Johnson, and Robinson, 2002). In our setting of property assessments by municipal governments, our focus is the deviation between assessment and transaction implied market values. This markup of assessment values is manifestly simple to calculate and straightforward to compare. Therefore, our setting allows the use large panels of local governments and authorities to test theories of political power. By analyzing the prime source of local government revenue in property taxes, we contribute by enlarging the frontier of public finance and political economy.

As far as we can tell, we are the also first study that links a comprehensive dataset of local public officials – assessors- to the measurable efficacy and characteristic of their public office. This is much akin to the literature on executives, board members, and their characteristics in corporate finance (Bertrand and Schoar, 2003; Malmendier and Tate, 2005; Adams and Ferreira, 2009; Faccio, Marchica, and Mura, 2016; Smith, Yagan, Zidar, and Zwick, 2019; and potentially many others). We use SmartLinx from LexisNexis to identify personal backgrounds and owned properties, similar to the extraction of fund manager and CEO backgrounds (Pool, Stoffman, and Yonkers, 2015; Yonkers, 2017a; and Yonkers, 2017b).

Finally, our paper provides a fuller picture of local governmental finances. Recent literature in finance examines the micro-characteristics of municipalities by analyzing the dynamics of the municipal bond market. These papers compare the yields and the realized returns of municipal bonds as related to individual government and other local characteristics (Butler, Fauver, and Mortal, 2009; Gao, Lee, and Murphy, 2019; Gao, Lee, and Murphy, 2020; Chen, Cohen, and Liu, 2023). Given the idea of Ricardian Equivalence (Barro, 1974; Buchanan, 1976), that debt and tax revenues are substitutes, our examination of the prime source of local tax revenue complements this existing literature by describing the main sources of tax revenue that supports local expenditures.

III. Main Results

A. Property Tax Revenue and Market Value Growths

To begin our analysis, in Figure 1, we plot the Zillow US Home Value Index and the total property tax revenues of our balanced panel of US local governments between 2000 and 2020. The Zillow US Home Value Index (ZHVI) is the time series of monthly changes in house value that is estimated by the Zillow corporation, which has considerable access to the U.S. housing market.[2] The US local government panel is derived from the US Census and contains all identifiable US local governments that have annual observations between 2000 and 2020. We provide the summary statistics of the county level data in the Panel A of Table 1.[3]

In Figure 1, we see that the main feature of the Zillow Home Value Index is the growth and decline in property value between 2006 and 2012. This feature, driven by the boom and bust of the US housing market, can also be observed in other similar value indices, such as the Case-Shiller U.S. National Home Pricing Index or the US Federal Housing Finance Agency's Transaction Price Index. This pattern is ostensibly absent from the aggregate property tax revenue levels, which are naturally based on the quantity of taxable households and their prices.

In order to reconcile the total property tax revenues with the secular decline in prices, the quantity of taxable properties must have increased dramatically to compensate. However, an immediate survey of the conditions of the housing market indicates that the quantity of taxable properties grew only modestly or even declined during this period. In Figure 2, FRED's New One

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[2] This time series is based on the monthly changes in the levels of Zestimate, which is the proprietary "market" value estimates of individual homes by the Zillow Corporation. In describing the Zestimate, Zillow states that these estimated individual home values are within 10% of the transaction values 95% of the time at any moment in time.

[3] Part of this panel was derived from the census, while other variables were derived using aggregation of the ZTrax database which we will describe in the following section.

Family Home Sales in the United States (Series: HNFSEPUSSA) followed the same pattern of rise and decline as the price indices. That is, the quantity and prices, at least for this sample period, were positively related. The smooth pattern of property tax revenue remains seemingly unexplained by the market conditions of both prices and quantity.

This aggregate pattern of tax revenues repeats across individual states- operating within a wide spectrum of legal and institutional frameworks. In Figure 3, we decompose the aggregate property tax revenue into states with and without explicit assessment limits, to states with and without levy limits, and specifically limiting to states without any explicit limits to the assessment process. The smoothness of property tax revenues exhibits itself in every one of the following decompositions of the US properties market.

We first decompose the aggregate trend to states with and without explicit limits to the growth rate of assessment values. There are 19 states that limit possible changes in property assessment values. For instance, California's proposition 13 limits the yearly change in assessment values to 2% for non-transacted properties. It is possible that these assessment limits accumulate excess undervaluation that cushions the declines in assessment values during market corrections.

Panel A of Figure 3 plots the growth of property tax revenues for states with (blue) and without assessment limits (orange) separately. It appears that legal limits on assessment value growth have very little to do with the upward trend on property tax revenue itself. Rather contrarily, states with assessment limits tend to have revenue levels that modestly stagnate when property prices decline. States without such limits tend to have smoother upward trends in property tax revenues, indicating that these limits are likely not responsible for the modest connection between property tax revenue and property market values.

Similarly, there are 37 states with levy limits- constraining the total tax revenue growth that can occur within a local government. These limits are not placed on individual properties, but are on the total tax revenue that a local authority may collect. Panel B of Figure 3 decompose the aggregate tax revenues into states with (blue) and without (orange) these limits. Both time series both show a pattern of revenue smoothening. Again, the constrained set of states show a greater reflection of the aggregate real estate market conditions than the unconstrained states; indicating that these limits are likely not responsible for overall smoothness of property tax revenues.

Lastly, Panel C plots the tax revenue limits for New Hampshire, Vermont, and Tennessee. These areas are known to have zero property tax restrictions at the state level. In this panel, we see a reflection of the aggregate trend in tax revenues that is divorced from prices and quantity. Collectively, these decompositions shows that aggregate smoothening of property tax revenues is likely not rooted in the legal framework of the state governments.

We further provide evidence of this revenue smoothening pattern by conducting multivariate regression analysis of the growth of property assessment values at the county levels. Table 2 regresses growth of the average single family homes aggregated at the county level against various sets of proxies on county level growth in property values. We include various lags, and winsorize both the left-hand side and the right-hand side variables at the 2.5% and 97.5% confidence levels, to give the regression models their best chance at explaining the variation in property assessment values.

Columns 1 through 3 regresses growth in assessment values using a simple univariate specification with the prior annual market value growth with varying lags as the only explanatory variables. Column 4 includes all the lags of left-hand side variables to account for possible reporting delays. Columns 5 and 6 regress the y-variable with year and county level fixed effects to benchmark the explanatory power without property value indices. In explaining against the growth of property tax revenues, designated market indices have only marginal explanatory power over our sample period. The simple univariate analysis explains about 0.22% of the variation in tax revenue growth. This is despite the legal mandate to capture market variation in prices at every state within the union.

Furthermore, the magnitudes of the relationship between market returns and property assessment growth are economically miniscule. A 1% market return only implies a 0.03% change in tax revenues. The explanatory power is slightly stronger at 1 to 2 year lags, where a market return of 1% translates to between 0.08% to 0.1% change in tax revenues. However, for property tax evaluation schemes that are mandated to capture market prices at a 1 to 1 basis, there is a distinctive disconnect between the foundational source of property tax revenue and property returns.

We find that the changes in property assessment values are disjoint from market returns using the industry-standard proxy of market values. This disconnect cannot be explained by state-level restrictions of assessments and property tax levies. In the rest of the paper, we will provide evidence that this disconnect can be explained by county level budgetary characteristics and biases in the frequency of reassessments. Furthermore, we will show that at the county level, assessment offices have considerable flexibility in the determination of assessment values and the levels of this assessment gap.

B. Assessment Values and Transaction Values.

The next step in our next analysis joins the panel series of property taxes to the individual transactions and assessment values. Micro data on U.S. properties allows us to capture the actual gap between a property's assessment values and its potential transaction value. We use this data to provide evidence that the disconnect in assessment prices is rooted in the budgetary characteristics of local governments.

The micro data on property values and transactions consists of the tax roll and transactions of US properties from the Zillow ZTrax database. This database contains the historic assessment values, house characteristics, and sales transactions across all 50 states. This database was provided by the Zillow corporation on an as-is basis for academic research. Specifically, it contains tax roll assessment values between 2000 and 2015 (in the historic version of this panel) and 2017 to 2020 (using the corporation's contemporaneous version of the data). Additionally, the transaction dataset contains property sales- with the acting parties, the dollar value of the sale, and the conditions of the properties at the time of the sale over their available history. We provide summary statistics on this dataset in Panel A of Table 1.

To capture the degree of over or under valuation by local assessment offices, we take all single-family home transactions and match these transactions to the latest assessment values from the tax roll dataset. This enables us to calculate a property's transaction deviation to the assessment values at the individual level. A property that was assessed at $400,000, but only sold for $500,000, has an assessment deviation of 25% ($100,000/$400,000). Likewise, a similar property that was assessed at $400,000, but sold for $300,000, has a transaction deviation of -25%. We aggregate these numbers to the county-year level: all properties that were sold for prices between $100,000 and $800,000 is averaged yearly within each county to provide the average transaction deviation (*% Diff Between Sales and Assessed Value*). Similarly, we also calculate the percentage of properties that undersold their assessment values by over 10% of the assessment price as *% Sold 10% Below the Assessed Value* each year.

In Table 3, we regress *% Diff Between Sales and Assessed Value* and *% Sold 10% Below the Assessed Value* against a variable that captures the budgetary constraint facing each county. *Local Government Deficit*- the primary explanatory variable- is the ratio between total expenditure and the total revenue of local governments aggregated at the county level. Columns 1 through 4 uses *% Diff Between Sales and*

Assessed Value as the left-hand side variable, while columns 5 through 8 uses *% Sold 10% Below the Assessed Value*. Columns 1 and 5 regresses these against county level deficits. Columns 2 and 6 adds local county level fixed effects as well as two additional controls for population and the importance of property tax revenues. Columns 3 and 7 uses year fixed effects. Finally, in the most demanding regression models in columns 4 and 8, we use all of the prior controls.

We observe that on average, the counties with the highest deficits tend to have the highest over-assessment. In the fully specified multivariate setting (columns 4 and 8), a 10% increase in county level expenses against revenue indicates a 28.3% lower average property sales price, and a 11.3% greater chance that a property will be sold at least 10% below their assessed values. This relationship is more significant without yearly fixed effects as the 2007 through 2009 financial crisis provides the most dramatic change in country level market values.

Furthermore, we examine the frequency of reassessments of properties outside of sales or other in-kind transfers. In table 4, we regress the proportion of existing non-transferred properties that were reassessed (had changes in assessment values) against proxies of market returns. We find that counties typically increase reassessments by up to 5% during periods of high market returns. Such a reassessment mechanism automatically prevent negative market returns from entering into the assessment values of properties- indicating that property reassessments typically occur only during periods of market boom.

Our detail micro data on the assessment values and transaction prices allows us to link local county characteristics to the gap in the assessment valuations of residential properties. We find that counties that have greater budgetary constraints have significantly higher value assessments when compared to market transaction prices. We will examine individual assessment offices and their officers to explain the variation in the degree of budgetary assessment next in our analysis.

C. Local Assessment Offices

We focus on the local assessment offices to show that these institutions hold considerable sway over the attribution of real estate wealth to individuals and businesses.

To provide this evidence, we hand collect an unbalanced panel of assessor identities from the various county websites and public databases between 2018 and 2020. In this process, we collect the names and locations of available county officials from several public sources.[4] We show that the identity of the assessment office has significant explanatory power over the accuracy of assessment values against actual sales. A head assessor, or a collection of possible head assessors, explains 7% to 15% of the total variation in assessment accuracy. These changes are statistically significant- F-statistics on the goodness of fit rejects the null hypothesis that these assessors are unrelated at 0.01% levels. These small, seemingly unimportant positions have considerable power over the finances of local government through allocating individual tax burdens.

In Table 5, we ask what- besides deficits- explains the degree of assessment gap in property price values. The explained left-hand side variables are the same *% Diff Between Sale and Assessed Value* and *% Sold 10% Below the Assessed Value* as in Table 3. We focus on whether individual head assessor identities- as explanatory variables- can rationalize the variation of this assessment gap between counties across time. We filter our initial data by requiring a county to have at least two different identified primary assessors working at different times within its available history (since a county with a single identifiable head assessor won't have any functional variation in assessor identities). Columns 1, 3, 5, and 7 report the goodness of fit for model specifications without using any assessor related

[4] For smaller counties, we rely on scraping the First Connect website for assessment officials.

variation. These regressions serve as the benchmarks that the identities of assessors are challenged to improve upon.

Columns 2, 4, 6, and 8 then takes the residual variation from these prior benchmark regressions and further regress them against the panel of assessor indicators. These assessor fixed effects have the value 1 only when an individual assessor is in office, and 0 otherwise. These regressions analyze whether the identity of the head assessment officer make any difference in the average valuation gap of single-family houses during his tenure. The rows of these columns then report the incremental goodness of fitness from the respective benchmark specifications. The F-statistics in the table represent the respective Assessor Fixed Effects' incremental explanatory power over the residuals after including County Fixed Effects (Columns 2 and 6) and both County and Time Fixed Effects (Columns 4 and 8). The p-values associated with these F-statistics are the probability that the observed correlation between individual assessors and the levels of assessment gap may be observed without any underlying associations. In all 4 cases, we reject the null that individual assessors are unrelated to the assessment gap at 0.0001 probability.

The underlying officers that man these property assessment offices matter significantly to the magnitude of the gap between a property's assessment and transaction values. We show this fact by reporting the incremental goodness of fit statistics of assessor identity fixed effects for several linear models of this assessment gap. For the next part of our analysis, we move to a natural setting to measure the flexibility and the discretion of their political offices- the valuation of an assessors' own homes.

D. Assessing Assessment Officer Properties

We use the setting of comparing assessment value assignments toward personal and nonpersonal properties to identify the interaction of private and public incentives in the municipal political economy. We ask, given the role of providing for a form of public service- by attributing taxes to individuals- do assessors internalize certain benefits? Is there a trade-off between using a flexible revenue collection system and allowing for certain pecuniary benefits to accrue to public officials?

Joining our data on assessment identities and property prices is the LexisNexis SmartLinx Comprehensive Persons Report. We query this database for information on the owned properties, employment history, the first 5 digits of the social security number, criminal arrests, immediate relatives, possible business associates, licenses, business registrations, and a gamut of other available public records of the assessors that we had hand collected.

Specifically, for each assessor-county pair, we query the database using the assessor's first name, last name, and county location. If the system returns more than a single unique match, we parse first 10 results for information that directly identify the individual's role as a property assessor.[5]

The SmartLinx system also helps us match individuals with possible alternative names and other data noise to the appropriate public records- hereby handling identification issues with using name and locations alone. For example, a query of Mike Pence from Indianapolis, Indiana gives – as the first-person report- a Michael R. Pence who currently resides in Zionsville, Indiana, actively registered as a Republican Absentee voter, having a history of addresses that span 1987 to 2023.

[5] These identifying keys are 1) email addresses associated with the U.S. government – that is, emails ending in .gov and .us domains and 2) the person's job titles which include either appraiser or assessor as keywords. The first record that contains such an identifying requirement or the only unique recorded individual is matched as the public record of the assessor-county pair.

Name and social security number, along with other possible identifiers, link an individual's public records together in the SmartLinx database, thereby stitching the history of records such as multiple deeds, licenses, and addresses. A common problem with using individual public records is identifying whether multiple deeds with the same name actually belong to the same individual or multiple individuals with the same name. Appropriately, because of the SmartLinx algorithm, our data is able to detail an individual's current address information, his collection of possible secondary properties, and his prior addresses. In the prior example, Mike Pence's previously designated address was a 4-digit P.O. Box in Washington DC.

We then match these properties to the ZTrax dataset to obtain their recent assessment history and their recent (if any) transaction prices.We find that assessor properties have assessment values (and tax burdens) that tend to grow at a slower pace than 1) their LexisNexis defined neighbors, 2) the average single-family home within their county, and 3) the average single-family home within their county after controlling for house-related characteristics. We tabulate these results in Tables 5 and 6.

In Table 6, we record the average yearly change in assessment values, the average change in dollar property tax, and the actual assessment values between the homes owned by assessors, the comparable homes within their neighborhood, and other single-family homes within their county. We find that there is a difference of 0.712% (t = 3.063) in the appreciation rates of assessors and their LexisNexis designated neighbor, and a 0.955% (t = 5.769) difference between assessor properties and other single-family homes within his county. These differences are economically meaningful- during our sample period, assessor properties had tax-related assessment values that grew at 20% to 24% slower proportional pace than comparable properties.

The difference in assessment values is also directly related to the reported data on tax burdens.[6] There is a 0.496% (t = 2.187) difference between the growth of tax amounts for assessor properties and their LexisNexis designated neighboring properties, and 0.539% (t = 3.062) difference between assessor properties and other single-family homes within his county. In terms of proportional magnitudes, assessor properties had property tax amounts that grew at 16% to 17% slower pace than comparable properties.

We can also assess these differences using hedonic regression models that account for square footage and other property level characteristics. In Table 7, we find that in the multivariate setting, properties owned by an assessor experience about 1.19% (t = 4.546) slower growth rate in assessment value and 1.46% slower (t = 4.430) growth rate in dollar taxed amounts than those owned by non-assessors. These differences can also be seen in the levels of assessment valuation. Assessor properties generally have a lower level of assessment values- a difference of $4,270 (t = 3.750)- than comparable properties within the same county.

In Table 8, we further decompose assessor properties into ones within the county of his authority and ones located out of the county. *Within County* is an indicator for whether a property is associated with an assessor and located within the county of his influence. *Outside County* are all other properties associated with the assessors in our data. We observe that the primary effect occurs in areas that the assessor has jurisdiction in terms of property assessments. *Within County* is associated with 1.23% (t = 4.676) lower assessment value growth, 1.46% (t = 4.481) lower tax value growth, and $4,353 (t = 3.829) in assessment values. Assessor properties located outside of his county have no statistically significant association with the left-hand side variables.

[6] When present, the ZTrax tax roll dataset reports both assessment values and the actual taxed amount in the. The tax amount is populated less than assessment values in the ZTrax contemporaneous data, and significantly less in the ZTrax historic data; therefore, we focus primarily on assessment values but report both variables in the cases they're available.

There appear to be a systematic lower growth rate both in assessment values and the resulting tax burdens for the properties owned by local assessors. This systematic difference is economically meaningful for an individual assessor and will be used in the next section as measures of personal benefit to dissect the tradeoffs in the political economy of a local government.

E. Assessor Benefits and the Average Assessment Markup

Lastly, we relate the findings between assessor's own pecuniary benefits and the average assessment valuation markup. We show that there appear to be a positive association between the markup in assessment values across a county as analyzed in section III.B and the degree of undervaluation of an assessor's own household. We argue that this fact provides evidence of a tradeoff between an assessor's ability to accrue private benefits and contributing to the fiscal health of the local government.

In Table 9, we regress the average markup of assessment values in the panel of county-time observations against the average gap in property growth rates of assessor related properties against neighboring properties. In column 1, we simply relate an assessor's slower growth in his house values against the markup in assessment values of his county. We find that the slower an assessor is to evaluate his own property upwards against his neighboring properties, the more likely homeowners in his county will sell their properties below their county assigned assessment values. These two metrics are negatively related, even after including county and time fixed effects in Columns 2 and 3. The more flexibility that an assessor has to accrue a slower increase in his own tax burden, the more likely that properties will be overvalued against their eventual transaction prices.

We present this as evidence that there is a tradeoff in the power structure of the local government. Our results show that the degree that an assessors internalize certain benefits is positively related to the overall overvaluation of properties against transaction prices within a county.

IV. Conclusion

We provide large sample evidence that local property tax revenues, which are municipalities' single largest source of discretionary revenue - do not grow in line with the property values that they aim to track. In particular, we find that revenues are "overly" smooth and upward sloping, nearly independent in some instances of fundamental housing price dynamics. We provide evidence that this revenue smoothing may be rooted in the political economy of these municipalities, in that there is a marked asymmetry of property tax re-assessments based on their implication for bottom-line county revenue. They spike during positive markets - increasing tax revenue for the municipality, but fail to show the same sensitivity to negative markets - which would decrease tax revenue collected.

We find that measures of local municipal budget constraints are further positively related to amount taxed per unit value – finding a significant relation between municipal budget issues and a property's total dollar assessment value relative to its eventual transaction price. Turning to the individual tax assessors themselves, we hand-collect detailed data on their backgrounds and each property they own. We find that they appear to hold sway in the property assessment process, assessing their own personal properties at significantly lower values than neighbors (which are otherwise hedonically identical); and having tax bills that grow significantly slower than these neighbors. Furthermore, we find a link between this individual assessor behavior and that of the municipalities they serve, in that the tax assessment gap between their properties and neighbors is significantly positively associated with the tax-maximizing municipality behaviors observed.

References

Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2001. "The Colonial Origins of Comparative Development." *American Economic Review*, 91(5): 1369-1401.

Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2002. "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution." *The Quarterly Journal of Economics*, 117(4): 1231-1294.

Adams, Renee B., and Daniel Ferreira. 2009. "Women in the Boardroom and Their Impact on Governance and Performance." *Journal of Financial Economics*, 94(2): 291-309.

Amornsiripanitch, Natee. 2021. "Why Are Residential Property Tax Rates Regressive?" *Unpublished Working Paper.*

Atuahene, Bernadette, and Christopher Berry. 2019. "Taxed Out: Illegal Property Tax Assessments and the Epidemic of Tax Foreclosures in Detroit." *UC Irvine Law Review*, 9(4): 847-886.

Avenancio-León, Carlos F., and Troup Howard. 2022. "The Assessment Gap." *Quarterly Journal of Economics*, 137(3): 1383-1434.

Barro, Robert J. 1974. "Are Government Bonds Net Wealth?" *Journal of Political Economy*, 82(2): 1095-1117.

Berry, Christopher R. 2021. "Reassessing the Property Tax." *Unpublished Working Paper.*

Bertrand, Marianne and Antoinette Schoar. 2003. "Managing with Style: The Effect of Managers on Firm Policies." *The Quarterly Journal of Economics*, 118(4): 1169-1208.

Black, David E. 1977. "Property Tax Incidence: The Excise-Tax Effect and Assessment Practices." *National Tax Journal*, 30(4): 429–434.

Buchanan, James M. 1976 "Barro on the Ricardian Equivalence Theorem." *Journal of Political Economy*, 84(2): 337-342.

Butler, Alexander W., Larry Fauver, and Sandra Mortal. 2009. "Corruption, Political Connections, and Municipal Finance." *The Review of Financial Studies*, 22(7): 2873-2905.

Chen, Huaizhi, Lauren Cohen, and Weiling Liu. 2023. "Calling All Issuers: The Market for Debt Monitoring." *Unpublished Working Paper.*

Clapp, John M. 1990. “A New Test for Equitable Real Estate Tax Assessment.” *The Journal of Real Estate Finance and Economics*, 3(3): 233-249.

Engel, Robert F. 1975. “De Facto Discrimination in Residential Assessments: Boston.” *National Tax Journal*, 28(4): 445-451.

Faccio, Mara, Maria-Teresa Marchica, and Roberto Mura. 2016. “CEO Gender, Corporate Risk-Taking, and Efficiency of Capital Allocation.” *Journal of Corporate Finance*, 39: 193-209.

Gao, Pengjie, Chang Lee, and Dermot Murphy, 2019. “Municipal Borrowing Costs and State Policies for Distressed Municipalities.” *Journal of Financial Economics*, 132(2): 404-426.

Gao, Lee, and Murphy, 2020. “Financing Dies in Darkness? The Impact of Newspaper Closures on Public Finance.” *Journal of Financial Economics*, 135(2): 445-467.

Geoffrey, Propheter. 2022. “An Impact Analysis of California’s State-County Assessors’ Partnership Agreement Program.” *California Journal of Politics and Policy*, 14(1): 1-26.

Kahrl, Andrew W. 2016. “The power to destroy: Discriminatory property assessments and the struggle for tax justice in Mississippi.” *Journal of Southern History*, 82(3):579–616.

Lagunes, Paul F., and Rongyao Huang. 2015. “Saving Gotham: fighting corruption in New York City’s Property tax system.” Greed, Corruption, and the Modern State Essays in Political Economy, edited by Susan Rose-Ackerman. *Edward Elgar Publishing*.

Newman, Andy. 2002. “Records Show Wide Variety in Lifestyles of Assessors.” *The New York Times*. 28 February.

Paglin, Morton, and Michael Fogarty. 1972. “Equity and the Property Tax: A New Conceptual Focus.” *National Tax Journal*, 25(4): 557-565.

Persson, Torsten, Gérard Roland, and Guido Tabellini. 2000. “Comparative Politics and Public Finance.” *Journal of Political Economy*, 108(6): 1121-1161.

Pool, Veronika K., Noah Stoffman, and Scott E. Yonkers, 2015. “The People in Your Neighborhood: Social Interactions and Mutual Fund Portfolios.” *The Journal of Finance*, 70(6): 2679-2732.

Smith, Matthew, Danny Yagan, Owen Zidar and Eric Zwick. 2019. “Capitalists in the Twenty-First Century.” *The Quarterly Journal of Economics*, 134(4): 1675-1745.

Yonkers, Scott E. 2017a. "Do Managers Give Hometown Labor an Edge?" *The Review of Financial Studies*, 30(10): 3581-3604.

Yonkers, Scott E. 2017b. "Geography and the Market for CEOs." *Management Science*, 63(3): 609-630.

U.S. Census Bureau. 2023. "Quarterly Summary of State & Local Tax Revenue Tables." https://www.census.gov/data/tables/2023/econ/qtax/historical.html.

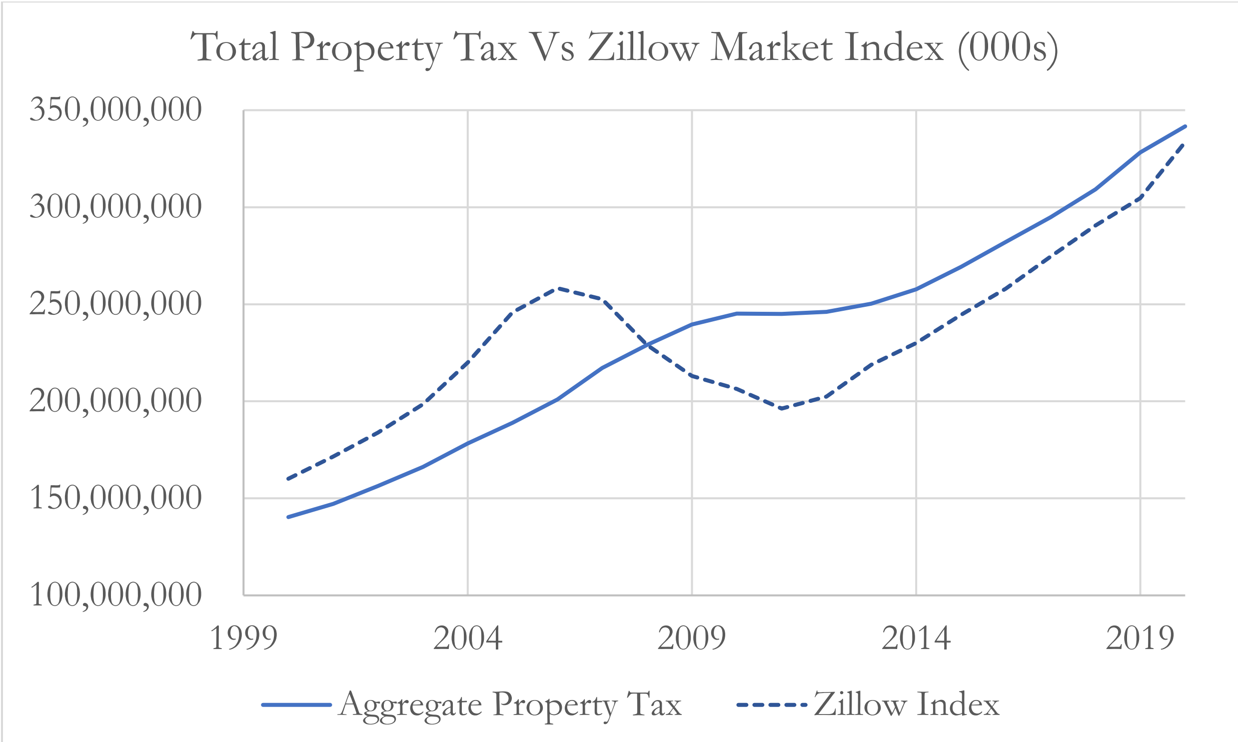


Figure 1. The Aggregate Property Tax revenue and the Zillow US Home Index. The Aggregate Property Tax time series, in blue, is calculated as the sum of all property tax revenues from local US governments that are observed annually (in a balanced panel) in the U.S. Census. The Zillow US Home Index is plotted in the dash-blue, and is normalized by the 2008 aggregate property tax revenue.

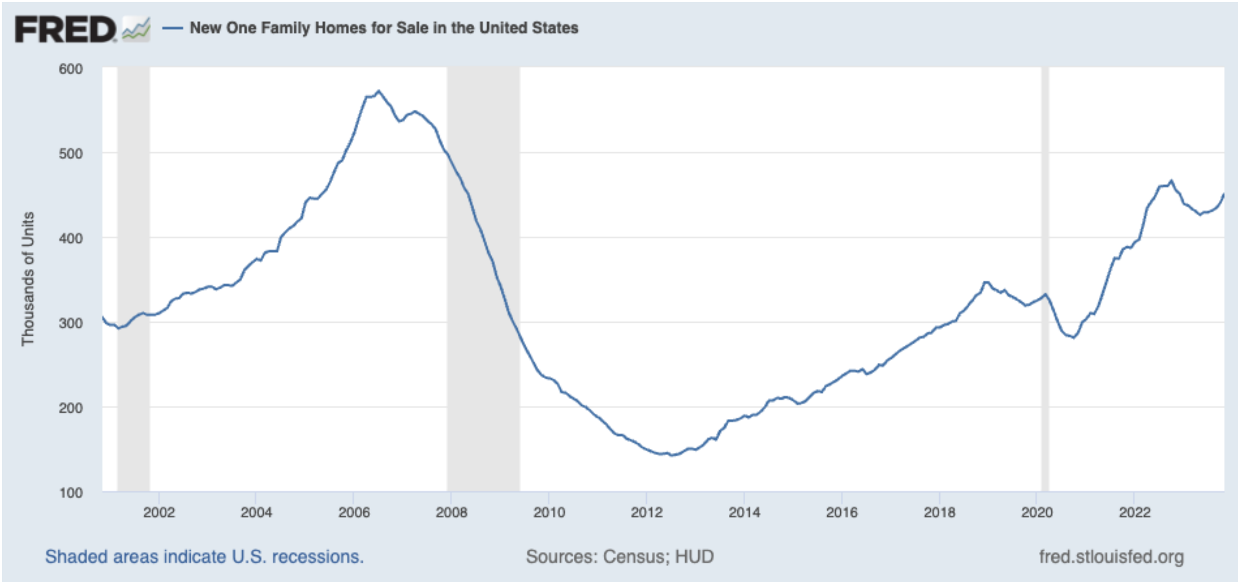
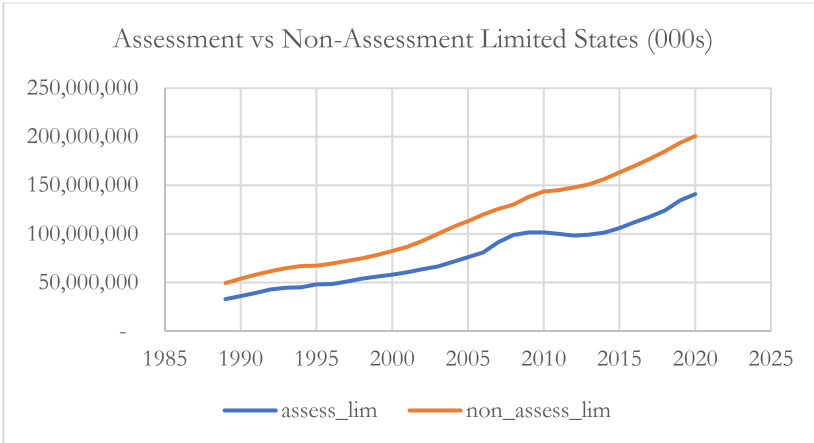
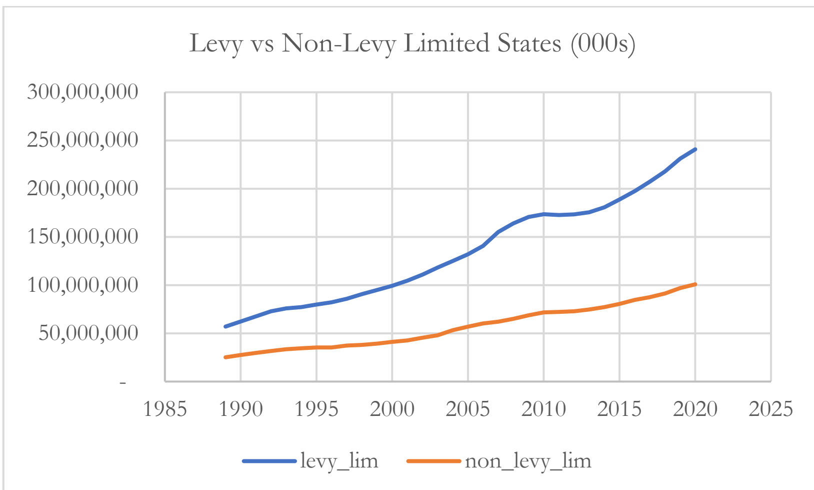


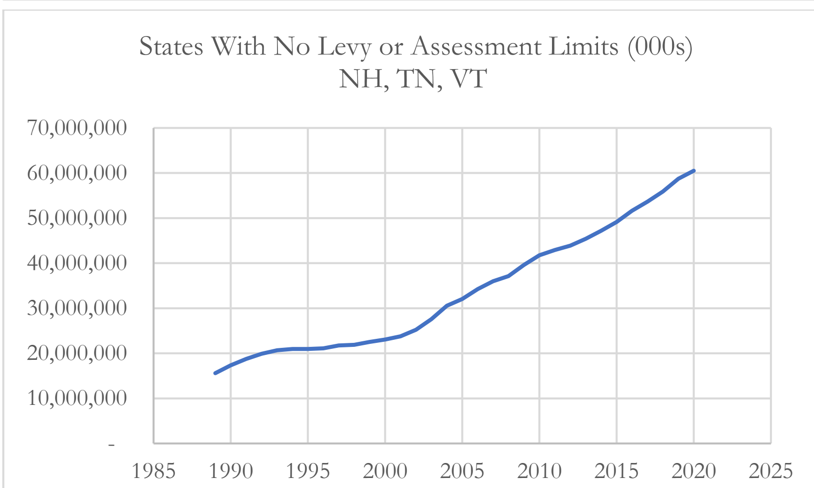
Figure 2. Federal Reserve Economic Data's New Family Homes for Sales in the United States Time Series.



Panel A



Panel B



Panel C .

Figure 3. Decomposing the dollar of property tax revenue into (Panel A) assessment and non-assessment limited states, (Panel B) levy and non-levy limited states, and (Panel C) states with the fewest restrictions on property tax revenue limits.

Table 1. Summary Statistics

	Local Government Level					
	10th P.	Median	90th P.	Mean	Std.	N
% Diff Between Sales and Assessed Value	-13.3%	16.3%	97.1%	29.0%	48.3%	6,559
% of Properties Over Assessed	4.36%	16.5%	58.9%	24.8%	22.0%	6,559
Deficit	-5.73%	1.86 %	11.1%	2.38%	6.61%	6,559
Population	101,941	274,339	977,6950	493,325	771,318	6,559
Property Tax as % of Total Tax	58.2%	79.0%	98.06%	78.3%	15.4%	6,559

Panel A.

	Property Transactions					
	10th P.	Median	90th P.	Mean	Std.	N
Sales Price	$43,500	$165,000	$516,000	$276,083	$498,998	119,425,837
Transaction Year	1998	2008	2018	2008	7.5	119,425,837
Sellers Per Transaction	1	1	2	1.54	0.90	119,005,541
Buyer Per Transaction	1	1	2	1.47	0.68	118,975,012

Panel B.

	Property Characteristics					
	10th P.	Median	90th P.	Mean	Std.	N
Assessment Value (Contemporary)	$136,980	$282,635	$676,000	$369,146	$360,153	16,895,963
Assessment Year	2018	2019	2020	2019	0.62	16,895,963
YoY % Change in Assessed Value	0%	2.00%	13.49%	5.43%	24.25%	16,895,963
Tax Amount	$2,059	$4,655	$10,852	$6,140	$8,321	16,895,963
YoY % Change in Tax Amount	-1.74 %	2.31 %	12.91%	7.24%	54.28%	16,895,963
Year Built	1940	1978	2006	1975	25	16,440,858
Square Footage	1,004	1,681	3,080	2,047	3,189	15,729,806

Panel C.

This table summarizes the main variables used in the study.
The top Panel A contains county-year characteristics. *% Diff Between Sales and Assessed Value* is the average deviation between sales and assessed values at the county-year level for the transacted properties. *% Sold 10% Below the Assessed Value* is the percent of transacted properties that are sold at least 10% below their assessed values in the county-year. *Non-Property Tax Decline* is an indicator for a nominal decline in the aggregate non-property tax revenues collected by all local governments within a county. *Log Population* is the natural log of the last available census population survey. *Number of Tax Authorities* is the number of different independent local governments operating in a county. *Assessment Capped* is whether there is a limit to assessment prices increases in the state of a county.
The data on property transactions and assessment values are provided using Zillow ZTRAX. The sample period is from 2000 to 2020. The middle Panel B contains the summary statistics on the transaction characteristics in the historic transaction roll. The bottom Panel C. contains characteristics of individual properties as derived from the contemporaneous assessment data. *Sales Prices* are the transaction prices of an individual sale. *Assessment Prices* are the observed residential property assessment values per year. *Over Assessed* is an indicator for whether a property is sold at a 10% discount to the previous year's *Assessment Price*.

Table 2. Changes in Tax Revenue Against Property Market Returns

	(1)	(2)	(3)	(4)	(5)	(6)
	Value Weighted Average Growth in Assessment Value$_t$					
Market Return$_t$	0.0267***			0.0247***	0.0300***	0.0403***
	(4.150)			(3.471)	(4.411)	(6.221)
Market Return$_{t-1}$		0.0767***		0.0845***	0.0555***	0.0605***
		(10.95)		(11.53)	(8.234)	(8.479)
Market Return$_{t-2}$			0.0885***	0.0932***	0.0458***	0.0478***
			(12.33)	(13.72)	(7.610)	(8.212)
Year FE	No	No	No	No	Yes	Yes
County FE	No	No	No	No	No	Yes
Observations	8,908	8,157	7,389	7,382	7,381	7,240
Adjusted R-squared	0.002	0.021	0.027	0.053	0.136	0.217

This table regresses changes in property assessment values against property market returns. *The Value Weighted Average Growth in Assessment Value* is aggregated at the county level. *Market Return* are measured using the Zillow US Home Value Index at the county level. This index uses Zillow's proprietary Zestimates, which captures individual home values within 10% of their transaction values 95% of the time at any moment in time.

Table 3. Over-Assessments

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	% Diff Between Sale and Assessed Value				*% Sold 10% Below the Assessed Value*			
Local Government Deficit	-0.972***	-0.933***	-0.438***	-0.283***	0.692***	0.673***	0.104**	0.113***
	(-9.989)	(-9.110)	(-3.900)	(-3.402)	(10.91)	(9.737)	(1.967)	(2.682)
Log Population		0.217***	0.110***	0.522***		-0.141*	-0.0173***	-0.213***
		(2.902)	(7.123)	(4.115)		(-1.728)	(-3.207)	(-3.556)
Property Tax as % of Tax Revenue		-0.888***	0.419***	-0.528***		0.625***	-0.0716**	0.249***
		(-5.140)	(5.273)	(-4.001)		(5.034)	(-2.060)	(3.803)
County Fixed Effect	No	Yes	No	Yes	No	Yes	No	Yes
Year Fixed Effect	No	No	Yes	Yes	No	No	Yes	Yes
Observations	6,524	5,761	5,798	5,761	6,524	5,761	5,798	5,761
Adjusted R-squared	0.417	0.431	0.253	0.586	0.252	0.269	0.511	0.710

This table regresses the average percentage difference between the sale price of properties and their prior public assessment value against local characteristics. The panel consists of counties-year observations between 2000 and 2020 with at least one thousand properties transactions in the *ZTrax* database. *% Diff Between Sale and Assessed Value* is the average percentage difference between the sale price of homes and their prior assessed value within a county. *% Sold 10% Below the Assessed Value* is the percentage of homes sold for 10% less than their assessed values. The sample of sold homes aggregated at the county-time level consists of those with between $100,000 and $2,000,000 in assessed value. *Local Government Deficit* is the percentage difference between the total expense and total revenue expressed as a percentage of the total revenue over the county. The local governments used for the county level aggregation consist of County, Municipal, Townships, and School Districts. *Log Population* is the natural log of a county's population. *Property Tax as % of Tax Revenue* is total property tax divided by the total observed tax.

Table 4. Reassessment Tendency

	(1)	(2)	(3)	(4)	(5)
	% of Observed Properties Reassessed				
	All States			Capped States	Non-Capped
Market Returns	0.102***	0.0500**	0.0560**	0.0583*	0.0724*
	(3.893)	(2.071)	(2.145)	(1.806)	(1.859)
County FE	No	Yes	Yes	Yes	Yes
Time FE	No	No	Yes	Yes	Yes
Observations	7,883	7,764	7,764	3,723	4,041
Adjusted R-squared	0.001	0.508	0.511	0.605	0.323

This table regresses the year-county panel of % of observed non-transacted properties that were reassessed against lagged market returns. *% of Observed Properties Reassessed* is the percentage of residential properties valued between $100,000 and $2,000,000 whose assessment value changed in each county. *Market Returns* is the yearly percentage change in the average transaction price of properties within the county last year. Columns (1), (2), and (3) conducts the regression across all states. Column (4) conducts the regression on states that explicitly limit changes in a property's assessment value. Column (5) conducts the regression on states with no explicit limits.

Table 5. Assessment Officials and Goodness of Fit

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	% Diff Between Sale and Assessed Value				*% Sold 10% Below the Assessed Value*			
F-Stat		1.99		1.42		2.74		1.64
Probability > F		0.0000		0.0001		0.0000		0.0000
County Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	No	No	Yes	Yes	No	No	Yes	Yes
Official Fixed Effect	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,342	1,342	1,342	1,342	1,342	1,342	1,342	1,342
Adjusted R-squared	0.408	0.551	0.575	0.645	0.206	0.462	0.687	0.749

This table reports the goodness of fit of regressions using identified officials fixed effects and other fixed effects. *% Diff Between Sale and Assessed Value* is the average percentage difference between the sale price of homes and their prior assessed value within a county. *% Sold 10% Below the Assessed Value* is the percentage of homes sold for 10% less than their assessed values. The sample of sold homes aggregated at the county-time level consists of those with between \$100,000 and \$2,000,000 in assessed value. The F statistics for the inclusion of officials FE are calculated by first residualizing the left-hand side variable against all other fixed effects, and then regressing these residuals against assessor fixed effect indicators.

Table 6. Assessment Official Properties (Sample Averages)

Panel A. Assessor Primary Address Comparison with Lexis Nexis Neighbors

	% Change in Assessed Value	% Change in Tax Amount	Total Assessed Value
Assessor Properties	2.762%	2.642%	$391,251
Neighbor Properties	3.475%	3.138%	$400,121
Difference	-0.712%	-0.496%	-$8,870.01
T-Stat	(-3.063)	(-2.187)	(-1.071)
N	422	397	422

This panel compares the yearly assessment characteristics of an assessor's primary legal address with that of his Lexis-Nexis defined neighbors. The sample is between 2018 and 2020.

Panel B. Assessor Primary Address Comparison with Residential Properties Within a County

	% Change in Assessed Value	% Change in Tax Amount	Total Assessed Value
Assessor Properties	2.995%	2.926%	$400,726
Neighbor Properties	3.951%	3.465%	$381,245
Difference	-0.955%	-0.539%	$19,481
T-Stat	(-5.769)	(-3.062)	(2.306)
N	603	567	603

This panel compares the yearly assessment characteristics of an assessor's primary legal address with that of all single-family homes within the same county. The sample is between 2018 and 2020.

Table 7. Assessment Officials (Hedonic Regressions)

	(1)	(2)	(3)	(4)	(5)	(6)
	% Change in Assessed Value		% Change in Tax Amount		Total Assessed Value	
Assessor	-0.0121***	-0.0119***	-0.0169***	-0.0146***	-3,348	-4,270***
	(-5.257)	(-4.546)	(-4.770)	(-4.430)	(-0.415)	(-3.750)
Prior Assessed Value		-6.70e-08***		-3.53e-08**		1.012***
		(-7.740)		(-2.511)		(128.1)
Square Footage		8.71e-05		1.39e-06		-30.64
		(0.939)		(0.00916)		(-1.221)
Other Hedonic Controls	No	Yes	No	Yes	No	Yes
County X Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,895,963	15,573,810	16,895,963	15,573,810	16,895,963	15,573,810
Adjusted R-squared	0.183	0.209	0.080	0.093	0.320	0.939

This table regresses indicators of a property owned (including non-primary homes) by local assessment official on growth in assessed property value (*% Change in Assessed Value*), yearly changes in tax value (*% Change in Tax Value*), and dollar levels of total assessed property value (*Total Assessed Value*). Other hedonic controls are property level characteristics- the number of rooms, bathrooms, and effective year built.

Table 8. Assessor Administration

	(1)	(2)	(3)	(4)	(5)	(6)
	% Change in Assessed Value		% Change in Tax Value		Total Assessed Value	
Within County	-0.0128***	-0.0123***	-0.0172***	-0.0147***	-2,565	-4,353***
	(-5.596)	(-4.676)	(-4.877)	(-4.481)	(-0.316)	(-3.829)
Outside County	0.00244	0.00653	-0.0389*	-0.0342*	82,726**	3,248
	(0.133)	(0.353)	(-1.857)	(-1.776)	(2.511)	(0.568)
Prior Assessed Value		-6.70e-08***		-3.53e-08**		1.012***
		(-7.740)		(-2.511)		(128.1)
Square Footage		8.71e-05		1.39e-06		-30.64
		(0.939)		(0.00918)		(-1.221)
Other Hedonic Controls	No	Yes	No	Yes	No	Yes
County X Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,895,963	15,573,810	16,895,963	15,573,810	16,895,963	15,573,810
Adjusted R-squared	0.183	0.209	0.080	0.093	0.320	0.939

This table regresses indicators of a property owned (including non-primary homes) by local assessment official on growth in assessed property value (% Change in Assessed Value), yearly changes in tax value (% Change in Tax Value), and dollar levels of total assessed property value (Total Assessed Value). The table splits the indicator of property owned by an assessor into *Within County* and *Outside County* variables. *Within County* indicates that the property is located in the same county as the assessor's jurisdiction. *Outside County* indicates all other assessor properties. Other hedonic controls are property level characteristics- the number of rooms, bathrooms, and effective year built.

Table 9. Assessor Undervaluation and the Assessment Gap.

	(1)	(2)	(3)
	% Diff Between Sale and Assessed Value		
Assessor Property Undervaluation	-2.239**	-9.238***	-8.298***
	(2.095)	(3.159)	(2.978)
County FE	No	Yes	Yes
Year FE	No	No	Yes
Observations	135	102	102
Adjusted R-squared	0.010	0.875	0.881

This table correlates the degree to which assessor properties under appreciate their peers with county level overassessment measure. *Assessor Property Undervaluation* is the growth difference between an assessor's own home and his neighboring properties (Higher means lower growth). *% Diff Between Sale and Assessed Value* is the average percentage difference between the sale price of homes and their prior assessed value within a county (Lower means homes are sold for lower than assessed values).