Does Centralization Matter? The Equity and Cost Implications of State Property Tax Assessment

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Abstract

Property assessment is almost exclusively administered by local governments in the United States. In the 1970s, Maryland transitioned responsibility for this function from counties to the state government. The primary policy goal at the time was to reduce assessment inequities across local assessing jurisdictions. Using the synthetic control method on historical assessment data, we find support for the state's policy goal. We also find, though, that centralization worsened uniformity within some local areas while improving it in others. We further tested the fiscal effects of centralization using historical assessment expenditures. The data are consistent with centralization costing less than decentralized assessment administration but also creating a budgetary fiscal illusion, allowing local governments to keep the assessor's budget rather than return it to taxpayers.

Keywords: Property taxes, property assessment, centralization, tax equity

JEL Codes: H11, H71, H72, H73, H83

1 Introduction

Local governments in the U.S. enjoy a significant degree of fiscal sovereignty from higher levels of government. This autonomy is facilitated in large part by the property tax, which is the most significant source of local revenue. Local governments in most states possess the authority to determine both their property tax rate and tax base, which is accomplished through the property assessment process.[1] This process entails the periodic valuation of all land and improvements within the borders of a locality to determine its economic value to tax purposes.[2]

There is a long running debate over the merits of local control of the assessment function. A landmark report by the US Advisory Commission on Intergovernmental Relations (ACIR) (1963) highlights several shortcomings with this arrangement. First, it points out the need for more technical expertise among local assessors, particularly those elected to the position rather than appointed. Second, it highlights the lack of uniformity in assessments between and within localities. This inconsistency leads to horizontal inequity in the property tax system, as owners of similar properties incur different tax liabilities owing to over- or underassessments. It also can be a source of vertical inequity, as high value properties are much more likely to be underassessed than low value properties (Berry, 2021). The ACIR made numerous recommendations to improve the administration of the property tax, which included the centralization of the assessment function in most states.[3] Few states embraced this recommendation, however. Two exceptions were Maryland and Montana; the former fully transitioning to state centralized assessments and the latter centralizing valuation but leaving locally elected assessors in place to serve as liaisons with property owners and manage other clerical functions. Around the same time, Hawaii, the only state to have fully

[1] Although local governments are responsible for assessments in 48 states, 17 states limit the rate at which property assessments may grow over time (Warner, 2024).

[2] Forty-three states also include business tangible property in their property tax base, which includes equipment, machinery, and inventory. However, Watson (2019) reports that business tangible property represents just 10 percent of the property tax base, on average, across the U.S.

[3] The ACIR report also noted the fragmentation and duplication of property assessment effort in many states.

centralized assessment administration at the time, devolved responsibility for assessments to local governments.

Since the ACIR's report, there has been much speculation about the effects of fully centralizing the assessment function to higher levels of government (Lynn, 1964; Groves, 1969; Mikesell, 2012; Scott and Daigle, 2022). But there has been no empirical efforts to test the ACIR's hypotheses. To be sure, there continues to be a thriving literature evaluating different features of property assessment administration such as differences between elected and appointed assessors (Bowman and Mikesell, 1989; Propheter, 2016; Ross, 2011); the effects of assessment office consolidations (Chicoine and Giertz, 1988; Kim et al., 2023; Krupa, 2016); the role of the assessment appeals process in improving or worsening outcomes (Bishu and Propheter, 2024; Doerner and Ihlanfeldt, 2014; Plummer, 2014); and property valuation cycles (Eom et al., 2017; Kim and Hou, 2024). But these studies explore contexts where assessment administration is almost entirely, if not exclusively, a local function.

Moreover, several recent studies have brought renewed attention to inequities in the property tax system arising from assessment errors (Berry, 2021; Amornsiripanitch, 2022; Avenancio-León and Howard, 2022; Hou et al., 2023). These papers raise important questions as to how state and local governments can best administer the property assessment system. While the authors do not consider alternative administrative structures for the property assessment function as a possible remedy to inequities, the ACIR's report suggests that it may be a partial cure for certain types. Our purpose is to evaluate several notable but heretofore untested claims about the benefits of assessment centralization by taking advantage of Maryland's transition to a fully centralized property assessment system in 1974.

We first consider the effect of state centralization on property assessment uniformity. We accomplish this by applying the synthetic control method (SCM) to a national dataset of property assessments compiled by the U.S. Census Bureau from 1957 to 1982.[4] The results show that the state's centralization reform reduced the inter-area dispersion of assessments

[4]These are publication years. Data were sampled from the year prior.

across Maryland's local jurisdictions by about 43 percent. Though a considerable improvement in uniformity, leading up to state centralization, Maryland's inter-area dispersion was already beating professional standards. We also find that centralization had heterogeneous local effects on assessment uniformity. Five of the seven counties we were able to evaluate experienced sizable declines in the dispersion of assessments–on the order of 20 to 40 percent–though only two of the county-specific estimates were statistically different from zero. Baltimore City's assessment uniformity initially declined after the reform but recovered within five years. Overall, our results suggest that Maryland's assessment centralization reform improved both across and within county assessment uniformity. The largest within-county improvements accrued to less populous counties.

We also consider the cost effectiveness of Maryland's transition to centralized assessment. Over the last several decades, Maryland spent less on property assessment administration than eight other states with decentralized assessment systems for which we were able to obtain relevant expenditure data. However, a counterfactual analysis of assessment expenditure in one county suggests that that the state performs the property assessment function at comparable cost to county governments. Although prior work by Mehta and Giertz (1996), Sjoquist and Walker (1999), and Krupa (2016) suggest that property assessment exhibits economies of scale, our evidence is more mixed in the Maryland transition context.

Finally, we test the effect of the transition to state property assessment on county expenditures. We theorize that state absorption of a previously locally funded function provides an opportunity for local lawmakers to keep their assessing office's budget rather than return it to taxpayers in the form of lower total government spending. Our results corroborate this behavior, which is supportive of the shift to state centralization creating a budgetary fiscal illusion for local lawmakers to exploit.

In sum, we find compelling empirical support for the ACIR's longstanding claim that centralizing can reduce assessment inequities within and across local areas. But there is a cost to taxpayers for improved assessment quality. Maryland appears to have initially spent more

on assessment administration than local governments would have had assessments remained decentralized, but the difference between the state's actual spending and the counterfactual local spending disappears within 10 years of the transition. This occurs because the state increasingly reduces funding to the state assessing office. Local lawmakers keeping their old assessment budget further suggests that local taxpayers pay more for fewer public services.

This paper is organized as follows. Section 2 provides background on property assessment in the United States and Maryland specifically. In Section 3 we describe our hypotheses while in Section 4 we discuss the data and identification strategies. We report our results in Section 5, and we close the paper with a brief summation and discussion in Section 6.

2 Background

2.1 Property Assessment

Before the advent of the income and sales taxes, both state and local governments were highly dependent on the property tax. In 1902, the states and their local governments derived 53 percent and 87 percent, respectively, of their own-source revenue from property taxes. The property tax is much less important to states now, with the Census Bureau reporting that only one percent of states' own-source revenue comes from the tax in 2022. Though the tax has waned in importance for local governments, falling to 46 percent of own-source revenue in 2022, the property tax remains their single largest source of own-source revenue and the second overall source of revenue behind state intergovernmental aid.

Property tax revenue is the product of the property tax base and property tax rates.[5] Unless otherwise prescribed by law, rates float with lawmaker spending preferences. The property tax base, in contrast, is the responsibility of assessors, and it has historically been

[5]Revenue in this sense is more often called the "levy" or the "yield" depending on the state and context. Property tax collections are distinct from revenue (qua the levy) in that the former reflect delinquencies and other adjustments to revenue including refunds, credits, and penalties.

a local government function.[6] County governments are responsible for assessment of real property in most states, but municipalities and other sub-county governments also perform this function in several states in the Midwest and New England. Table 1 tabulates the number of assessing jurisdictions in 2024. Sub-county governments made up about 72 percent of the 9,376 localities that performed the assessment function, and they collectively comprised 10 percent of the country's $34.7 trillion in locally assessed taxable market value. A few states have enacted reforms with the goal of consolidating, or coordinating, local administration of the assessment function. For example, Texas transferred responsibility for assessments from over 3,000 jurisdictions to 253 County Appraisal Districts (CADs) in 1982.[7] Similarly, in 2008, Indiana shifted the property assessment function from over 1,000 townships to its 92 county governments (Krupa, 2016). Other states have pursued more incremental reforms. New York State provides incentives for its municipalities to merge their assessor offices (Kim et al., 2023). Illinois requires elections of multi-township local assessors for any adjoining townships with fewer than 1,000 residents.[8]

The organization of property assessment administration in the US is a state-level policy decision, and there is variation in the administrative structure. Classifying systems, however, is complicated by the multiple dimensions along which to subclassify. There are four relevant dimensions: the level of government, the geographic scope of responsibility, property characteristics, and administrative functions. As noted in the previous paragraph, the level of government responsible for property assessments varies from villages and townships to the state. While in most cases the level of government corresponds with the geographic scope of responsibility, sometimes it does not. In Maine, for instance, the state is responsible for assessing all property that is located inside unorganized territory; property inside incorpo-

[6]The US Advisory Commission on Intergovernmental Relations (1963) report suggests that local assessors likely possess more intimate knowledge of the properties they administer, which may have been relevant prior to the advent of computerized record keeping in the 1950s.

[7]CADs have boundaries coterminous with counties except for the Potter-Randall district which spans both respective counties. The legislation also empowered the newly formed State Property Tax Board to conduct statewide ratio studies and to provide professional development and training to local assessors.

[8]Illinois ranked fourth nationally in the number of assessing sub-county jurisdictions in 2024, surpassed only by Michigan, Wisconsin, and New York.

Table 1: U.S. Assessing Jurisdictions by Level of Government

Level of Government	Jurisdictions
Counties	2,593
Municipalities	6,784
States with some jurisdiction over all property	3
States with statewide jurisdiction over some property†	47

† Excludes states with some jurisdiction over all property.
Notes: Data are for the 2024 tax year. Some counties assess property for some of their municipalities, such as Oakland County, Michigan. Since the municipal jurisdictions are not consolidated and treated as a single unit by the county, we categorize them here as municipalities, not as counties. States with some jurisdiction over all property refers to instances where state administration is geographic based rather than property based. States with statewide jurisdiction over some property refers to instances where state administration depends on the type of property, more commonly known as centrally assessed property such as utilities, railroads, and the like. Washington, DC is tallied as a municipality.

rated areas is the responsibility of the local assessor. Thus, in Table 1 there are three states with some jurisdiction over all property: Maryland, Montana, and Maine.

With respect to property characteristics, some taxable property is designated by law to be assessed by a specific level of government. For example, real and personal property that span the boundaries of multiple localities or are otherwise mobile as part of their nature, such as railways, airplanes, and utilities, are almost exclusively assessed by states. Property in such instances are sometimes called "state assessed property" or "centrally assessed property." This arrangement prevents the duplication of assessment effort across multiple localities and reflects the complexity of assessment. Figure 1 shows that centrally assessed property represents a negligible share of the total property tax base in most states. In 2023, for the 42 states that we could obtain relevant data, only six percent of the $36.8 trillion dollars in taxable market value was assessed at the state level.[9]

Finally, assessment administration entails various functions, including valuation, technology, clerical, and leadership oversight. While rare, functions may be split across different

[9]We treat all property in Washington, DC as locally assessed since it does not possess a state government.

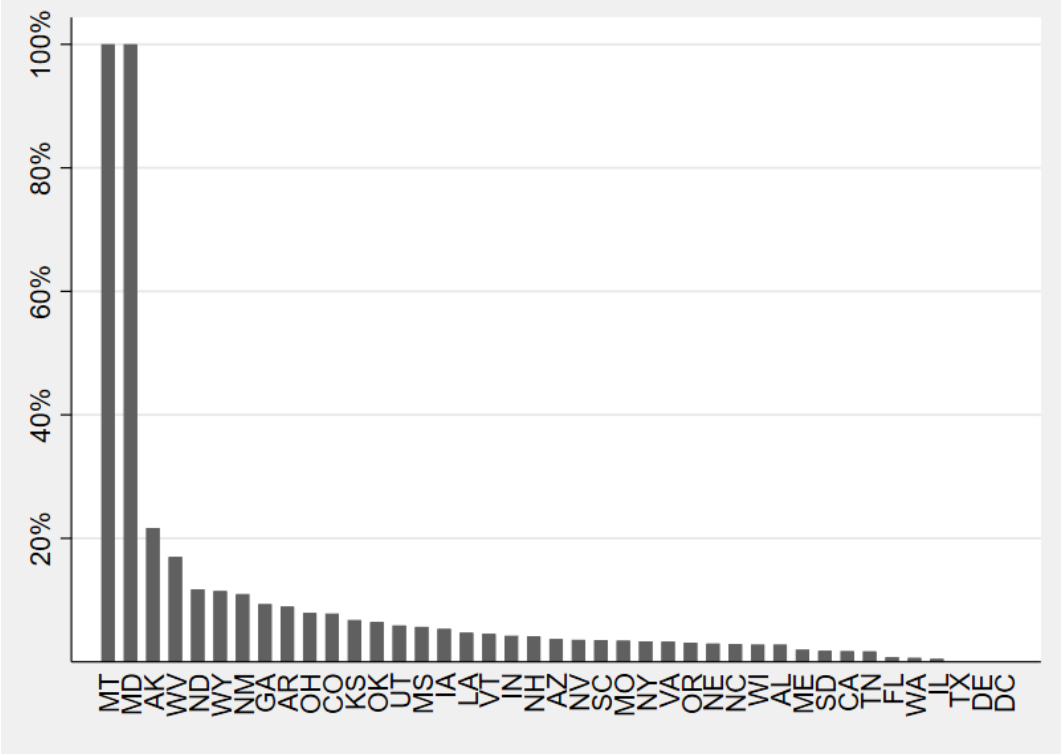

Figure 1: Share of Taxable Market Value Assessed by the State Government, Select States in FY 2023

levels of government, implying variation in degree of centralization along this dimension. Montana, for instance, values property at the state level, treating the state as a single assessing jurisdiction, but it also has locally elected assessors that perform the liaising and clerical aspects of assessment administration.

With these dimensions in mind, we can place one state at each extreme of the spectrum. On one end is a fully decentralized system in which responsibility for all elements of administration for all property is vested within a common local government level. On the other end is a fully centralized system in which the responsibility for all administrative tasks for all property belongs to the state. Delaware and Texas are the only states at the fully decentralized end of the spectrum. For instance, property that would otherwise be assessed at the state level, including subsurface mineral deposits, are assessed locally, or may not be subject to the property tax but an excise tax instead. Texas CADs often contract out the valuation of such property to professional firms, but the assessment responsibility remains

local. On the other end of the spectrum is Maryland. The State Department of Assessments and Taxation (SDAT) has offices in each county and Baltimore city, and each office has an appointed executive that performs the same functions of the local assessor elsewhere in the US. However, these executives are state employees and take their directions from SDAT, itself an executive agency whose head is appointed by the governor.

All other states fall somewhere between Texas-Delaware and Maryland in terms of assessment administration organization. Notable examples closer to Maryland are Montana and Kentucky. Montana, as just noted, assesses property at the state level but otherwise leaves other functions to locally elected assessors. Kentucky is similar to Maryland in that its local assessment executives, known as Property Valuation Administrators, are state officials, but they are also locally elected and each county is treated as a distinct assessing jurisdiction, making it distinct from a fully centralized system. States like Illinois, Michigan, and New York have systems that are closer to fully decentralized. These are states where assessments are often a village or township level function, but these states have laws or programs that under certain conditions will result in assessments being conducted by counties or a consolidated assessing unit.

It may be helpful to envision what a "typical" state looks like in terms of property assessment administration. In our view the average state resembles California or Colorado: county-level or independent city-level responsibility for the assessment function ranging over all taxable property excluding utilities, railroads, airplanes, and subsurface deposits where the executive of the office is either locally elected or locally appointed. In 2024, 38 states fit this description.

2.2 Maryland

As the object of our study, it is worth providing more context on Maryland. Maryland, Montana, and Hawaii are the only three states with experience performing property valuation at the state level. While Maryland is our focus, Appendix A contains detailed background

information on Montana and Hawaii's experiences with centralized assessment.

The origin of Maryland's fully centralized assessment system is traceable to the first half of the 20th century. In 1939, the governor of Maryland appointed the Tax Revision Commission, which advocated for the state government to assume responsibility for the assessment function. At the time, each county's elected officials had the power to appoint a county assessor, as did lawmakers in Baltimore city, which is a unified county-city government. The rationales for centralization offered in the report of the Maryland Tax Revision Commission (1941) largely echo those later put forth by the US Advisory Commission on Intergovernmental Relations (1963). Specifically, they expressed concern about the quality of assessments performed by locally appointed assessors as well as the undue influence that local officials had over all aspects of the property tax: the levy, the rate, and the base (Maryland Tax Revision Commission, 1941).

In 1973, the Maryland General Assembly and governor embraced the Commission's proposal to centralize property tax assessment by enacting Maryland House Bill 531.[10] The law transferred statewide responsibility for property assessment to SDAT. According to Hare and Papenfuse (2002), SDAT was created in 1959 to perform two functions. First, to serve as the custodian of corporate records and administrator of the state's taxes on corporations. Second, to monitor local assessors and enforce applicable state regulations.[11] SDAT's assumption of the assessment function was phased in over two years. On July 1, 1973, which corresponds to the beginning of the 1973-74 tax year, the directors of each county assessment office became state employees. The following July 1st, county staff assessors were transitioned to the state's payroll. SDAT absorbed any remaining employees of county assessment offices by July 1, 1975.

The impact of SDAT's absorption of county assessors on its budget is apparent. Figure 2 shows SDAT's total budget, and its budget for the Assessment and Equalization function

[10] See 1973 Md. Laws ch. 78.

[11] This responsibility was similar to the monitoring and audits of local assessments that is now routinely performed by state governments such as the Board of Equalization in California.

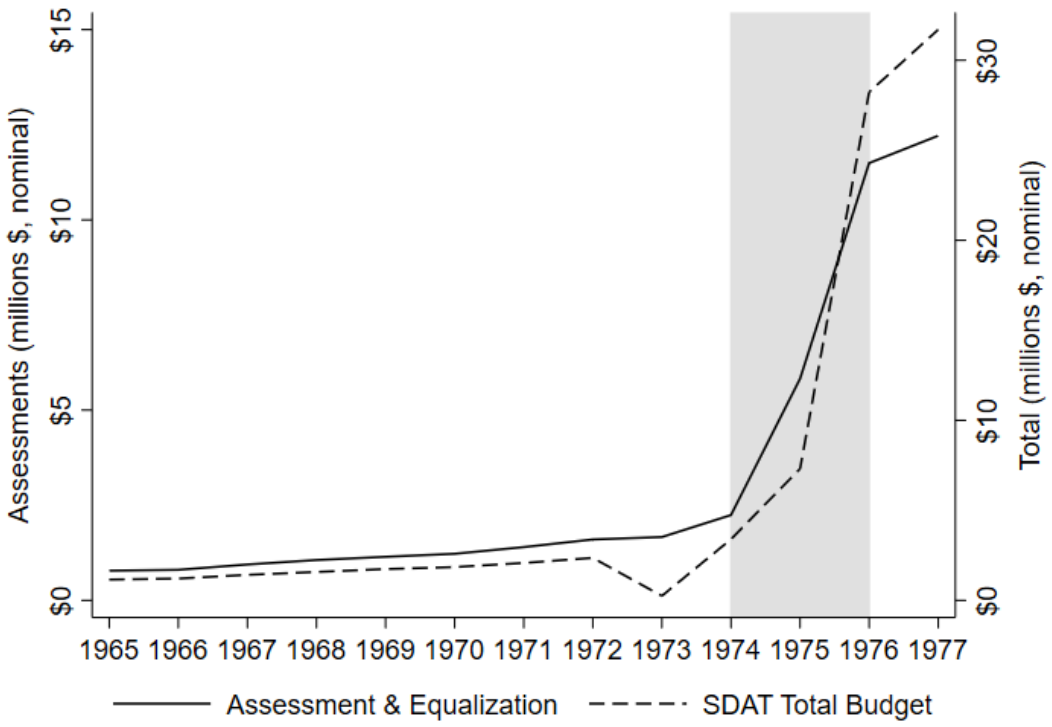

Figure 2: Maryland SDAT Budgeted Expenditures, FY 1965-77

from 1965 to 1977. During the transition to centralized assessment, SDAT's assessment budget grew seven-fold from $1.6 million in the 1972-73 fiscal year to $11.5 million in 1974-75. Prior to the 1973 reform, each Maryland county was assessing its properties at different cadences and fractions of market value. As a result, SDAT hired 21 new staff members, in addition to the local assessor staff that it absorbed from county governments (Dilts, 1974). The SDAT operates a three-year assessment cycle, with assessments set at 100 percent of each property's market value. Any increase in a property's valuation is phased in over the three-year assessment cycle. Real property comprised about 95.3 percent of the statewide property tax base in the 2023 tax year.[12] Meanwhile, business personal property accounted for just under three percent of the state's tax base.[13]

[12] As noted previously, some state governments assume responsibility for assessing certain unusual categories of property. We estimate that local assessors would bear responsibility for 99.7 percent of Maryland's real property in other states.

[13] Personal property made up 9 percent of the state's property tax base in 1956. This decline mirrors national trends observed by Propheter (2024). Curiously, the decision to exempt it from the tax base is a county decision even though SDAT bears responsibility for assessment.

3 Hypotheses

Maryland's transition to centralized assessment was motivated by several contemporaneous policy issues. First, growing voter discontent with the property tax. Property values appreciated rapidly in the 1960s and 1970s which spurred growth in property tax bills across the United States. This provoked several notable state-level property tax reforms, including California's Proposition 13 (Martin, 2008; Mound, 2020).[14] Increased attention toward the property tax also prompted interest in assessment administration, particularly differences in assessments between similarly situated properties within localities and across them (Paglin and Fogarty, 1972).

These broader concerns over fairness in assessments intersected with several Maryland-specific administrative considerations. Cardin and Rombro (1973) report that multiple Maryland counties failed to appropriate the funds necessary to comply with state laws concerning the frequency and uniformity of assessments.[15] They further argued that SDAT's monitoring of local assessors was insufficient to address these issues. These problems intersected with the fiscal interests of Maryland's state government, which raised a modest amount of revenue from a statewide property tax levy.[16] Proponents of assessment reform argued that local assessors were undervaluing real property, which in turn had a negative impact on state tax receipts (Johnson, 1973).

Historical accounts of the expected benefits of centralized assessment help to motivate this paper's hypotheses. First, we expect that centralized assessment will enhance the inter-area uniformity of assessments across Maryland counties. This reflects the adoption and application of consistent assessment practices by a state assessor compared to those developed

[14]Maryland also introduced two statewide property tax relief programs in the 1970s. The Homestead Property Tax Credit limits growth in owner-occupied property assessments to 10 percent annually, while the Homeowners' Property Tax Credit is a circuit breaker credit available to low-income homeowners. Spreen and Keddington (2023) provide a detailed overview of state and local property tax relief programs in Maryland.

[15]Article 15 of the Maryland's constitution requires that taxes levied by any government in the state are uniform across classes and sub-classes of land, improvements, and personal property.

[16]The state of Maryland's property tax rate was 0.21 percent per $100 in assessed value in the 1973 tax year.

individually by 24 independent county assessors. Indeed, SDAT annual reports explicitly state that "The Department believes that the uniformity of assessments through out the State is its primary responsibility, and that the level of assessments must remain a secondary consideration" (State Department of Assessments and Taxation, 1987, p.10).[17]

Second, we evaluate the impact of Maryland's centralized assessment reform on the uniformity of assessments within counties. Sue (1978) suggests that (de)centralization of the assessment function has "no clearly predictable effect upon inequities between parcels and between neighborhoods within a county" (p. 66). Proponents of centralization often suggest that state assessors are more professionalized than their local counterparts (US Advisory Commission on Intergovernmental Relations, 1963; Cardin and Rombro, 1973). This implies that state assessors should outperform their local counterparts, though it is unclear whether this argument holds in practice. Notably, Bowman and Mikesell (1989) and Eom (2008) both find that assessment uniformity is roughly consistent between elected and appointed local assessors, who tend to be more professional. Conversely, county assessors may possess more intimate knowledge of local property markets, which could confer assessment performance benefits, though there is little direct empirical evidence to support this claim. One relevant study by Chicoine and Giertz (1988) finds that assessment uniformity was poorest in small and rural Illinois localities. This motivates their recommendation to merge the assessment function across small population localities, a reform that subsequently adopted by the state of Illinois. The limited available evidence suggests that Maryland's centralization reform is most likely to enhance the uniformity of assessments in rural counties, though the impact on urban counties is unclear.

Finally, we assess the impact of state centralization on the cost of administering assessments. Prior research on centralization at the local level indicates that property assessment exhibits economies of scale (Krupa, 2016; Mehta and Giertz, 1996; Sjoquist and Walker,

[17]We could not access the complete history of archival SDAT's annual reports to determine when the department's explicit emphasis on inter-area uniformity began and ended. However, we know that this phrase does not appear in the 1997 annual report and thereafter.

1999). In line with these findings, we expect that Maryland's state assessor will perform the assessment function at a lower unit cost than their local counterparts. In addition, we also consider how Maryland's county governments used the savings that resulted from the transition of the assessment function from counties to the state. Did they return it to taxpayers in the form of reduced local government expenditures, or did they keep it, thereby increasing local government spending? We describe the data and identification strategy for testing these hypotheses in the following section.

4 Research Design and Data

4.1 Statewide Inter-Area Uniformity

We assess the impact of Maryland's centralization reform on inter-area assessment uniformity using data from the U.S. Census Bureau's ratio studies. These studies were produced every five years from 1956 until they were discontinued in 1981. They contain information on transaction prices, assessed values, and assessment uniformity metrics for a sample of single-family homes and vacant lots in every U.S. state and select local governments.[18] We plot each state's performance along two common measures of state-level assessment uniformity in Figure 3. The left graph shows each state's local area average deviation from the statewide median assessment-sales ratio (ASR) expressed as a percentage. The right figure shows each state's coefficient of dispersion (COD), which is the average deviation divided by the statewide median. A value of zero for both measures indicates perfect assessment uniformity, which suggests that assessors are accurately assessing property values.[19] A larger percentage indicates greater dispersion in assessed values relative to sale prices, which is indicative of

[18]The Census Bureau provides data for single-family homes as new construction and as previously occupied. Our analysis is on the latter, as these are more abundant and are reported consistently over the full observation period. The data collection methods and assessment uniformity metrics were largely consistent over the study period. However, the sample size varied considerably. The 1956 study contained a sample of 366,000 single-family homes, which increased to 828,000 in 1976, and then declined to 297,000 in 1981.

[19]The average deviation from the statewide median is an input to the coefficient of dispersion.

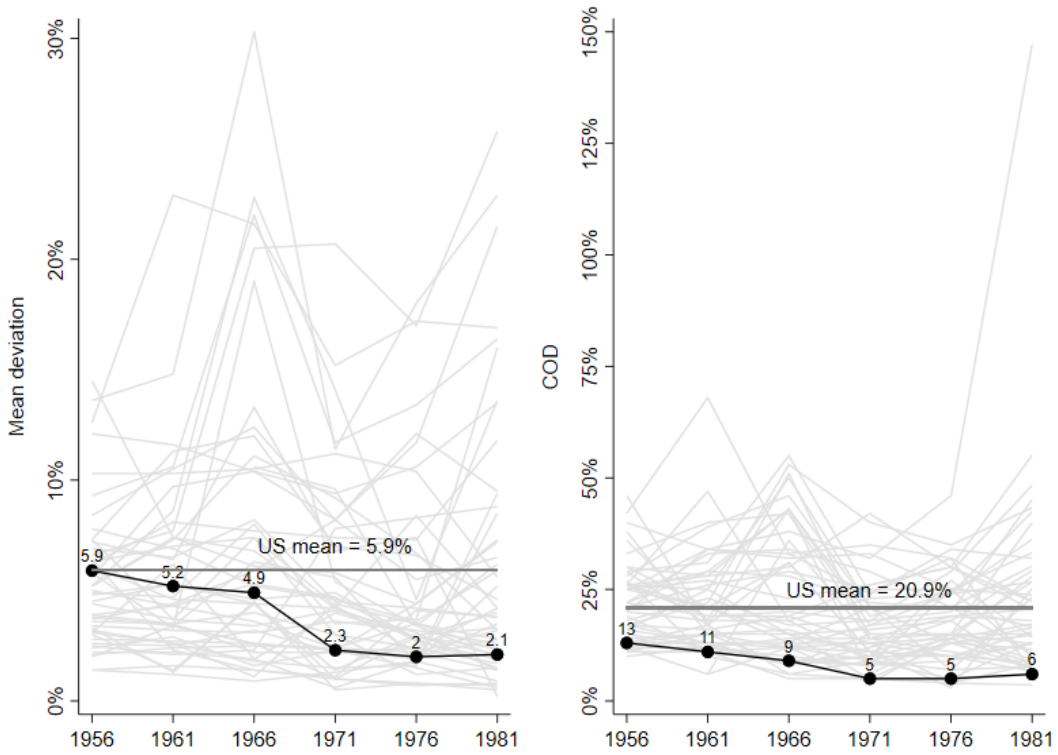

Figure 3: Maryland Assessment Uniformity Compared to Other States

poor assessor performance. Both figures highlight that Maryland's assessment uniformity performance was in the top half of the distribution of states, but improved markedly in the 1970s, coinciding with the state's centralization reform.[20]

We conduct a more rigorous evaluation of Maryland's centralization reform using the synthetic control method (SCM). SCM generates counterfactual outcomes to treated units based on the pre-treatment observable characteristics of untreated units. In this sense, SCM is akin to nearest neighbor matching but is viable for case studies with few or only a single treated unit (Abadie and L'hour, 2021). SCM can also account for unobserved factors that autocorrelate through their effect on past outcomes (Abadie et al., 2010; Abadie and Gardeazabal, 2003).

A critical identifying assumption of SCM is that there are no other policy changes or other events that may be meaningfully correlated with the outcomes of interest during the study

[20] A COD of 15 or less falls within the professional standard of the International Association of Assessing Officers (Corusy, 1976). Figure 3 shows that Maryland met this guideline, though most other states and the U.S. on average did not.

period. We reviewed the state's legislative records and found no other state laws related to property assessment that were enacted in the 1970s. As noted previously, the state's transition to a centralized assessment system expanded the SDAT's budget and staffing levels. However, this is not a confounding event but rather a feature of the centralization reform. Later, we assess the implications of these changes on the cost of assessments.

The synthetic control method also requires the analyst to identify when the policy under evaluation first came into effect. We possess data on assessments and expenditures by fiscal year, which runs from July 1 to June 30 in Maryland. However, Maryland's transition to a state assessment system was phased in over two fiscal years. We treat the first of these two fiscal years (FY 1973-74) as the beginning of the assessment centralization treatment window. This also limits potential anticipation effects, since the enabling legislation was adopted in May 1973.[21]

For the state-level analysis, we generate a synthetic counterfactual for Maryland using a pool of other states. However, there is cause to exclude several states from the donor pool. First, we exclude Hawaii and Montana because they enacted changes to their assessment administration structure during the study period.[22] Similarly, we remove California since it transitioned to acquisition-based assessment system following the passage of Proposition 13 at the tail of our uniformity observation window.[23] Finally, we exclude Alaska and Washington, DC as they lacked a state government during some or all the study period.

[21] Although it is common practice in studies that employ the SCM, we do not test for anticipation effects to the centralization treatment for two reasons. First, there is no evidence based on legislative records that assessment centralization was likely to occur prior to 1973. Second, even if counties received advance notice of the reform, there would be little to gain and significant cost to coordinating to reduce their assessment deviations just prior to centralization. By May, assessments for the year would have been completed, save for any lingering appeals, which would have been decided by the appeals board, not the local assessment office.

[22] We do not evaluate Montana or Hawaii's property assessment administration reforms. We lack the data necessary to assess the effects of Hawaii's decentralization reform. Montana exhibited considerable volatility in assessment uniformity prior to its transition to state centralized assessment. This made it challenging to develop a suitable counterfactual. As noted by Abadie (2021), outcomes displaying too much volatility are ill-suited for SCM given the difficulty of identifying the causal effect.

[23] In acquisition-based systems, properties are revalued at the time of sale rather than on a cycle. A consequence of acquisition-based systems is that tax burdens decrease with ownership length, as the gap between the property's sale price and its assessed value increases over time. As a result, standard assessment performance measures fail to measure assessment accuracy.

Table 2: Maryland Assessment Performance by Sampled Local Area, 1956-1981

Area	% Population Black 1970	Per Capita Income 1970	Pre-Reform		Post-Reform	
			ASR	COD	ASR	COD
Anne Arundel County	11.1	$4,663	45.8	17.9	34.5	14.0
Baltimore County	3.2	$5,026	54.6	15.8	37.9	13.2
Baltimore City	46.4	$4,052	65.5	28.0	36.3	61.0
Frederick County	6.9	$4,211	47.4	18.3	37.9	18.6
Harford County	8.2	$4,428	46.5	19.2	38.3	10.1
Montgomery County	0.2	$7,207	49.4	11.4	37.2	12.3
Prince George's County	13.9	$5,245	47.6	16.1	38.6	9.6
Rest of U.S.	10.8	$4,134	30.8	22.4	35.8	25.8

Notes: The "pre-reform" column corresponds to the average median ASR and COD of each county and the rest of the United States from 1956 to 1974. The "post-reform" column corresponds to the average from 1974 to 1981. The "Rest of U.S." corresponds to the average values of 929 localities outside of Maryland that appeared in one or more of the Census Bureau's ratio studies between 1956 and 1981. The "Rest of U.S." black population and per capita income exclude all Maryland local jurisdictions.

After these exclusions, the usable donor pool for the statewide uniformity analysis contains 45 states. We report the final SCM weights and summary statistics with the discussion of the empirical results in Section 5.1.

4.2 County Intra-Area Uniformity

We also consider the impact of the centralization reform on county intra-area assessment uniformity. The Census Bureau ratio study dataset contains complete information for six Maryland counties and Baltimore City between 1956 and 1981. We report the average assessment performance within these seven localities before and after 1974 in Table 2. The table suggests that most of the selected counties experienced improvements in one or both uniformity metrics after the state's centralization reform. Over the time period, while the rest of the US worsened in terms of the local level median ASR, among these seven Maryland areas, the median ASR improved, decreasing by an average of 26 percent. (Recall that a lower median ASR and lower COD are normatively more desirable than larger values of

either.) Baltimore City, however, is clear outlier in terms of the COD. Its median ASR decreased the greatest amount on average, 45 percent, but its COD increased the greatest, 118 percent. Said differently, the city's distribution around the median ASR increased dramatically following state centralization. Frederick County's and Montgomery County's COD also increased on average post-reform, but by trivial amounts, less than a percentage point, or about eight percent or less.

Why Baltimore city appears to have been disproportionately and negatively impacted by state centralization in terms of within-area uniformity is unclear but existing research points to a possibility. Baltimore city's residents were generally poorer than residents in the other Maryland communities sampled as well as compared to the rest of the US. The city also housed a majority of the state's minority black population as of the 1970 census. The recent efforts of Avenancio-León and Howard (2022) and Berry (2021) documenting property tax burden inequities point to differences in assessment appeals behavior and appeals outcomes by homeowner race, insights corroborated by Doerner and Ihlanfeldt (2014). Drawing on the representative bureaucracy literature, Bishu and Propheter (2024) find evidence that shared individual-level attributes between appeals board members and homeowners, such as gender and possibly race, increases the chances of an appeal being upheld. Plummer (2014) finds that the appeals process can be corrective by improving assessment uniformity.

If appeals are corrective, and yet there are race-based systematic differences between appeals activity and outcomes, then the descriptive patterns for Baltimore city become understandable. Though it is not within the scope of this study to explore direct effects of centralization on assessment outcomes by race and wealth in Maryland, if the appeals process is to blame for the patterns, it would not be reason to avoid centralization, since assessments and assessment appeals are distinct functions performed by different bureaucracies. Instead, it would be a reason to consider redesign of the appeals system at the same time one is considering redesign of the assessment system.

Of course, our simple pre/post-reform comparison neglects to consider the counterfactual

outcome in the absence of the state's centralization reform. We provide a detailed discussion of our methodology for generating synthetic counterfactuals for each county using a donor pool of 201 county governments outside of Maryland in Appendix B. We present the empirical results of this SCM analysis in Section 5.2.

4.3 Assessment Cost Analysis

We also explore the cost implications of the centralization reform using distinct approaches. First, we compare the total expenditures of Maryland's SDAT to the aggregate expenditure on local property assessment in eight other states that report detailed local expenditure data.[24] We scale aggregate property assessment expenditures by each state's personal income to account for differences in task volume and demand.[25] Table 3 reports descriptive statistics for each state in our assessment expenditure dataset. During the time period under review, Maryland's SDAT spent about 33 percent less on assessment administration than the group average of $782 per million dollars of personal income in 2024 constant dollars.

We also consider the change in assessment expenditure within Maryland. We were able to obtain detailed budget records for only a single Maryland county—Anne Arundel County—during the 1960s and 1970s. These records report the county's expenditure by department, including its county assessment department. We were also able to obtain records of SDAT's expenditure on property assessment within Anne Arundel County following the 1974 transition to a state centralized assessment system. We use these data to compare the cost of property assessment within the county whether performed by the state or the county itself. We also generate a simple counterfactual for the post-1974 period; namely, what Anne Arundel County would have spent on property assessment if their prior short-run expendi-

[24] We do not consider total state and local property assessment expenditure in this analysis because most state-assessed property in decentralized assessment states (e.g. airplanes) is not subject to the property tax in Maryland.

[25] We use state personal income rather than aggregate property value for two reasons. First, we could not obtain complete market valuation data for all states over the period under review. Second, income is a demand-side input for government services whereas market value is an output of assessment administration. Additionally, in states that do not reassess annually or that have acquisition-based systems, market value does not measure the annual volume of the assessment task.

Table 3: Historical Assessment Administration Spending by State

State	Years	Expenditure per Million of Personal Income			
		Mean	Median	Min	Max
California	1970-2021	$1,340	$690	$264	$4,972
Georgia	1985-2020	$506	$516	$270	$724
Iowa	1977-2024	$927	$787	$348	$2,642
Indiana	2012-2020	$251	$253	$225	$277
Maryland	1976-2024	$519	$314	$88	$2,208
Montana	2004-2023	$710	$667	$350	$1,080
New York	2001-2023	$264	$228	$107	$532
Texas	2002-2022	$521	$488	$355	$704
Washington	1998-2022	$1,215	$411	$196	$4,999

Notes: All figures are reported in 2024 constant dollars. Data reflect local assessment spending aggregated to the state level except in Maryland and Montana where property valuation is conducted by a state agency. Data for California were drawn from the state comptroller's annual reports of local government finances as well as assessor reports submitted to the Board of Equalization. Georgia's expenditure data was obtained from the Carl Vinson Institute of Government at the University of Georgia. Iowa data were obtained from the Department of Management. Indiana data were obtained from the Indiana Gateway database. Maryland and Montana data were obtained from the respective state budgets. Data for New York were obtained from the state comptroller, except for New York City. New York City data was obtained from the NYC Department of Finance and city budgets. Data for Texas were obtained from the annual County Appraisal District operations survey. Washington data were obtained from the Department of Revenue's annual Comparison of County Assessor Statistics reports.

ture trends held constant into the short-run future. We describe the process for generating this counterfactual in Section 5.3.

4.4 Budgetary Fiscal Illusion

Finally, we make use of Maryland's assessment centralization reform as a test of the fiscal illusion hypothesis. Fiscal illusion theory posits that voters routinely misunderstand their tax burdens and the extent of public spending (Dollery and Worthington, 1996). This most directly reflects rationally ignorant voters, although it may be abetted by duplicitous lawmakers. Public spending on property assessments were borne by county governments prior

to 1974 reform, at which point it became the state's full financial responsibility. County lawmakers serving perfectly attentive median voters should return the savings to local taxpayers, which implies that county general government expenditures should decline after 1974. This decrease should be proportional to the county's prior spending on its assessment department. A less than complete decrease suggests that the county reassigned some portion of those savings to other functions, which is consistent with a fiscal illusion.

We test for this by evaluating the change in county general government expenditures following the centralization reform using a difference-in-differences (DD) approach. We begin by compiling historical data on Maryland county general government functions expenditure from the 1967-68 through 1976-77 fiscal years. This expenditure category includes spending on county legislative operations as well as executive administration functions: treasurers, assessors, planners, auditors, and so forth. It does not include direct spending on education, roads, or any other public service. We narrow our focus to general government spending for a few related reasons. First, county expenditures on assessments represents a much larger share of general government spending (about 10 percent) than total countywide spending (about 0.5 percent).[26] This improves the likelihood that we could detect a meaningful change in aggregate expenditures if one occurred. Second, total expenditures reflect numerous other considerations we cannot adequately address in an empirical model. For example, most local public services receive significant intergovernmental support, which is not typically the case with general government functions. Even a modest shift in state or federal transfer policy could motivate a much more substantial change in county expenditures that dwarfs the dissolution of county assessment departments.

Our comparison group is composed of California counties, which hold responsibility for real property assessment. Despite their geographic distance, California and Maryland's

[26]Prior to the reform, Maryland counties collectively allocated about $10 million toward their assessment departments. Total nominal Maryland county expenditures grew from $2.0 billion in FY 1967-68 to $3.8 billion in FY 1976-77. By comparison, nominal county general government expenditures grew from $94 million to $152 million over this period.

property assessment systems shared many common characteristics prior to Proposition 13.[27] Both relied on county assessors prior to Maryland's reform, and both assessed at similar fractions of market value.[28] Both states also had assigned responsibility for training and monitoring assessment quality to a state agency.

Expenditure data for Maryland counties are drawn from historical reports published by the Maryland Fiscal Research Bureau and the SDAT. The Fiscal Research Bureau published annual digests of local government spending by major expenditure categories, including general government functions, for all cities, counties, and special districts.[29] SDAT's annual reports to the legislature contain data on the assessable tax base and assessment ratios, the latter of which enable us to reverse engineer assessed value to market value in order to create a consistent measure of property tax base size. We gathered the same information for California counties from historical reports issued by the State Controller's Office.[30]

Table 4 contains descriptive statistics for California and Maryland assessing jurisdictions over the 10-year observation period from 1967-1968 through 1976-1977 fiscal years. Unsurprisingly, California and Maryland look quite different in terms of their property tax bases and expenditure patterns. Prior to Proposition 13, California also used a lower assessment ratio than Maryland, partially explaining the state's much lower effective tax rate. However, when general government expenditures are scaled by market value, the two states appear much more similar. A simple pre/post-comparison of Maryland's county general government suggests they declined by about 10 percent on average following the centralization reform. We present the results of a more rigorous evaluation of the fiscal illusion following

[27] We also selected FY 1977 as the end point for this analysis because California's Proposition 13 was passed and implemented in the following fiscal year. Proposition 13 fundamentally changed the local assessment task and how local lawmakers budgeted for it (Welch, 1991).

[28] California's target assessment-sales ratio was 25 percent compared to Maryland's 50-55 percent, depending on county.

[29] These data are also available in a discontinued U.S. Census Bureau annual report titled "Local Government Finances in Selected Metropolitan Areas and Large Counties" which draws on data collected in the Annual Survey of State and Local Government Finances. However, the Census reports only contained data for the six most populous Maryland counties, while Maryland's state reports contain data for all 24 counties.

[30] The Controller's Office has published detailed annual spending data for counties, including tax base information such as assessment ratios, statutory tax rates, and components of the assessable base since the mid-1950s.

Table 4: Descriptive Assessment Data for California and Maryland, FY 1967-77

	California			Maryland		
Variable	All Years Mean (Std Dev)	Pre Mean (Std Dev)	Post Mean (Std Dev)	All Years Mean (Std Dev)	Pre Mean (Std Dev)	Post Mean (Std Dev)
Gen Gov't Exp	86	108	70	29	36	25
	(329)	(417)	(252)	(58)	(66)	(52)
Market Value	30,445	31,711	29,602	6,785	7,126	6,557
	(80,965)	(80,187)	(81,585)	(9,695)	(9,875)	(9,602)
Exp/MV	2,650	3,062	2,376	3,340	4,076	2,948
	(1,304)	(1,707)	(841)	(2,644)	(3,307)	(1,975)
ETR	0.6	0.6	0.6	2.3	2.3	2.3
	(0.2)	(0.2)	(0.2)	(0.7)	(0.6)	(0.7)

Notes: All figures are reported as 2024 constant dollars. Tax rates are expressed as percentages. The "pre-reform" period corresponds to FY 1967-68 to FY 1973-74. The "post-reform" period is 1973-74 to 1976-77. The California data correspond to 57 of the state's 58 counties with San Francisco excluded due to missing data. Maryland data correspond to all 23 counties and Baltimore City. "Gen Gov't Exp" means expenditure on general government functions, which comprise basic legislative and executive administrative offices such as treasurers, auditors, assessors, clerks, and so forth. "MV" means market value. "ETR" means effective tax rate.

centralization that incorporates a counterfactual design in Section 5.4.

5 Results

5.1 Statewide Inter-Area Uniformity

Inter-area uniformity refers to the dispersion of assessments across localities. Prior to state centralization in 1973, each of Maryland's 23 counties and the city of Baltimore were independently responsible for assessments. We measure statewide inter-area assessment uniformity using the statewide average of counties' deviation from the statewide median ASR. The ASR is the ratio of the assessed value to sales price for all sampled homes. A smaller average deviation means that more local areas have median ASRs closer to the statewide median. A reduction in the average deviation of assessments following centralization would be consistent with Maryland lawmakers' policy objective to improve consistency in assessments between jurisdictions.

Table 5 shows the average deviation of assessments in Maryland, its synthetic counterfactual, and the average value of all U.S. states other than Maryland. The synthetic Maryland is composed of Nevada (46.1 percent), Iowa (32.8 percent), Florida (20.2 percent), and Ohio (0.01 percent).[31] The table demonstrates that the synthetic Maryland closely matches the pre-treatment mean covariate values relative to a naive aggregation of all other U.S. states. One noteworthy improvement is the number of geographic areas in the synthetic Maryland relative to the real Maryland. This means that Maryland and its synthetic counterfactual possess a consistent number of data points underlying the calculation of their uniformity metrics.

[31]The SCM modeling process assigns each unit in the donor pool a weight. These weights collectively sum to one, and only donor pool units with non-zero weights contribute to the synthetic counterfactual. SCM analyses typically result in the creation of multiple viable sets of SCM weights based on the matching variables or other modeling decisions. We considered two weighting decision rules to determine the final set of weights. Abadie et al. (2010, 2015) propose a weighting decision rule that minimizes the root mean square percentage error (RMSPE) whereas Adhikari and Alm (2016) recommend a normalized version of the RMSPE. However, both decision rules yielded a nearly identical set of SCM weights.

Table 5: Mean Values for Matching Variables in the Pre-Reform Period

Variable	Maryland	Synthetic Maryland	Mean of All States
Average deviation, 1961	5.2	5.2	5.7
Average deviation, 1971	2.3	2.4	5.4
Number of areas	17.7	18.1	27.5
Number of sales	14,920	13,632	13,689
Mean sales price	30,979	26,945	14,664
Median ASR	45.0	36.9	29.7

Notes: Sales data are based on sampling of single-family owner-occupied houses (excluding new construction) for assessment ratio analyses conducted by the US Census Bureau. The following states are excluded from the synthetic control donor pool: Hawaii, Montana, Alaska, Washington DC, and California. Hawaii and Montana changed their assessment administration structure during the observation period. Alaska and Washington DC are both missing data for some pre-treatment periods. We exclude California because it shifted to an acquisition-based system, making assessment performance metrics meaningless. The synthetic Maryland is comprised of the following weighted states: Nevada (46.1 percent), Iowa (32.8 percent), Florida (20.2 percent), and Ohio (0.01 percent).

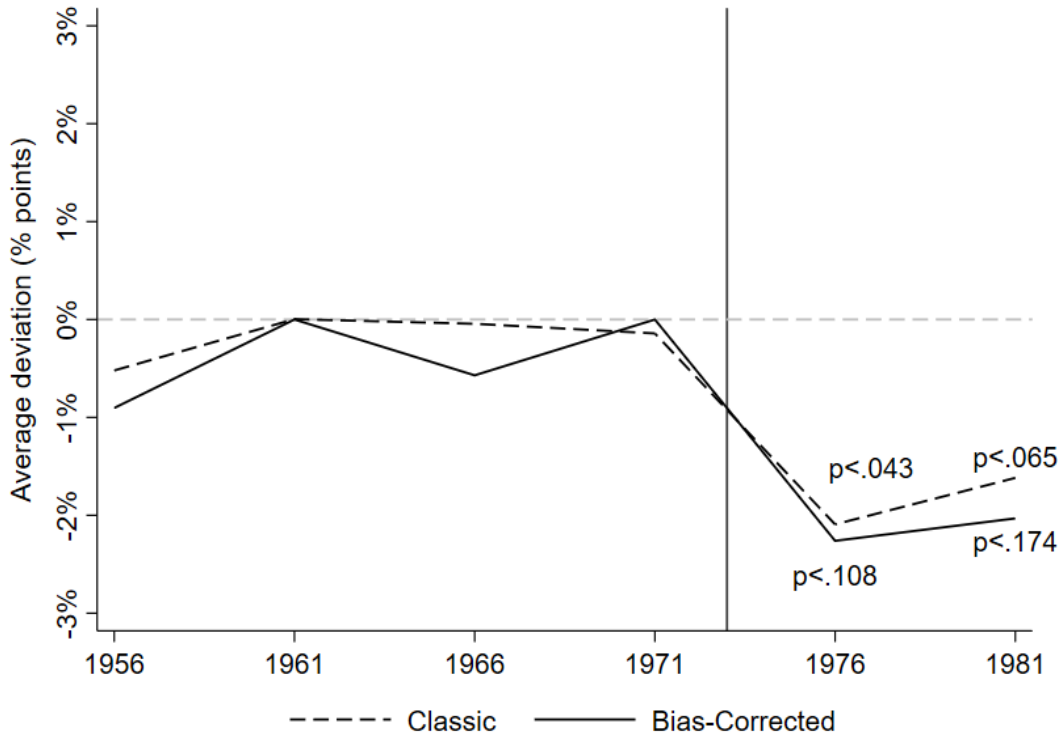

Figure 4: Statewide Inter-Area Deviation Treatment Effects

Figure 4 displays the difference in the annual average deviations of Maryland and its synthetic counterfactual. The dashed line represents the difference generated from the classic synthetic control approach as proposed by Abadie and Gardeazabal (2003), Abadie et al. (2010), and Abadie et al. (2015). The solid line incorporates bias-correction to the classic synthetic control method. This correction penalizes the treatment effect estimate by the size of any mismatch in the pre-treatment period (Abadie and Imbens, 2011). We use the bias-correction techniques proposed by Abadie and L'hour (2021) and Ben-Michael et al. (2021) and implemented by Wilshire (2022). P-values for each treatment effect estimate are provided as well, which reflect the probability of obtaining an estimate at least as large as the one produced for Maryland if centralization of the assessment function were assigned at random among states in the donor pool (Abadie et al., 2015).

The direction of the treatment effects that result from both the classic and bias-corrected SCM approaches match our hypothesis. Prior to centralization, the difference in average deviation of the actual and synthetic Maryland differed by no more than one percentage point. In the two five-year survey periods before the reform, the difference was no more than half a percentage point. By 1976, two years after centralization, the gap grew to two percentage points and remained consistent through the end of our study period in 1981. This result demonstrates that centralization improved assessment uniformity between local governments with two important qualifications. First, although the effect sizes are nearly identical, the resulting p-values suggest that only the classic SCM estimate is statistically significant. This reflects the small sample size that accompanies any analysis of state policy changes using state-level data. Second, we observe some modest reversion in assessment uniformity toward the pre-treatment average through 1981. However, the difference between Maryland and its synthetic counterfactual remains economically significant through the end of our study period.

We assess the robustness of the baseline results using several common tests. We begin by evaluating the sensitivity of the results to changes in the composition of the donor pool. First,

we limit the donor pool to states with a statewide COD in the pre-treatment period within seven and five percentage points of Maryland. As shown in Table 5, Maryland's median ASR differs considerably from other states, and limiting the donor pool to states with similar pre-treatment CODs helps to account for unmeasured differences in state characteristics that predict the distribution around the median. The seven-percentage point threshold reduces the donor pool to 20 states while the five-percentage point threshold reduces it to 17 states. Second, we narrow the donor pool to only states that have pre-treatment mean statewide average deviations within five and two percentage points of Maryland's. This test also implicitly reduces unobserved variation between Maryland and donor states, although it is agnostic to the source of the variation. The five-percentage point threshold reduces the donor pool to 37 states while the two-percentage point threshold reduces it to 23 states.

The result of all four SCM robustness checks are posted in Figure 5. Although the donor pool shrank by as much as a half, the treatment effect estimate from the main analysis remains, a roughly two percent point decrease in the average deviation from the statewide median ASR. This provides some confidence that the modest effect sizes are not being driven by donor pool composition or by unmeasured sources of variation. These robustness checks, however, further highlight uncertainty in whether the improvement in statewide inter-area uniformity is a short-term or long-term effect. The bias-correction estimates suggest the improved uniformity persisted through 1981 while the classic estimates sometimes suggest the gains in uniformity had reversed by 1981.

We also perform the standard "leave-one-out" test. This test ensures that no single donor state strongly influences the resulting SCM estimate. It involves sequentially excluding each donor state that received a non-zero SCM weight in the baseline analysis and re-estimating the treatment effect with that state excluded. As shown in Figure 6, the leave-one-out estimates mirror the baseline estimates. One notable discrepancy is that a subset of the leave-one-out estimates show greater reversion through 1981 compared to the baseline analysis.

Finally, we perform the in-space placebo test. Mechanically, this test assigns centraliza-

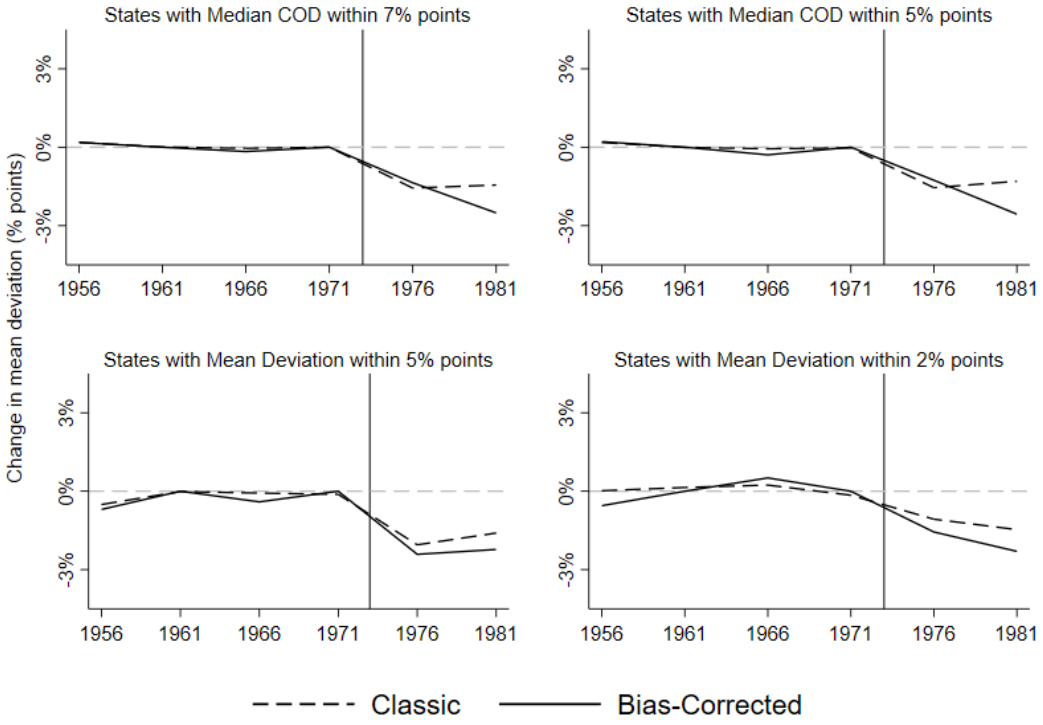

Figure 5: Donor Pool Robustness Tests for Inter-Area Mean Deviation

Figure 6: Leave-One-Out Test

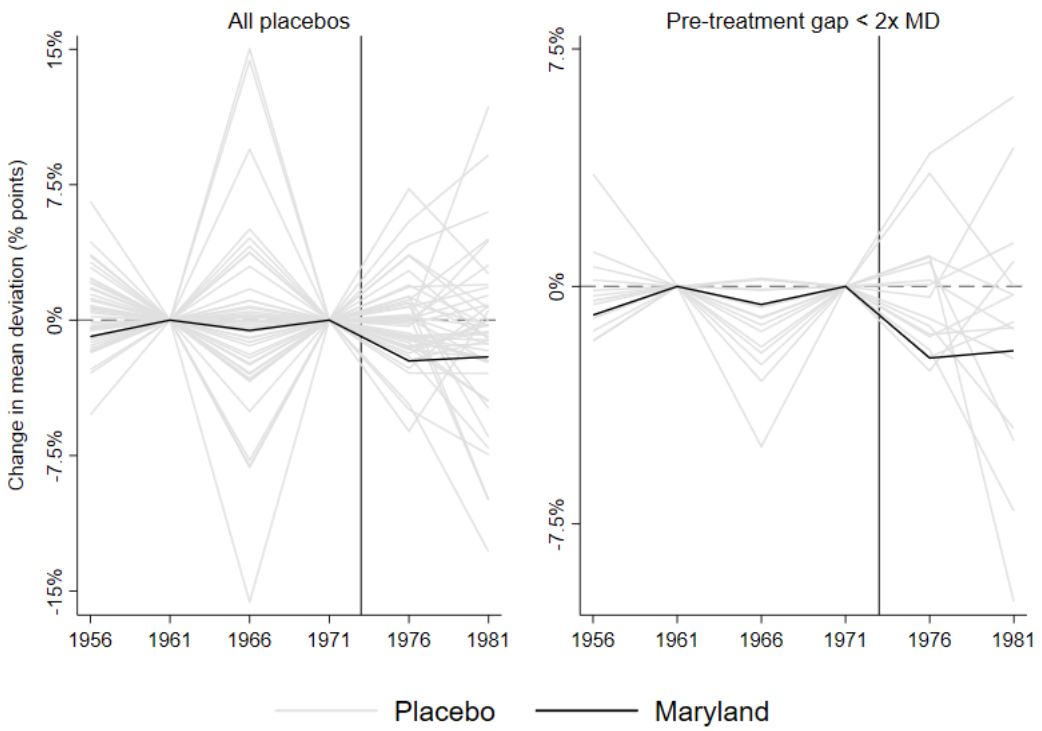

Figure 7: Bias-Corrected In-Space Placebo Test

tion of the assessment function as a placebo treatment to donor pool states. We then observe the distribution of treatment effect sizes that results from all placebo cases. Our baseline analysis assumes that all of the observed change in the mean deviation in Maryland is attributable to the centralization treatment, which implies that we should observe no similar reduction in other states during this period. This means that Maryland's treatment effect estimate from the main analysis should not lie near the center of the distribution of placebo outcomes. The further from the center, the more confidant we are that this assumption holds.

Figure 7 maps the distribution of bias-corrected SCM results for Maryland (black line) and placebo states (grey lines). The left graph includes all donor pool states, while the right graph only contains states where the mean pre-treatment bias-corrected gap is within 200 percent of Maryland's. In other words, the placebo tests in the right graph are most like Maryland in terms of pre-treatment fit. Both graphs show that the reduction in Maryland's

average deviation following centralization place it in the bottom tail of the placebo distribution, which supports the conclusion the treatment effect estimate obtained in the baseline analysis is attributable to the state's centralization of the assessment function.

5.2 County Intra-Area Uniformity

Although the primary purpose of Maryland's assessment centralization reform was to reduce inter-jurisdictional deviations in assessment quality, it could also affect assessment outcomes within local areas. This will occur if state assessors are more or less effective at achieving within-county assessment uniformity than the county assessors they replaced. To determine the effect of Maryland's centralization reform on uniformity within counties, we apply synthetic control methods to estimate the change in the single-family COD for seven local assessing jurisdictions in the Census Bureau dataset: Baltimore City and Anne Arundel, Baltimore, Frederick, Harford, Montgomery, and Prince George's counties.

There are 201 potential donor counties and cities with complete data over the four period pre-treatment window. We restrict the donor pool to units that have an average pre-treatment COD within two percentage points of each treated unit to improve the chances of fitting only donor units that share genuine pre-treatment trends with each Maryland county.[32] We relax this restriction to five percentage points for Prince George's and Montgomery counties because the smaller two percentage point threshold reduced their respective donor pools to fewer than 10 localities.

Figure 8 shows the change in the average COD across these seven Maryland counties relative to the average of their synthetic counterfactuals. Both the classic and bias-corrected estimates indicate that assessment centralization reduced the average COD of these seven counties by six percentage points. This estimate translates to a 32 percent improvement in

[32]We impose this restriction to avoid overfitting problems that may arise when the donor pool is very large relative to the number of pre-treatment periods. Abadie and Vives-i Bastida (2022) note that there is an increasing chance that any donor unit will be selected for inclusion in the synthetic control as the ratio of donor units to pre-treatment periods grows. This reduces the explanatory power of the synthetic control method because donors have a greater likelihood of experiencing common shocks with the treated unit.

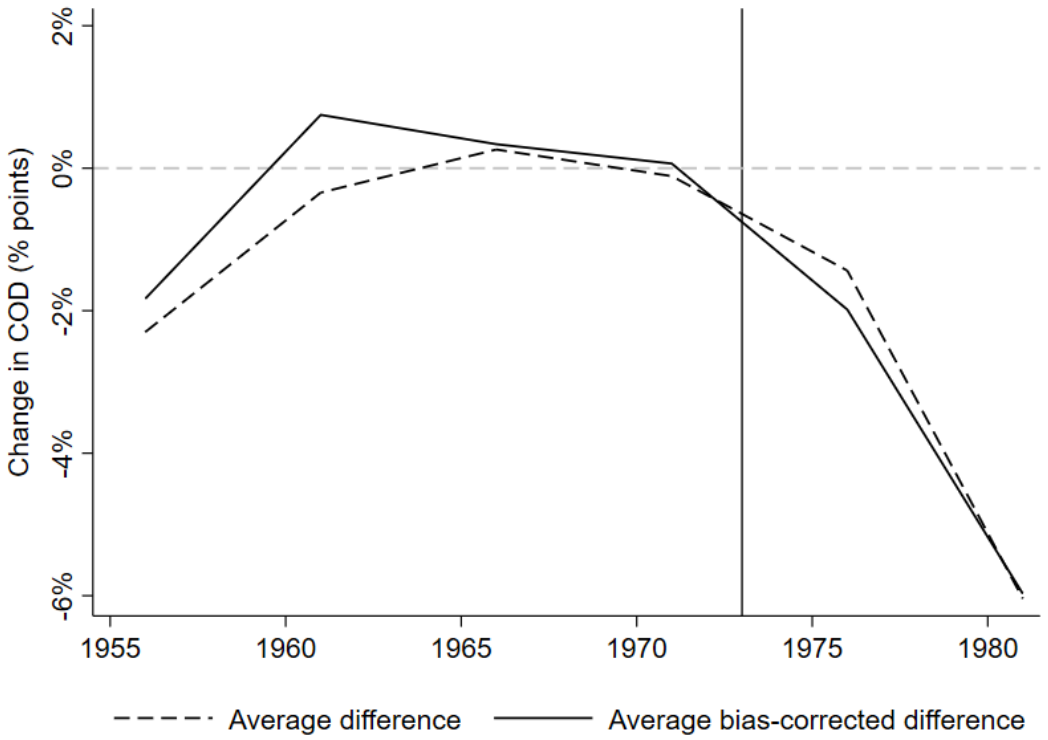

Figure 8: Average Local Inter-area COD Treatment Effects

the local intra-area uniformity, as measured by the change in the COD. This result is also significantly larger than the two-percentage point improvement in statewide inter-area uniformity.[33] These results suggest that, in aggregate, Maryland's state assessor outperformed their local counterparts at achieving within-county uniformity of assessments.

Next, we evaluate the impact of centralization on the assessment uniformity of each of the seven counties we consider. Figure 9 shows the COD trend of each county before and after the centralization reform. A detailed discussion of the methodology used to obtain these results and associated robustness checks appears in Appendix B. Overall, the SCM was able to generate a reasonably suitable counterfactual to all seven counties based on their pre-reform COD trends over the 20-year pre-reform period. Figure 8 suggests that the COD declined in five of the seven counties following state centralization of property assessment. However, only two of the decreases—for Anne Arundel and Harford Counties—register as statistically

[33]We consider two distinct measures in the statewide and county inter-area uniformity analyses. Since the calculations differ, they are not directly comparable, though they remain suggestive about the respective effect sizes.

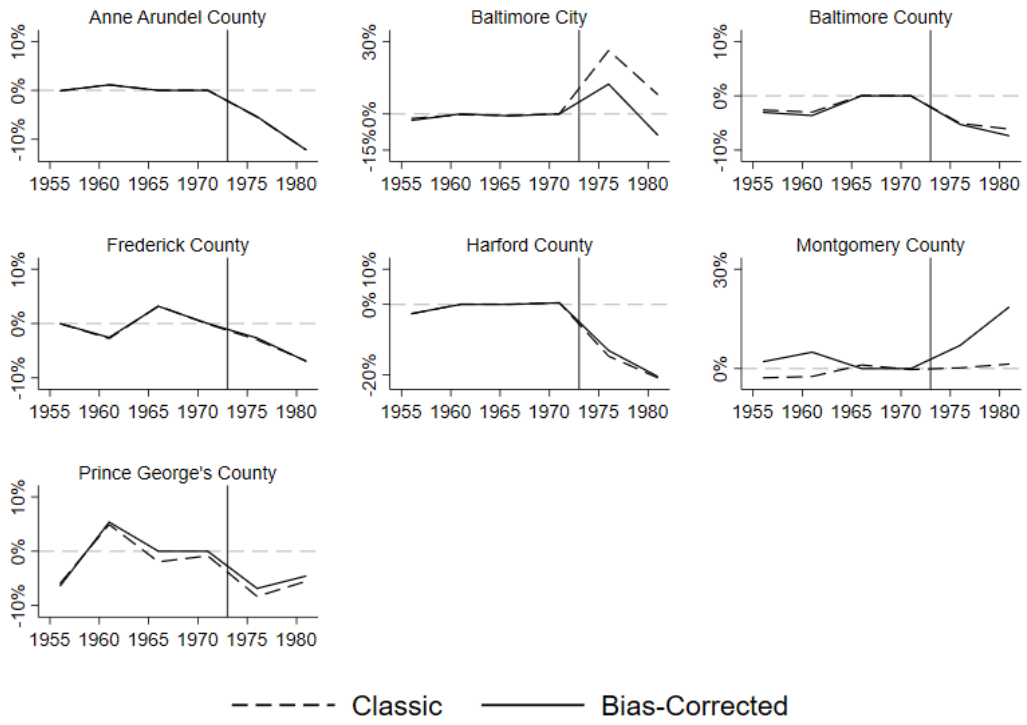

Figure 9: Inter-Area COD Treatment Effects by Local Area

different from zero in Table 6. The remaining changes in the COD are uniformly null, except for Baltimore City. Both models indicate that Baltimore City initially experienced a large, statistically significant increase in the COD following centralization. However, the classic and bias-corrected SCM models disagree about the longer-term impact through 1981. The bias-corrected approach shows a marginally significant decrease in the COD, while the classic approach suggests a modest increase.

Although most of the treatment effect estimates for individual counties are statistically insignificant, the economic significance of these results cannot be ignored. Five counties experienced a 20 to 40 percent decrease in their COD following centralization, which indicates considerable improvement in the within-county uniformity of assessments among the sample of single-family homes. Table 7 decomposes the county-level treatment effects reported in Table 6 into three categories: areas made better off, worse off, and no significant change. The two counties that experienced statistically significant improvements in their CODs following

Table 6: Countywide Inter-Area Treatment Effect Estimates

		Classic		Bias-Corrected	
County	Year	Effect	p-value	Effect	p-value
Anne Arundel	1976	-5.5	p=.026	-5.4	p=.026
	1981	-12.2	p=.026	-12.2	p=.026
Baltimore City	1976	26.3	p=.031	12.4	p=.031
	1981	8.0	p=.063	-8.9	p=.094
Baltimore County	1976	-5.1	p=.174	-6.1	p=.304
	1981	-5.3	p=.261	-7.4	p=.348
Frederick County	1976	-3.0	p=.682	-6.9	p=.500
	1981	-2.7	p=.682	-7.0	p=.523
Harford County	1976	-14.7	p=.042	-20.9	p=.042
	1981	-13.1	p=.083	-20.5	p=.042
Montgomery County	1976	0.2	p=.933	1.4	p=.999
	1981	7.0	p=.733	18.7	p=.467
Prince George's County	1976	-8.3	p=.246	-5.5	p=.508
	1981	-6.9	p=.344	-4.5	p=.574

Notes: All estimated treatment effects were generated using the synthetic control method. Underlying sales data are based on samples of single-family owner-occupied houses (excluding new construction) compiled by the U.S. Census Bureau for assessment ratio analyses. The following states are excluded from the synthetic control donor pool: Hawaii, Montana, Alaska, Washington DC, and California. Hawaii and Montana changed their assessment administration structure during the observation period. Alaska and Washington DC are both missing data for some pre-treatment periods. We exclude California because it shifted to an acquisition-based system, making assessment performance metrics meaningless.

Table 7: Average Pre-Treatment Characteristics by Outcome

Variable	Better Off	Worse Off	No Difference
COD	18.5	28.0	15.4
Median ASR	46.1	65.5	49.8
Population, 1970	208,087	904,585	474,565
% Black, 1970	9.6	46.4	6.1
Per capita income	$4,546	$4,052	$5,422
Average sales price	$16,624	$9,994	$19,641

Notes: The "better off" column includes Anne Arundel and Harford counties. The "worse off" column contains Baltimore City only. The remaining four counties appear in the "Not Significant" column.

the state centralization reform–Harford and Anne Arundel–were the among least populous in our sample in 1970. By contrast, the sole jurisdiction made worse off by the reform, Baltimore City, was the most populous locality we consider.[34] These results are congruent with Chicoine and Giertz (1988), who also find that centralization has the strongest positive impact on assessment uniformity in less populous localities. One important qualification to these results is that Baltimore City had particularly poor assessment uniformity prior to the state's centralization reform. Although the COD initially declined following the reform, the rebound in subsequent years suggests there may have been a long-term improvement in the city's assessment uniformity, but we are unable to observe the long-term trend after our sample ends in 1981.

5.3 Assessment Cost Analysis

The prior analyses suggest that Maryland's centralization of the assessment function accomplished its primary policy objective of enhancing inter-area uniformity at the state level, but it also appears to have had uneven effects on intra-area uniformity at the local level. We next consider the cost implications of the reform. Addressing this research question entails two significant challenges. First, we cannot observe the cost of assessment at the state and county level simultaneously. This is because all Maryland counties discontinued property assessments in 1974 following the state's centralization reform. Second, there is no statewide dataset that details county spending on property assessment, but we made an effort.

One simple approach to evaluating Maryland's assessment reform is to compare its costs to the aggregate assessment costs of local governments in states that maintained decentralized assessment systems during this period. To make this comparison, we compiled historical assessment expenditure data for eight other U.S. states.[35] We report aggregate spending on property assessment in Maryland and the eight comparison states as a share of state personal

[34]Baltimore City was also ranked 7th in the United States in total population and population density in the 1970 Census.

[35]The chosen states reflect practical considerations around data availability as well as the specific characteristics of their property assessments system.

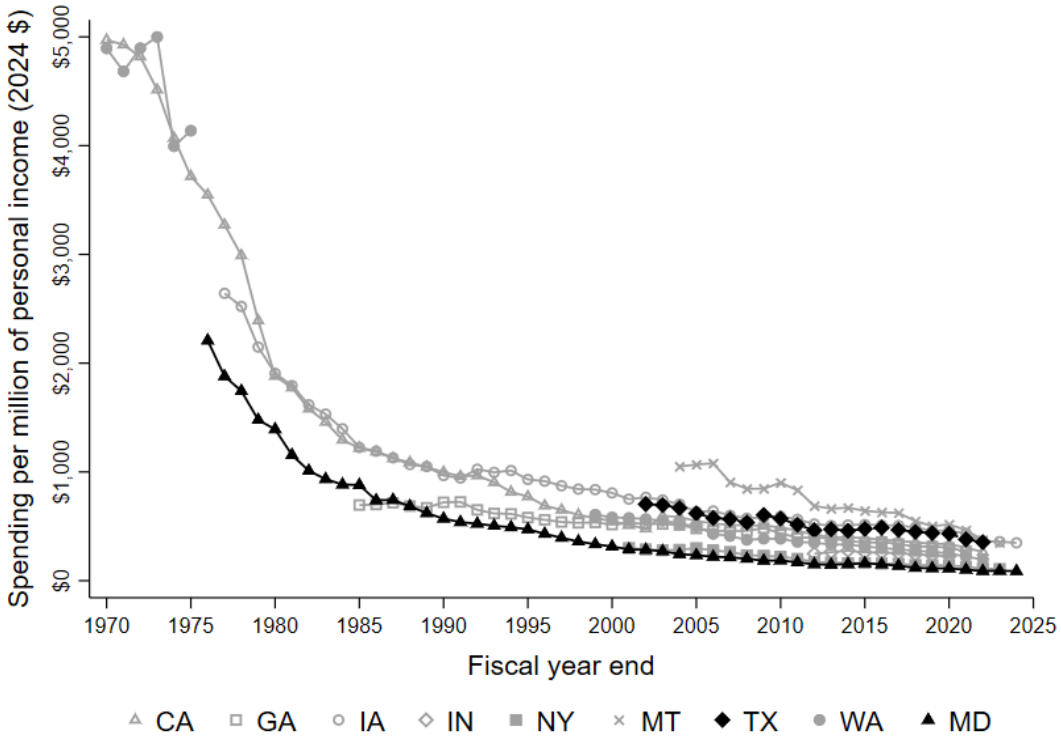

Figure 10: Historical Statewide Spending on Property Assessments, Select States, FY1970-2024

income in constant 2024 dollars in Figure 10. The figure shows that Maryland consistently spent the least on assessment administration since its 1974 centralization reform among the states we consider. However, Maryland's assessment spending is nearly matched by New York, which possesses a more decentralized assessment system. Montana, the only other state that values property at the state level, has historically spent more on assessments than other states in the figure, at least the time period we could obtain data. It is worth reiterating that neither state is fully centralized or fully decentralized. Montana has locally elected assessors to perform many of the clerical, recording, and liaising responsibilities of assessing offices. New York State has responsibility for assessing a small subset of properties, and for processing property tax credits and exemptions.[36]

Among the states shown in Figure 10, Texas is the only one to possess a fully decentralized

[36]New York State's Department of Taxation and Finance assesses taxable state-owned properties, utilities, railroads, and oil and gas extraction properties. It also determines which properties are eligible for the state's School Tax Relief (STAR) program.

assessment system while sharing other elements with Maryland. Both states assess properties on a three-year schedule, have local option exemptions for personal property, and have local offices with an appointed executive. Unlike most other states, Texas's CADs are responsible for assessing properties like utilities and railroads, though they typically contract these out to third-party appraisal firms. Texas is, in other words, Maryland's polar opposite, and the data show that Texas's assessment spending considerably exceeds that of Maryland's.[37]

Recognizing the limitations of this approach, we consider how the centralization reform affected assessment spending at the county level. We were able to obtain archived copies of Anne Arundel County's budget documents for the 1966 through 1977 fiscal years.[38] We use these records to construct a time series of the county's assessment expenditures.[39] We construct a similar time series for the SDAT using historical state budget records. These records indicate spending on personnel on each county office, as well as non-personnel and other central services costs at the state level.[40] We assign a portion of these costs to Anne Arundel County by multiplying the total statewide expenditure by the county's share of the total state tax base. That is, we assume that areas with larger tax bases will consume proportionately greater central services. We then add the result to the state's spending on personnel stationed in Anne Arundel County to obtain an estimate of the state's assessment expenditure in the county following the centralization reform.

We plot both time series in Figure 11. The left figure shows assessment expenditures by fiscal year in constant 2024 dollars based on the Consumer Price Index. The right figure shows assessment expenditures as a percentage of the county's total market value. We scale by value, since one could argue that when under state control, the county assessor found more taxable value than would have been found under local control. Scaling by value accounts

[37]Delaware is also fully decentralized, but we could not obtain historical assessment expenditure cost data from the three counties.

[38]These were the only county budget documents available in the Maryland State Archives that coincided with the state's assessment centralization reform.

[39]Anne Arundel County's transitioned from a calendar year to a July-June fiscal year in 1967. To align the timing of county with state expenditures over time, we only consider Anne Arundel's assessment costs from 1967-1968 onward, which was the first full budget cycle under the July-June structure.

[40]State expenditures on central services include management, oversight, and training of assessors.

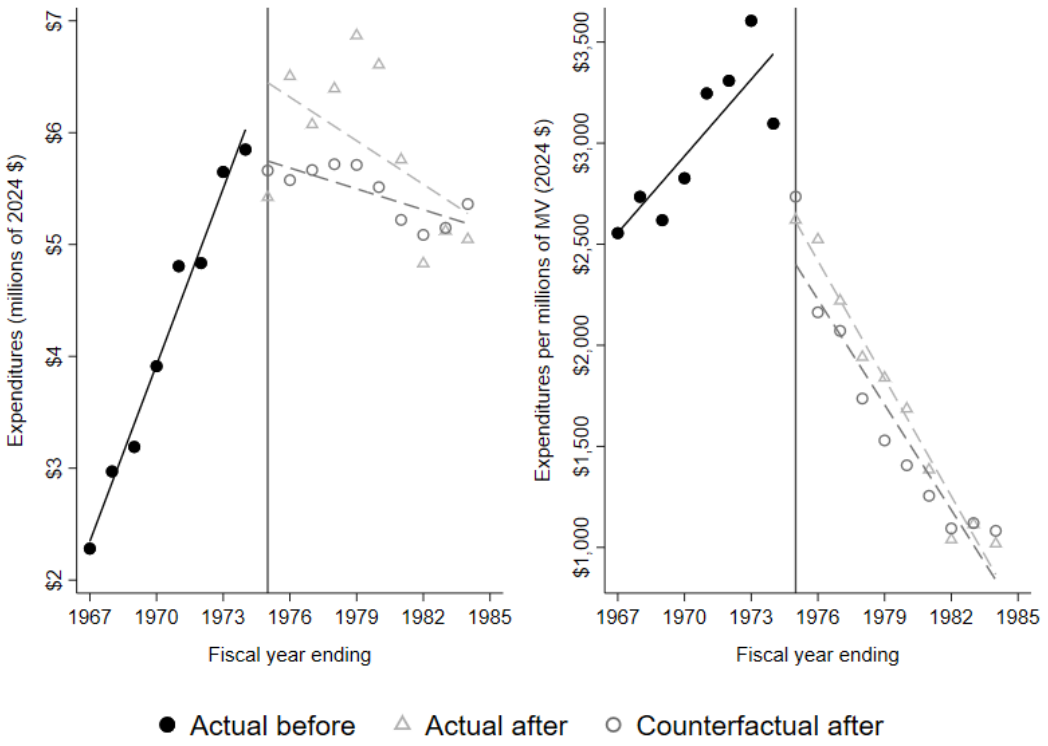

Figure 11: Expenditure on Property Assessment in Anne Arundel County, FY1967-85

for this possibility in spending decisions. Both figures show rapid growth in real county expenditure on assessments up to the year of the state's centralization reform. However, after the reform, the SDAT's real expenditure on assessments in Anne Arundel County declined through 1985. This suggests that the state achieved economies of scale in assessment but ignores the counterfactual of what would have happened to assessment spending in absence of the reform.

We consider this counterfactual by imputing Anne Arundel's probable expenditure on assessments had it retained responsibility for that function. Between 1967 and 1973, Anne Arundel County reliably spent between six and nine percent of its total general government expenditure on its Assessments Department, which averages to 7.5 percent per year.[41] We construct a counterfactual for 1974 onward by assuming that Anne Arundel County would have spent between six and nine percent of its total general government expenditure on

[41] General government expenditures include costs related to the local legislature, planning, finance, assessments, and similar departments.

assessments through 1985.[42] These counterfactual observations appear in Figure 11 as circles. They show that the state's spending on assessments exceed the county's predicted spending in the first few years following the reform.[43] However, by the 1980s, the two series largely converge. On average, the state spent about six percent more on assessments in Anne Arundel County compared to our simple counterfactual over the 10-year post-reform period we consider.

Given that we lack appropriate data to employ a more rigorous identification strategy, we are unable to reach a definitive conclusion as to whether Maryland's centralized property assessor achieves cost savings relative to a partially or fully decentralized assessment system. On one hand, Maryland spends less on property assessment administration as a share of state personal income than several other U.S. states. We also observe a sizeable decline in assessment expenditure in one county in the decade that followed the state's 1974 centralization reform. However, it appears likely that the county assessor would have achieved similar cost savings over that period. Prior work by Sjoquist and Walker (1999) and Krupa (2016) suggests that property assessment exhibits economies of scale at the local level. It is plausible that property assessment exhibits diminishing returns when scaled to the state level, though we do not possess the means to further test this hypothesis.

5.4 Budgetary Fiscal Illusion

Our final analysis tests how Maryland's transition to state property assessment administration affected local expenditures. County general government expenditures should decline after their assessment departments were abolished under an attentive median voter model. A less than complete decrease in general government expenditures indicates that the county reassigned those funds to other functional areas rather than returning them to taxpayers, a result consistent with a budgetary fiscal illusion.

[42]The county's assessment expenditures as a share of the population and tax base were much more volatile, ranging from -9 to 29 percent.

[43]This is consistent with the SDAT's budget document following the reform, which indicate that the department added at least 20 new staff statewide to support the transition.

To test for a budgetary fiscal illusion, we use a DD approach where Maryland jurisdictions are treated and 57 of California's 58 counties serve as control units. We exclude San Francisco due to missing data. As noted earlier, California and Maryland looked similar in terms of assessment administration and property tax system features before Proposition 13 and the latter's centralization. Both assessed property at the county level, Baltimore city notwithstanding; both assessed below market value by similar amounts; and both reassessed on similar cycles. California has more assessing jurisdictions than Maryland–58 compared to 24–which is advantageous since it provides some flexibility for constructing a suitable treatment group that will satisfy parallel trends.

However, owing to differences in population between the two states, we divided the sample of California county governments into population deciles based on the 1970 census.[44] Our logic is that California is more likely to pass the parallel trend requirement when it comprises counties that most resemble Maryland's counties in terms of population. We perform tests of time-varying difference in the pre-treatment period for different California county bundles following Autor (2003).[45]

Figure 12 maps the event studies for expenditures on general government functions. The top left graph contains time-varying differences when the full usable sample of 57 California counties comprise the control group while the top right graph excludes the top and bottom population decile from the California sample. The bottom graphs show results as the remaining counties in the tails of California's county population distribution are successively trimmed. As we expected, the sample with all 57 full California counties is the least credible, but despite this, the point estimates are not statistically different from zero. The other three California county bundles are more compelling. The event studies indicate that the

[44]California's state population was almost 20 million in 1970, compared to just 4 million in Maryland. This discrepancy plausibly correlates with demand for general government services and assessor workload.

[45]The underlying regression includes the county's market value of assessed property and the effective property tax rate as covariates. The former is a parsimonious way to control for scale differences in the assessment function across jurisdictions and within them over time. The latter accounts for differences in tax burdens, which correlates with the median voter's attentiveness to lawmaker investment in assessment administration.

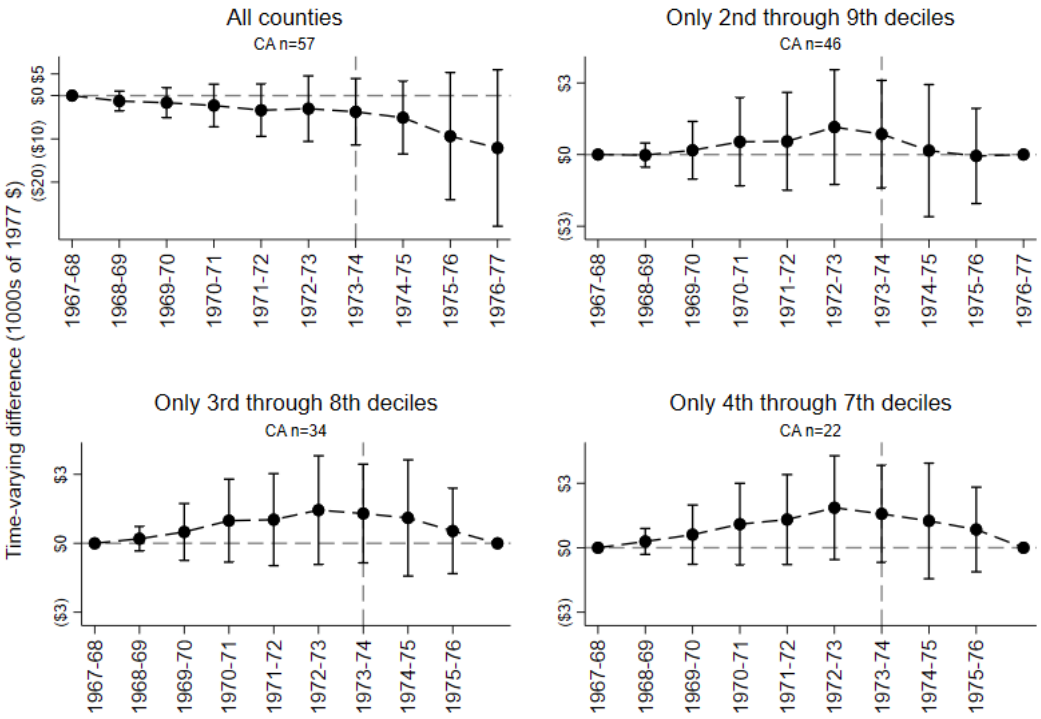

Figure 12: Event Study of Maryland County General Government Expenditures, FY1967-75

average control unit and the average Maryland unit are at most $3,000 apart in 1977 dollars in terms of expenditures on general government functions, or less than one percent at mean expenditures.

We generated DD point estimates and confidence intervals for the average treatment effect on the treated. These results are in Figure 13 and share a similar organization to the event studies graphs. We show the results with and without controls, which are counties' annual market value of assessed property and their annual effective property tax rate. All values are indistinguishable from zero, implying that Maryland's assessment centralization reform did not change counties' expenditures on the general government function. Three of the four specifications yield precisely estimated null effects. The remaining estimate, based on the full donor pool of California county governments, indicates a 0.1 percent ($4,000) decline in general government expenditures following centralization but does not differ statistically from zero.

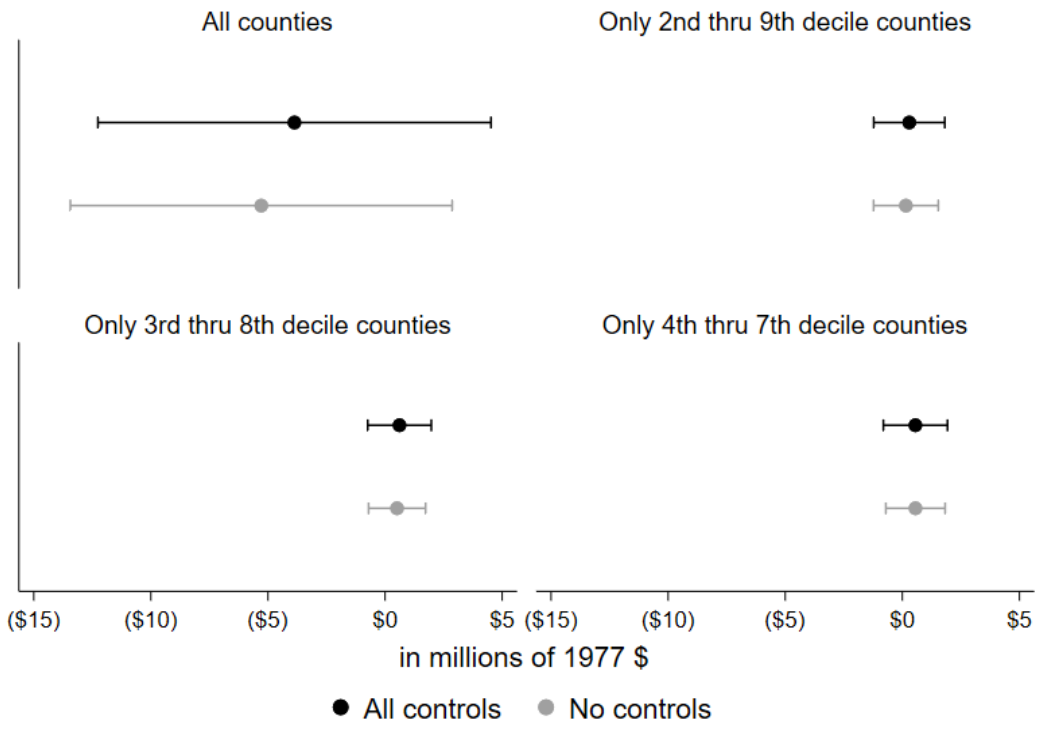

Figure 13: Difference-in-Differences Results: Post-Reform Change in Maryland General Government Expenditures

Our DD results are consistent with a local budgetary fiscal illusion arising from state centralization of assessment administration. However, we must call attention to the shortcomings of this analysis. Most notably, we possess insufficiently granular data to observe directly how county spending patterns changed after the state's centralization reform. Nonetheless, we find it difficult to ignore the evidence; Maryland county governments spent no more and no less on general government functions (auditors, the legislature, treasurers, planning, assessments, and so forth) after the state absorbed local assessment administration.

6 Discussion and Conclusion

This paper aims to determine whether state centralized property assessment leads to improved uniformity at lower cost compared to a decentralized assessment system. We accomplish this by treating Maryland's 1974 centralization reform as a natural experiment and

comparing its assessment outcomes with those of a synthetic Maryland constructed from other states. Our research design and data enable us to present several novel conclusions.

First, our analysis shows that Maryland's centralization reform led to a sizable improvement in statewide inter-area assessment uniformity. The average local area deviation from the statewide median declined from 4.6 percent to 2.6 percent, implying a 40 percent improvement in assessment uniformity across Maryland counties. This finding is consistent with the stated legislative rationale for the reform as well as the conventional wisdom regarding the benefits of centralized assessment systems (Cardin and Rombro, 1973; US Advisory Commission on Intergovernmental Relations, 1963). However, we are unable to test whether this improvement persisted over the following decades, as the Census Bureau discontinued production of the dataset we use in 1981.

Second, Maryland's centralization reform had heterogeneous impact on assessment uniformity within counties. Most of the counties in our sample experienced improvements to their within-county uniformity, but only two of the seven changes were statistically different from zero. Baltimore City's assessment uniformity decreased after the centralization reform, though the data also indicate some reversion toward the pre-reform level over time. The areas most likely to see improvements were less populous, have larger share of White residents, and were wealthier. However, we were unable to explore these attributes in greater detail due to data limitations.

Third, we showed that Maryland's Department of Assessments and Taxation spends less on property assessment administration than local governments in the aggregate due in several other states. Over the last two decades, Maryland spent just one third as much on assessment administration as a share of state personal income as Texas. This comparison is notable because Texas has a fully decentralized assessment system, but its other specific features closely match those of Maryland's, such as having a triennial assessment cycle. We also provide evidence that in one county, Anne Arundel, the state spent more on assessment administration than county lawmakers would have had centralization not occurred. Due to

data limitations, though, we could not conclude

Finally, when freed from the assessment function, lawmakers retained the assessment office's budget rather than return it to taxpayers. The implication, then, is that state centralization caused an increase in the overall level of local expenditures, consistent with a budgetary fiscal illusion. As it was not within the scope of our study or possible with our data, we could not test if the money retained was allocated to more welfare-enhancing public services, which would be a fruitful line of future research.

We draw several insights to academic researchers and state policymakers. To our knowledge, we are the first to present evidence on the tradeoffs of centralized property assessments. Notably, the US ACIR endorsed state property assessment administration, recommending "immediate adoption by some states and ultimate adoption by most states." (US Advisory Commission on Intergovernmental Relations, 1963, p.14). Although several states entertained this recommendation in the 1960s, only Maryland and Montana subsequently adopted it, even as Hawaii concurrently transitioned to a decentralized assessment system.[46] Recent work by Berry (2021), Amornsiripanitch (2022), Avenancio-León and Howard (2022), Hou et al. (2023), and others highlight assessment administration errors as a significant source of racial and vertical inequity in the property tax system. Currently, many states attempt to enhance the uniformity of property assessments indirectly through state regulation of local assessors. For example, California provides financial assistance to county assessors with the goal of improving local assessment outcomes (Propheter, 2022).[47] Our findings suggest that a fully centralized state property assessor will achieve some equity goals, and perhaps at comparable or lower cost, than partially or fully decentralized assessment systems. However, gains in assessment equity will not be experienced evenly across space.

Our results are also relevant to ongoing legislative discussions in Maryland. In January

[46]The US Advisory Commission on Intergovernmental Relations (1963) report describes earlier efforts to centralize assessment administration in California, New Mexico, Rhode Island, and Wisconsin on page 96. Groves (1969) argued that few states would adopted state centralization of the assessment function because local governments would push hard to retain control over their tax base. History has proven him correct.

[47]Other states enforce more stringent regulations on county assessors. For example, depending on the results of ratio studies, Kentucky may require a county to increase its total assessments (Combs et al., 2023).

2024, the Maryland SDAT failed to meet the statutory deadline to mail updated assessments on 100,000 property owners. As a result, those properties retained their previous valuation, which will reduce local property tax revenues by almost $200 million over the next three fiscal years (Sears, 2024). The Maryland General Assembly is presently studying property assessment reforms to address concerns about SDAT operations, which also include persistent staffing vacancies and declining uniformity of real property assessments.[48] One proposal under consideration would shift responsibility for property assessments from the state back to county governments. The results of this study suggest that a return to a decentralized assessment system will reduce statewide inter-area assessment uniformity, with the potential to affect the uniformity of assessments within counties. A separate relevant consideration is how this change will affect state and local spending and tax burdens. For instance, our study suggests that switching back to decentralized assessment administration will afford state lawmakers an opportunity exploit voter inattentiveness and keep SDAT's assessment appropriation.

[48]These issues were noted in a Maryland Department of Legislative Service's review of the SDAT that was prepared in February 2024. A copy of that report is available from the authors upon request.

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A Appendix: Property Tax Administration in Hawaii and Montana

To our knowledge, Hawaii, Maryland, and Montana are the only three states in the history of the US to have centralized the administration of property assessments for all property at the state level for some period of time.[49] Hawaii decentralized property assessment administration system in the early 1980s while Maryland and Montana centralized it in the mid-1970s. In the main paper, we provide some historical insight on Maryland's switch to centralization. As we also noted in the paper, the Census Bureau data does not allow us to study Hawaii and the characteristics of Montana do not make it a viable case study for a synthetic control approach. Nevertheless, we believe it could be useful to document what we learned about Hawaii's and Montana's respective policy changes.

A.1 Hawaii

Property assessment administration had been a centralized public service beginning with the Hawaiian monarchy and through its territorial years (Ooka, 1970). Centralization continued into statehood in 1956 with assessments becoming a responsibility of the state Department of Taxation. Property tax revenue was and remains exclusively for county use, but of the determinants of property tax revenue, the tax rate was in control of counties while the base was in control of the state. The state provided no local authority to determine the base. That is, counties could not exempt property of their choosing, nor tax any property the state exempted.

By the mid-1970s, calls for local control of the base reached a crescendo, and the state legislature began exploring the transfer of assessment responsibility to the counties. County officials were becoming increasingly frustrated with the legislature for passing legislation that eroded the property tax base (Sue, 1978). In 1976, for instance, the legislature expanded the homeowner exemption from $8,000 to $12,000, and in the following year, it approved legislation reducing the assessment ratio from 70 percent to 60 percent. State lawmakers also approved what we know today as a truth-in-taxation requirement, one that forced public hearings before property tax rates could increase. These types of legislative changes were common in the 1970s and 1980s as states were managing or trying to head off a period of taxpayer revolts that focused on the property tax (Martin, 2008).

[49] Washington, DC and the remaining US territories are also single assessing jurisdictions. However, since they do not have lower level jurisdictions with policy making and independent administrative power, the distinction between centralized and decentralized has no meaning in such instances.

Compounding these issues was a 1975 audit of the Department of Taxation, which revealed considerable disparities in assessment-sales ratios (Office of the Legislative Auditor, 1975). The audit found that 31 percent of assessing areas exceeded the department's internal maximum performance limit of a 20 percent COD. It attributed the uneven treatment of areas in part to the agency's inconsistent valuation and administrative practices. With respect to valuation decisions, the audit concluded, for example, that state assessors arbitrarily depreciated buildings and used an inappropriate construction cost index for many properties. With respect to administrative decisions, the audit faulted the agency for personnel allocation decisions that resulted in variation in staff appraisers' workload across assessing areas, resulting in more frequent appraising of some areas than others.

The only legislative effort to decentralize assessment administration occurred in the 1978 session where the Senate Committee on Intergovernmental Relations reported out SB 1732. However, this bill was never put to a full vote of the senate. Instead, Hawaii voters were given the chance to decide the matter through a referendum as part of the state's constitutional convention. In the November 7, 1978 election, 51.9 percent of 252,226 votes cast for Amendment 16 approved transferring the real property assessment function to counties, a change which would take effect July 1, 1981. The individual responsible for real property assessments in each county is called the Real Property Tax Administrator, an appointed position. Hawaii has not taxed personal property since 1947.

A.2 Montana

Montana is a curious case in that it appears to have a hybrid assessment administration structure. It has locally elected assessors whose responsibilities are, among other things, keeping property records and liaising with the state. It may also assist with valuing personal property. Real property valuation, however, is a state function with lead appraisers in each county field office. This administrative structure was established in the 1972 constitution and went into effect on July 1, 1973 codified by Chapter 405 of the laws of 1973. From the state's inception in 1889 through 1972, all property was assessed locally by elected county assessors. From 1972, counties were allowed to keep their elected assessors but now they act, in essence, as agents of the state. A citizen-led constitutional initiative to return the assessment function to the counties failed to gather enough signature to make the November 1976 ballot.

While there was broad concern about within-county and between-county assessment inequities (Revenue and Finance Committee, 1972b), the publicly documented causes for the change in administrative structure were varied. One concern was that holding the assessor

position did not require any expertise, training, or on-going professional development in either property appraisal or office management. Although the constitution at the time allowed the legislature to adopt other qualifications it had not done so by the 1972 convention (Barber, 1971). A second concern was that equalization under the 1889 constitution (as amended in 1915 and 1922) was not under the control of any of the three branches. Instead, the State Board of Equalization had the authority to equalize properties across jurisdictions but also decide appeals to its own decisions. Since the Board of Equalization derived its authority from the constitution, it was not answerable to any branch, and as such it is "freer to ignore the mandates and directives of the legislative assembly" (Revenue and Finance Committee, 1972b, pp. 17-18). A third justification was the state's size and rural nature. Public officials argued that it would be more cost effective for the state to administer assessments than counties (Barber, 1971).

However, the most consistent reason for state lawmakers pushing the change was related to how the state financed public schools. Under the Education Foundation ACt of 1949, all property taxpayers would face a minimum millage required to provide "the amount required to operate and maintain an adequate and efficient school." The millage would finance a uniform minimum amount of funding across school districts with the state making up any shortfalls. During the 1972 constitutional convention, delegates heard testimony that the state's education financing structure provided an incentive for local assessors to underassess property as a way to provide property owners (i.e., homevoters) tax relief (Revenue and Finance Committee, 1972a). By undervaluing property, residents receive relief while the state makes up the difference. Whether centralization of assessment administration decreased underassessments is an empirical question that we hope future scholarship will consider.

B Appendix: County Inter-Area SCM Data and Robustness Checks

The county inter-area results reported for the seven local jurisdictions in the main paper use different pre-treatment matching variables than for the statewide inter-area results. In addition, the Census Bureau data allows for a much larger donor pool–197 counties and cities with complete data for the full pre-treatment period. However, prior studies suggest that too large of a donor pool may be undesirable. As the size of the donor pool increases relative to the length of the pre-treatment period, overfitting the data becomes increasingly likely, casting doubt on the credibility of the SCM treatment effects. A simple solution is to narrow the donor pool according to the dimensions most relevant to the outcome. For the countywide inter-area analysis we only included local areas with a mean pre-treatment COD within two percentage points of each treated area into the donor pool. The exceptions to this were Montgomery County and Prince George's County, for which we used a five percentage point threshold since two percentage point thinned the donor pool in each case to only a handful of potential controls.

In Table B1 we report the actual and synthetic mean values for the matching variable in the pre-treatment period. The overall mean of all 197 donor pool units is also provided for a naive comparison. The synthetic controls more closely approximate their actual local area counterpart more so than the aggregate mean, which is not surprising. Figure B1 displays in-space placebo results with the black line indicating the treated local area and grey lines being placebos. As with the statewide inter-area analysis in the main paper, we report the placebo results for the full donor pool as well as for a subset based upon the proximity of the placebos' RMSPEs relative to each treated unit. For the subset, we limit the donor pool to the 10 placebo areas with the closest RMSPE. In both cases, as noted in the main paper, the donor pool is only comprised of counties and cities where the pre-treatment average COD was within two percentage points of each treated unit. As our main SCM analysis only showed Anne Arundel, Baltimore City, and Harford has having consistent and credible treatment effects, we limit the in-space checks to these areas. Other robustness checks for other areas are available upon request. For all three areas, we see that the treatment effects are at the end of the gap distribution, providing additional confidence in the magnitude and direction of the local effects of assessment centralization.

Table B1: Countywide Inter-Area Actual and SCM Means

	Actual	Synthetic	Mean of donor pool
Anne Arundel County[1]			
Coefficient of dispersion, 1966	15.5	15.5	18.7
Coefficient of dispersion, 1971	16.5	16.5	22.0
Population, 1970	299,825	306,706	363,194
Median ASR (%), 1971	40.7	40.4	33.4
Aggregate sales price (000s), 1971	74,100	73,683	37,164
Aggregate AV of sampled homes (000s), 1971	29,618	30,343	13,251
Number of sales, 1971	2,952	2,948	1,649
Baltimore City[2]			
Coefficient of dispersion, 1961	25.8	26.2	23.1
Coefficient of dispersion, 1971	36.3	36.2	22.0
Population, 1970	904,585	1,368,418	363,194
Median ASR (%)	55.8	46.6	32.1
Aggregate sales price (000s)	44,235	47,435	21,410
Aggregate AV of sampled homes (000s)	22,443	21,116	7,465
Number of sales	3,335	3,740	1,289
Baltimore County[3]			
Coefficient of dispersion, 1966	15.9	15.8	18.7
Coefficient of dispersion, 1971	12.9	13.0	22.0
Population, 1970	622,418	505,972	363,194
Median ASR (%)	49.0	48.4	32.1
Aggregate sales price (000s)	57,772	53,459	21,410
Aggregate AV of sampled homes (000s)	24,679	22,103	7,465
Number of sales	1,901	2,009	1,289
Frederick County[4]			
Coefficient of dispersion, 1956	24.1	25.3	18.7
Coefficient of dispersion, 1971	15.4	15.5	22.0
Population, 1970	85,309	120,185	363,194
Median ASR (%)	44.3	45.3	32.1
Aggregate sales price (000s)	7,580	11,605	21,410
Aggregate AV of sampled homes (000s)	3,077	5,945	7,465
Number of sales	255	491	1,289
Harford County[5]			
Coefficient of dispersion, 1961	23.2	23.1	23.1
Coefficient of dispersion, 1966	16.9	16.8	18.7
Population, 1970	116,349	113,580	363,194
Median ASR (%)	43.8	39.9	32.1
Aggregate sales price (000s)	12,380	9,172	21,410

	Actual	Synthetic	Mean of donor pool
Aggregate AV of sampled homes (000s)	5,123	4,710	7,465
Number of sales	370	390	1,289
Montgomery County[6]			
Coefficient of dispersion, 1966	10.5	9.4	18.7
Coefficient of dispersion, 1971	14.0	14.3	22.0
Population, 1970	524,400	547,456	363,194
Median ASR (%)	49.2	46.3	32.1
Aggregate sales price (000s)	214,797	191,220	21,410
Aggregate AV of sampled homes (000s)	105,077	95,352	7,465
Number of sales	5,304	6,274	1,289
Prince George's County[6]			
Coefficient of dispersion, 1961	24	23.4	23.1
Coefficient of dispersion, 1971	10.8	11.7	22.0
Population, 1970	666,136	666,183	363,194
Median ASR (%)	49.9	64.3	32.1
Aggregate sales price (000s)	89,475	80,058	21,410
Aggregate AV of sampled homes (000s)	44,659	48,988	7,465
Number of sales	3,300	3,101	1,289

[1]Donors (weights): Denver (.235), El Paso Co., CO (.205), Polk Co., IA (.078), Johnson Co., KS (.250), Campbell Co., KY (.183), Wake Co., NC (.034), Franklin Co., OH (.014)
[2]Donors (weights): Portland, ME (.137), Alamance Co., NC (.174), Philadelphia (.689)
[3]Donors (weights): Arapahoe, Co., CO (.142), Jefferson Co., KY (.338), Cuyahoga Co., OH (.110), Jackson Co., OR (.349), Bucks Co., PA (.060)
[4]Donors (weights): La Salle, IL (.366), Campbell Co., KY (.123), Jackson Co., OR (.180), Henrico Co., VA (.331)
[5]Donors (weights): Tuscaloosa Co., AL (.446), Campbell Co., KY (.416), Portage Co., OH (.040), Clackamas Co., OR (.085), Salt Lake Co., UT (.012)
[6]Donors (weights): Broward Co., FL (.489), Jackson Co., OR (.024), Fairfax Co., VA (.486)
[7]Donors (weights): Miami-Dade Co., FL (.093), Johnson Co., KS (.154), Jefferson Co., KY (.633), Montgomery Co., OH (.120)
Notes: Sales data are based on sampling of single-family owner-occupied houses (not new construction) for assessment ratio analyses conducted by the US Census Bureau. Local governments in the following states are excluded from the synthetic control donor pool: Hawaii, Montana, Alaska, Washington DC, and California. Hawaii and Montana changed their assessment administration structure during the observation period. Alaska and Washington DC are both missing data for some pre-treatment periods. We exclude California because it shifted to an acquisition-based system, making assessment performance metrics meaningless.

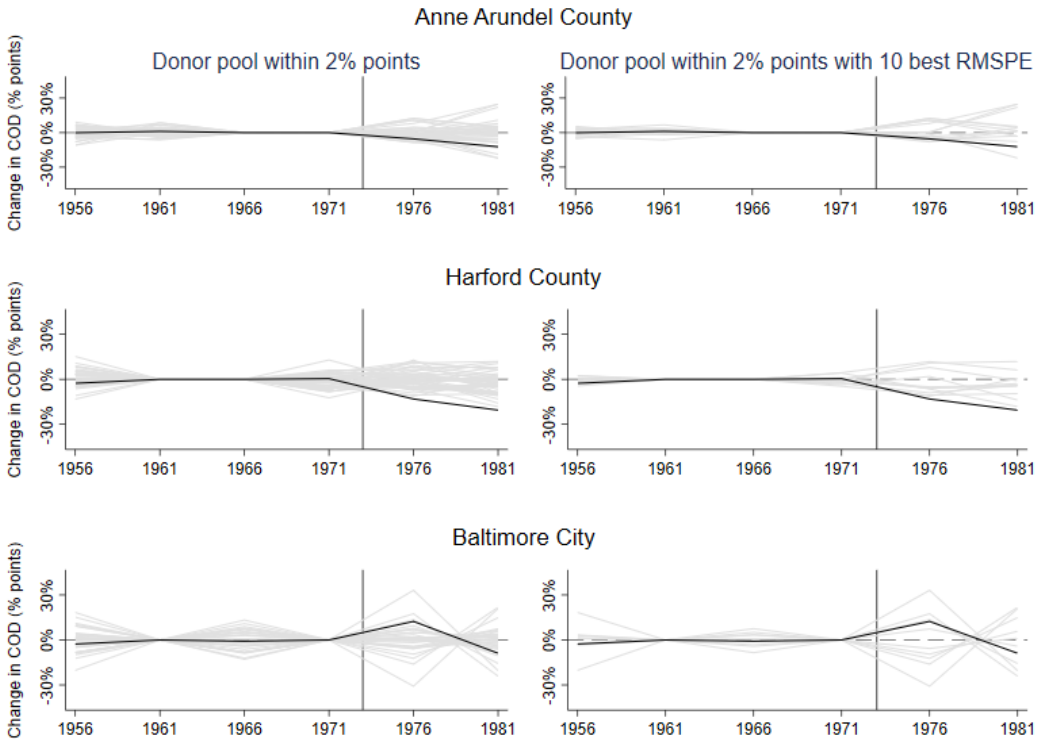

Figure B1: In-space Robustness Results: Anne Arundel County, Baltimore City, and Harford County