Full Disclosure: Unanticipated Improvements in Property Tax Uniformity

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This paper contributes to two strands in the property tax literature. One thread considers the effects of full disclosure requirements or "truth in taxation" on the rate of property tax growth. The second studies the determinants of assessment uniformity. This article focuses on the role of full disclosure in changing administrative incentives and improving the uniformity of the property tax. A panel of 29 Utah counties over a 32-year period is used in a TSCS analysis. Findings suggest there is substantial evidence that full disclosure improved uniformity in Utah, but limited evidence that it restrained property tax growth.

INTRODUCTION

Public finance experts consider property tax an important source of revenue for local governments. In a survey conducted in the early 1990s of over 1,300 members of the National Tax Association, 93 percent of the respondents with training in economics favored the property tax as a major source of revenue for local governments.[1] McGuire notes that among public finance economists, the perceived advantages of the property tax for funding local governments approach dogma.[2]

A variety of arguments support such views. The property tax provides subnational governments—cities, towns, special districts, and school districts—with a revenue source that offers fiscal stability, is difficult to evade, and provides political and fiscal

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1. Joel Slemrod, "Professional Opinions About Tax Policy–1994 and 1934," *National Tax Journal* 48, no. 1 (1995): 121–148.

2. Therese J. McGuire, "Proposition 13 and Its Offspring: For Good or Evil," *National Tax Journal* 52, no. 1 (1999): 129–138.

autonomy.[3] The property tax is also direct and visible, two necessary criteria to assure political accountability.[4] Accountability is even greater if land-use zoning is practiced within a community.[5] And to the degree that property tax is capitalized into the purchase price of land and improvements, subsequent owners do not pay the tax.[6]

But a property tax is far from perfect. It is criticized as being insensitive to cash flow and for being applied against unrealized gains. Perhaps these criticisms are part of the reason why its historical public acceptance has been relatively low.[7] In addition, standard texts in public finance suggest that the property tax often suffers from nonuniform administration—potentially an even more serious shortcoming.[8]

The reality however is that although uniform property tax administration is a concern for legal experts, economists, and tax professionals, it has virtually no political traction. Property tax administration has taken a back seat to the more popular political issue of limiting the property tax. Proposition 13, adopted as a result of a 1978 California referendum, is the most notable in a series of relatively recent actions to limit the property tax in the United States. It is clear that during the past 25 years, proposing or supporting property tax limits has been an effective political scheme. No one gets elected on the promise of property tax reform, but promising property tax limits or reductions appeals to voters. As a result, the property tax in 46 of the 50 states is now limited to some degree by statutorily or constitutionally imposed base restrictions, rate limits, or revenue limits.[9]

One danger of property tax limits is that they may actually increase the nonuniformity of the property tax. Again, Proposition 13 is an extreme example of this outcome. While

3. William A. Fischel, *The Homevoter Hypothesis: How Home Values Influence Local Government Taxation, School Finance, and Land-Use Policies* (Cambridge, MA: Harvard University Press, 2002).

4. Wallace E. Oates, "Taxation in a Federal System: The Tax-Assignment Problem," *Public Economics Review* 1 (1996): 35–60.

5. Bruce Hamilton, "Zoning and Property Taxes in a System of Local Governments," *Urban Studies* 12 (1975): 205–211; William A. Fischel, "Property Taxation and the Tiebout Model: Evidence for the Benefit View from Zoning and Voting," *Journal of Economic Literature* 30 (1992): 171–177.

6. Joan Youngman, "The Hardest Challenge for Value Based Property Taxes: Part I," *State Tax Notes* 16, no. 10 (1999): 745–748.

7. ACIR, *The Role of the State in Strengthening the Property Tax* (Washington, DC: Advisory Commission on Intergovernmental Relations, 1963); Richard L. Cole and John Kincaid, "Public Opinion and American Federalism: Perspectives on Taxes, Spending and Trust," *Spectrum: The Journal of State Government* (2001): 14–18; Ronald C. Fisher, *State and Local Public Finance* (Chicago, Irwin, 1996).

8. David N. Hyman, *Public Finance: A Contemporary Application of Theory to Policy* (Fort Worth, TX Dryden Press, 1999); Richard Musgrave and Peggy Musgrave, *Public Finance in Theory and Practice*, 5th ed. (Boston: McGraw-Hill, 1995); Sherwin Rosen, *Public Finance*, 6th ed. (Boston: McGraw-Hill, 1999).

9. ACIR, *Tax and Expenditure Limits on Local Governments* (Washington, DC: Advisory Commission on Intergovernmental Relations, 1995). These limits, among other factors, have affected the property tax. Since 1978 the rate of growth of the property tax has waned in the United States (Alvin D. Sokolow, "The Changing Property Tax and State and Local Relations," *Publius: The Journal of Federalism* 28, no. Winter (1998): 165–187; Alvin D. Sokolow, "The Changing Property Tax in the West: State Centralization of Local Finances," *Public Budgeting and Finance* 20, no. 1 (2000): 85–104).

it limited the property tax, Proposition 13 also validated a nonuniform assessment process.[10] Most limits do not affect uniformity as directly as Proposition 13 has, but as demonstrated in several studies on uniformity, taxing jurisdictions with lower effective tax rates tend to exhibit greater inconsistency in their property tax assessments.[11]

Our research both contributes to the evaluation of tax limitation measures and builds on the tradition of examining administrative and organizational factors that have been asserted to contribute to or diminish property tax uniformity. Tax policy experts have tended to focus more on equity and efficiency in administration. Early studies in this area focused on the influence of the assessor's background, age, training, experience, and appointment process on the uniformity of the property tax.[12] More recent studies on uniformity have focused on analyzing the influence of institutional issues such as mapping to support appraisals, full-time versus part-time appraisers, contract appraisals versus public appraisals, frequency of reappraisals, and county versus township appraisals.[13]

The logic of past efforts to improve uniformity has often been based on the assertion that an informed public is central to good tax administration. The Advisory Commission on Intergovernmental Relations thus defined full disclosure in terms of policies designed to bring transparency to the property tax process. These policies included sales assessment ratio studies, valuation at full market value, and open appeal processes.[14]

There is also at least one approach to tax limitation that focuses on public information as a means of restraining growth. This effort has also been termed truth-in-taxation or "full disclosure" by its proponents. In this view, full disclosure is defined as a process that clearly identifies why property tax increases are occurring. In this article we examine one such policy scheme that, when adopted, was primarily intended to limit or slow the growth of the property tax through pubic information, but may actually have been more effective in facilitating assessment uniformity. As we will describe below the Utah law is consistent with this latter definition of full disclosure as a means of limiting tax growth. While we evaluate the effectiveness of the Utah law in limiting property tax growth, our primary focus in this article is not on the role such laws have played in limiting the property tax,

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10. Arthur O'Sullivan, Terri A. Sexton, and Steven M. Shefferin, *Property Taxes and Tax Revolts: The Legacy of Proposition 13* (Cambridge, UK: Cambridge University Press, 1995).

11. John H. Bowman and John L. Mikesell, "Uniform Assessment of Property: Returns from Institutional Remedies," *National Tax Journal* 31 (1978): 137–153; Melvin Borland and Stephen Lile, "The Property Tax Rate and Assessment Uniformity," *National Tax Journal* 32 (1980): 73–84; John H. Bowman and John L. Mikesell, "Elected versus Appointed Assessors and the Achievement of Assessment Uniformity," *National Tax Journal* 42 (1989): 181–189.

12. Vincint J. Geraci and James L. Plourde, "The Determinants of Uniform Property Tax Assessment," *Assessor's Journal* 1, no. 4 (1976): 235–250.

13. John H. Bowman and William Butcher, "Institutional Remedies and the Uniform Assessment of Property: An Update and Extension," *National Tax Journal* 39, (1986): 157–169; Bowman and Mikesell, "Elected versus Appointed Assessors and the Achievement of Assessment Uniformity"; Bowman and Mikesell, "Uniform Assessment of Property: Returns from Institutional Remedies."

14. ACIR, *The Property Tax in a Changing Environment: Selected State Studies* (Washington, DC: Advisory Commission on Intergovernmental Relations, 1974).

but rather on their role in changing the institutional incentives of property tax administration and improving the uniformity of the property tax. Bland and Laosirirat[15] and Cornia, Smith, and Wheeler[16] have noted the role that this type of full disclosure might play in improving property tax uniformity, but to date, this aspect of full disclosure remains unexplored.

Our analysis differs from earlier studies on administrative outcomes in that we explicitly examine a policy that changes the political and organizational incentives for public assessors. Thus, we do not explore the use or even the importance of appraisal techniques. We examine a change in the political incentives surrounding property appraisals for tax purposes. Our study also differs from earlier studies, which generally examined the issue of uniformity on the basis of a one-year cross-sectional data set, in that we analyze the uniformity of the property tax in a panel of jurisdictions over a 32-year period.

In this paper, we posit that the full disclosure law in Utah created an institutional climate that fostered more timely administration of the property tax by elected county assessors and more rigorous supervision by the Utah State Tax Commission regarding property tax matters.[17] If the posited outcome is validated by evidence, as we believe it is, then full disclosure laws can and should be judged beyond their role in controlling the rate of increase in the property tax.

We begin by briefly discussing property tax uniformity and describing the operation of a full disclosure law. We then briefly report on the fiscal consequences of the full disclosure law in Utah. Our analysis suggests that the Utah's law did not radically change the fiscal landscape in cites, counties, and school districts in the state.[18] We next proceed to a review and discussion of the property tax appraisal implications that we suggest are associated with full disclosure laws of this type. In the discussion, we offer a view of how full disclosure contributes to improved property tax administrative practice. We contend that even if intended, a certainly less heralded outcome of the full disclosure law was an improvement in the administration and a resulting improvement in the degree of uniformity in the property tax in Utah. We conclude with limited policy observations and recommendations.

15. Robert L. Bland and Phanit Laosirirat, "Tax Limitations to Reduce Municipal Property Taxes: Truth in Taxation in Texas," *Journal of Urban Affairs* 19, no. 1 (1997): 45–58.

16. Gary C. Cornia, Scott Smith, and Gloria M. Wheeler, "Effects of Truth-in-Taxation on Property Tax Revenue in 29 Utah Counties," *Public Budgeting and Financial Management* 2, no. 2 (1990): 233–252.

17. Because of the length of time of our analysis and inadequate records we do not identify the actual actions taken by the individual county assessors or the State Tax Commission, focusing instead on the outcomes over time.

18. It may also have increased reliance on special districts in Utah.

UNIFORMITY

This article focuses on one aspect of tax administration: the uniformity of property assessments. Nonuniform tax administration occurs when properties within the same taxing jurisdiction which have similar economic and market attributes are not valued equally for property tax purposes. Unfortunately, nothing in property tax practice and administration inherently identifies and adjusts for changes in market value.[19] To appraise or reappraise a property, assessors must act overtly and estimate the sales price of each property as of the legal lien date. The need to proactively establish the economic value of the base makes the property tax different from other taxes where the value of the base is established through observable economic transactions (e.g., sales price of goods or annual income). As we will note, assessors are often reluctant to revalue property even if uniformity would be improved.

There are a number of troublesome dimensions of nonuniform property tax administration and accompanying nonuniform tax burdens.[20] State constitutions, statutes, and court rulings require tax administrators to impose uniform and equal property taxes; doing otherwise results in time-consuming and expensive administrative and court challenges.[21] Reduced tax acceptability and even low tax compliance are additional examples of potential problems that may result from nonuniformity. Taxpayers may never be happy about having to pay a tax, but they will be even more unhappy and will be less likely to fully comply with a tax if they perceive it to be unfairly imposed or administered.[22]

Another illustration of the potential problems associated with a nonuniform property tax is the role taxes might play in capital investment and reinvestment decisions. There is a possibility that improved properties with higher tax burdens could face cash flow problems that might deter needed maintenance or investment in additional capital improvements.[23] Additionally the efficiency of investment decisions involving vacant land might be adversely influenced.

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19. In some states, there is a practice of increasing the assessed value of property by applying a factor to the assessed value of the previous year. Such action can account for overall changes in the price level of housing, but it does not easily account for differential changes in the taxable value within a taxing jurisdiction.

20. Marcus T. Allen and William Dare, "Identifying Determinants of Horizontal Property Tax Inequality: Evidence from Florida," *Journal of Real Estate Research* 24, no. 2 (2002): 153–164; Brent C. Smith, "Applying Models for Vertical Inequity in the Property Tax to a Non-Market State," *Journal of Real Estate Research* 19, no. 3 (2000): 321–344.

21. J. Terwilliger, "An Error in Methodology: Inclusion of External Costs of Sales in Property Tax Valuations," *Akron Law Review* 17 (2002): 23–42.

22. J. Andreoni, B. Erard, and J. Feinstein, "Tax Compliance," *Journal of Economic Literature* 36, no. 2 (1998): 818–860.

23. W. Wheaton, "The Incidence of Inter-Jurisdictional Differences in Commercial Property Taxes," *National Tax Journal* 37, no. 4 (1984): 515–529.

FULL DISCLOSURE

Under a property tax full disclosure law of the sort considered here, it is generally the case that each local taxing district, city, town, school district, and special district is required to calculate a rate that when applied to the tax base for the current year, produces property tax revenue equal to the amount of property tax revenue generated during the previous year.[24] The desired rate is referred to as the constant yield rate and is calculated as follows:

$$CYR_t = \frac{PT_{t-1}}{TV_{t-1}(1+v)} \tag{1}$$

where

CYR_t is the current year's constant yield rate for the local government in question,
PT_{t-1} is the prior year's revenue from the property tax,
TV_{t-1} is the prior year's taxable property value, often called the tax roll,
v is the percentage change in the value of the prior year's property value resulting from wholesale adjustments, revaluation, or policy changes.

Increases in property value as a result of inflation or appreciation must be offset by a revenue-neutral reduction in the tax rate. Local officials are generally permitted to apply existing tax rates to new growth. If public officials anticipate a tax yield rate that generates more revenue than the previous year ($PT_t > PT_{t-1}$), then they have consciously chosen to increase taxes and must formally adopt a rate that is greater than the constant yield rate. A notice must be distributed to inform the public that a tax rate increase is anticipated. The public notice is commonly carried in a newspaper and follows specific requirements regarding the size, placement of the notice in the paper, and the language of the notice. In Utah, and previously in Florida, a preliminary tax notice is also sent to taxpayers before the actual budget is adopted. The Utah notice identifies when and where the particular budget and rate setting hearing for each government will be held.

Without a full disclosure law, the property tax system operates as shown in equation (2) below, where R_{t-1} is the tax rate from the previous year, PY_t is the tax yield for the current year and other variables are defined as in equation (1):

$$PY_t = R_{t-1}TV_{t-1}(1+v) \tag{2}$$

If there are increases in the assessed value of properties (v) which are not offset by a reduction in the rate (R_{t-1}), increased assessed values create additional revenue for the taxing authority. In fact, elected officials with rate-setting and budget responsibility could boast that property tax rates had not changed ($R_t = R_{t-1}$) and therefore

24. Full disclosure laws differ in several ways, such as the level of government that is required to follow the law and the level of tax increase that triggers their use. Bland and Laosirirat ("Tax Limitations to Reduce Municipal Property Taxes: Truth in Taxation in Texas") review the specific requirements of full disclosure laws in the United States.

avoid taking direct responsibility for any tax increases. Using data from Massachusetts, Bloom and Ladd[25] found this pattern of behavior—no reduction in R_t over R_{t-1}—by elected officials following several cycles of increases in assessed value resulting from revaluations. In a later study, Ladd[26] found less persuasive evidence of such behavior in North Carolina. Nevertheless, using revaluation to capture a windfall gain in property taxes was still apparent in some of the North Carolina communities she studied. However, the reluctance to lower rates may not necessarily be attributable to revenue opportunism on the part of elected officials. For example, Cornia and Knighton[27] describe how differential appraisal cycles between classes of property constrain the ability to lower tax rates after a reappraisal. In the case, illustrated by Cornia and Knighton large public utilities were revalued every year and residential properties were revalued less frequently. As a result when residential properties were reappraised it was difficult to reduce rates on residential properties without doing the same for the utilities.

It comes as no surprise that in situations where there is increased taxable value and no reduction in rates, the assessor's office is quickly identified by the public as the villain behind the tax increase. When other elected officials receive complaints about higher taxes, an easy response is that "we have not changed the rates from the previous year." The ability to avoid responsibility for tax increases under such a process is substantial.[28] And the political consequences that follow reappraisals—not the least of which are losing in the next election cycle or not being reappointed—are powerful incentives for an assessor to not reassess property and thereby avoid the angry backlash of property owners and eventually voters.

While the behavior is understandable, it violates a central tenant that is at the foundation of a tax system where the tax base must be consistently recalibrated or reappraised in order to even approach uniformity. The expectation is that the assessor, acting as an agent of the state and guided by legal and professional requirements, appraises property according to state law and professional practice.[29] The goal of state laws and professional guidelines is to estimate what a willing buyer would pay and a willing seller would accept for a specific property.[30] But because assessors may be concerned about their own reelection or reappointment, they may act in self-interest by not appropriately

25. H. S. Bloom and Helen F. Ladd, "Property Tax Revaluation and Tax Levy Growth," *Journal of Urban Economics* 11 (1982): 73–84.

26. Helen F. Ladd, "Property Tax Revaluation and Tax Levy Growth Revisited," *Journal of Urban Economics* 30 (1991): 834–899.

27. Gary C. Cornia and Lennis Knighton, "The Myth of Property Tax Rate Reduction Following Revaluation," *Assessment Digest* 8, no. 1 (1986): 2–10.

28. Henry Aaron, *Who Pays the Property Tax?* (Washington, DC: The Brookings Institution, 1975).

29. The importance of keeping appraisals current has increased due to state funding of K-12 education. In many states the basis of education funding is the property tax with the expectation that school districts will not be unduly rewarded for underassessment of the property tax base.

30. IAAO, *Property Appraisal and Assessment Administration* (Chicago: International Association of Assessment Officers, 1995).

revaluing properties. The principal–agent relationship that underpins uniformity is eroded. This frequent pattern does not mean that property is never appraised, but often it is appraised only when an economic or external event occurs, new construction is completed, a sale of property takes place, or remodeling or an addition to an existing property is reported. And, of course, a nonsystematic appraisal process only increases the problem of nonuniformity. On the other hand, reappraisals can trigger numerous property tax appeals that lead to improvements in the overall uniformity of the property tax system, thus providing a self-correcting aspect of the property tax process that does not occur with partial reappraisals.[31] Fair, equitable, and efficient property tax administration requires uniform reappraisals, but the potential for being personally penalized is so high that many assessors avoid reappraisals whenever possible. In the long run, such behavior fosters nonuniformity in property tax administration and assessment.

Full Disclosure in Utah

The Utah full disclosure law was adopted in 1985 and took effect in 1986. The act followed a series of property tax events that had transpired over the previous four decades. The most significant incident was the state's attempt in the 1970s to revalue all residential, commercial, and industrial property in the state after a period of over 20 years without meaningful reappraisals.[32] The revaluation process arguably saved the state from a school-funding court case and postponed a lawsuit from utility and mineral property owners, but it also had unanticipated and, for the most part, unwelcome policy, political, and appraisal outcomes.[33]

As with most revaluations, Utah's revaluation process resulted in a substantial shift in the tax burden and an increase in the property tax liability on residential property owners. In short order, the state legislature undertook a series of actions to prevent such a shift. As a result, the assessment ratio for residential property was set at 15 percent—one-half the assessment ratio set for all other properties, although the assessment ratio for residential homes was eventually ruled unconstitutional because it was granted only to homeowners.[34] Increases in property tax revenue were capped at an annual change of no more than 6 percent. Local governments discovered it was prudent to adopt the full 6 percent increase because the amount granted in any subsequent year was based

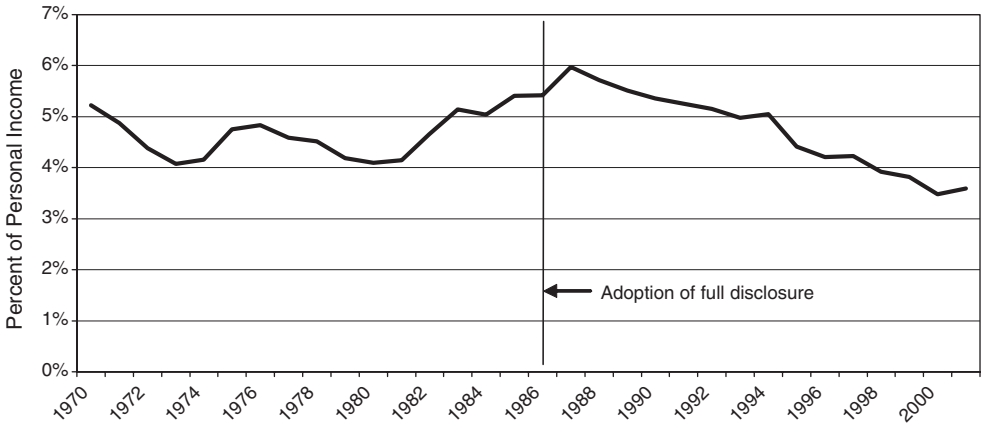
31. John L. Mikesell, "Property Tax Reassessment Cycles: Significance for Uniformity and Effective Rates," *Public Finance Quarterly* 8, no. 1 (1980): 23–37.

32. Michael E. Christensen, *Financing Government in Utah: A Historical Perspective* (Salt Lake City: Utah Foundation, 2000); Denis R. Morrill, "Property Tax Assessment and the Utah Constitution–a Taxpayer's Dilemma," *University of Utah Law Review* 16, no. 2 (1966): 491–517.

33. Gary C. Cornia and O. William Asplund, "How Trying to Make Things Better May Make Them Worse: Statewide Reappraisal," *The Property Tax Journal* 6, no. 2 (1987): 81–97.

34. This 1984 ruling by the Utah Supreme Court created political and administrative problems because it prohibited virtually all the steps taken to prevent a shift in the property tax burden to residential homes. See *Rio Algom Corp v. San Juan County*, 681 Ut 2d 184 (1984).

FIGURE 1
Average County Property Taxes as a Percent of Personal Income



on the level of property taxes levied in the previous year. The 6 percent limit on revenue growth soon became a floor for growth rather than a ceiling. These difficulties made it surprisingly easy to adopt a full disclosure law.[35]

FULL DISCLOSURE AND PROPERTY TAX LIMITS: THE INTENDED RESULTS?

Because the primary intent of the full disclosure law was to control increases in property tax we begin our analysis by evaluating the success of this aspect of the policy. Two different studies have reported on the effect of full disclosure on the rate of growth in property tax. Cornia, Smith, and Wheeler[36] examine the effects of full disclosure on local governments in Utah and report some evidence that full disclosure did reduce the rate of growth in property tax imposed by local governments. In a later and much richer study of 93 cities in Texas Bland and Laosiririat[37] consider the role of full disclosure on property tax over a 12-year period. They report little evidence that full disclosure had any measurable impact on the rate of property tax growth in these cities. Our findings are more similar to those of the Texas study than those of the earlier Utah study.

The initial evidence of the apparent success of full disclosure in slowing the rate of increase in property tax compared with the rate of change in personal income is offered in Figure 1. It appears from the change in the direction of the trend in Figure 1 that the adoption of full disclosure did have an influence on the rate of property tax growth.

35. Christensen, *Financing Government in Utah: A Historical Perspective*.

36. Cornia, Smith, and Wheeler, "Effects of Truth-in-Taxation on Property Tax Revenue in 29 Utah Counties."

37. Bland and Laosiririat, "Tax Limitations to Reduce Municipal Property Taxes: Truth in Taxation in Texas."

However, this simple trend does not control for other factors that were at play during this 32-year period. To account for some of these factors, we present a model that takes as its dependent variable the change in the aggregate property tax imposed by cities, towns, counties, special districts, and school districts in each of the 29 counties in Utah. In this model, we look explicitly at the change in (constant dollar) property tax collections since full disclosure was adopted precisely to restrain property tax growth.

The independent variables included attempt to capture some of the factors that influence changes in local government revenues, and reflect both changes in the economic and the policy environment. Since the dependent variable is a measure of change, most of our independent variables also measure changes. Our argument for including this particular set of variables is that each potentially impacts property tax collections. As population increases, for example, there is both an increased demand for government revenue to fund services and generally an increase in the tax base resulting from new construction and renovation. At the same time, the population impact may not be immediate since assessments in Utah are as of January 1 and tax bills are not due until the following November. Among the factors we include, then, are changes in population (both in the current and previous year), changes in personal income.

In Utah, as in other Western, Midwestern, and Southern states, the state tax commission or revenue authority appraises the property of public utilities, transportation companies, oil and gas wells, and mining activities. In Utah, as in many states with very rural counties, these centrally assessed values can represent over 90 percent of a counties taxable value. Counties with a high proportion of state-assessed properties have some incentive—perhaps considerable incentive—to undervalue locally assessed property and impose higher tax rates, thus exporting more of their tax burden to the owners and customers of large industrial companies. The result appears as a higher apparent tax burden, though much of the revenue would in fact come from taxpayers outside the county. Two of our independent variables then are both the level and the changes in the share of the tax base assessed by state authorities.

We would also contend that counties with relatively high property tax levels in the prior year are likely to view property tax changes differently than jurisdictions with lower tax levels. Higher property taxes tend to make property owners more aware of any potential property tax increases or inaccurate appraisals that may place them at a disadvantage.

Finally, we include two dummy variables. The first reflects the full disclosure policy and takes a value of one for all years after implementation of the policy. The second dummy variable accounts for the period between 1980 and 1986, during which time Utah had a state statute in place that limited increases in local property tax rates to 6 percent each year. As described above, we believe that this law, which was intended to limit property tax increases to less than 6 percent, actually drove increases because the nuances of the law provided an incentive to increase the tax by the full 6 percent. The top half of Table 1, labeled Panel 1, lists the summary statistics for the variables used in the model, along with the sources for each variable.

TABLE 1
Descriptive Statistics for All Variables

Variable Name	*N*	Mean	Standard Deviation
Panel 1 (1st model)			
Change in constant dollar property tax[a] collected	870	1.027	0.145
Population change[b]	870	0.023	0.036
Change in per capita personal income[c]	870	0.011	0.050
Proportion of property of centrally assessed[d]	870	0.346	0.254
Change in proportion of centrally assessed property[e]	870	0.994	0.229
Lagged (1 year) property tax as percent of personal income[f]	870	0.047	0.034
6% revenue increase cap years (dummy)	870	0.233	0.423
Full disclosure years (dummy)	870	0.500	0.500
Panel 2 (2nd model)			
COD[g]	928	21.448	10.021
County population (1,000s)[b]	928	56.412	134.898
Per capita income (1,000s)[c]	928	18.088	3.932
Proportion of property of centrally assessed[d]	928	0.349	0.250
Property tax collected as percent of personal income[f]	928	0.047	0.033
6% revenue increase cap years (dummy)	928	0.219	0.414
Full disclosure years (dummy)	928	0.469	0.499

Sources:
[a]Property Tax Division, Utah State Tax Commission, Salt Lake City, UT, various years, and calculations by the authors.
[b]Population Division, U.S. Census Bureau, Time series of Utah intercensal population estimates by county, various years, and calculations by the authors.
[c]U.S. Bureau of Economic Analysis, Annual estimates of local area personal income, various years, and calculations by the authors.
[d]Same as (a).
[e]Same as (a).
[f](a), (c), and calculations by the authors.
[g]Commission (various). Assessment/Sales Ratio Study. Salt Lake City, UT, Property Tax Division, Utah State Tax Commission.

We assume that the data are both autoregressive and contemporaneously correlated between cross-sections, and employ the Parks method to estimate model parameters, which are shown in Table 2. Again, the model takes as the dependent variable the ratio of the current year's property tax collections to the prior year's collections, both in constant dollars, hence the intercept term is close to unity. Not all the variables in the model are currently available for 2002, and since we include (one period) lagged values of both population change and the property tax burden level, we also lose the first year of our data. As a result, the 30-year time period covered by these models is 1971 through 2001.

As expected, we find that jurisdictions do experience increases in revenues as their populations increase, with larger increases coming in the year following growth, though

TABLE 2
Time Series-Cross Section Models with Change in Property Tax as the Dependent Variable (DV)

	DV: Change in Property Tax Collected (Constant $)	
Variable	**Parameter Estimate**	**Standard Error**
Population change (1 year)	0.135	0.019***
Population change, lagged 1 year	0.686	0.017***
Change in per capita personal income (1 year)	−0.009	0.011
Proportion of property centrally assessed	0.090	0.004***
Change in proportion of property centrally assessed (1 year)	0.058	0.002***
Property tax as percent of personal income, lagged 1 year	−0.985	0.051***
6% tax increase cap years (dummy)	0.056	0.002***
Full disclosure years (dummy)	−0.005	0.002*
Intercept	0.952	0.003***
Model R^2	0.892	

Significance levels:
*0.05; **0.01; ***0.001.

it is fair to ask whether a property tax increase of roughly 0.7 percent on average is adequate to provide the additional property-tax-funded services needed by the additional 1 percent of the population.

We are also not surprised by the positive relationship between the proportion of property assessed by state authorities and the overall property tax burden within a county. Based on our model, changes in the proportion of centrally assessed property show up very quickly as increased revenue.

From Table 2, it is also apparent that jurisdictions with higher property taxes in the preceding year are more likely to see smaller increases in the current year. Controlling for other factors in the model, there appears to be about a one-for-one relationship between higher tax burdens and a reduced rate of property tax growth.

We also find that during the period that Utah had a 6 percent per annum cap on property tax increases, the property tax tended to increase more rapidly than in other years. In fact, when other factors in the model were held constant, the average constant dollar increase during these years was 5.6 percent, again indicating that the legal ceiling on increases became more of a floor and that jurisdictions tended to impose increases at or near the legal limit each year.[38]

38. The average annual constant dollar increase in property taxes collected during the period in question was 5.6 percent, the same as the estimated coefficient, compared with a modest decline in real terms both before the cap was imposed and after it was replaced by full disclosure.

Finally, we note that there is very modest evidence from our model that full disclosure impacted the rate of change in property taxes. The sign on the full disclosure dummy variable is negative, but the magnitude is quite small and the estimate is only marginally significant. We are left then with the observation that, controlling for all other factors in the model, the adoption of full disclosure in Utah had at best a very small restraining effect on property tax increases. If full disclosure had such a small impact on the rate of property tax change in Utah, the same is not true for its impact on property tax administration. It is to this question that we next turn our attention.

FULL DISCLOSURE AND PROPERTY TAX UNIFORMITY: THE UNINTENDED RESULTS

Utah, like most states, monitors the quality, or uniformity, of the property tax process according to guidelines promoted by the International Association of Assessing Officers.[39] The analysis, required by law since 1970, is conducted annually and begins by gathering data on the sales price (*SP*) of recently sold properties in each of Utah's 29 counties. As the assessing unit, the county is also the evaluation unit.

Analysts next compare the assessed value (*AV*) that was estimated by the assessor prior to the sale to the actual sales price (*SP*) of individual properties. The resulting sales ratio (*AV*/*SP*) gives information on the overall assessment levels in a taxing jurisdiction.[40] By considering the degree of dispersion of the *AV*/*SP* ratios within a taxing jurisdiction, it is possible to examine uniformity issues. The standard measure of intra-area uniformity is the coefficient of dispersion (*COD*) shown in equation (3):

$$COD = \frac{(1/N)\sum_{i=1}^{N}\left|R_i - R^{\text{med}}\right|}{R^{\text{med}}} \times 100 \tag{3}$$

where

N is the number of properties in the sample,
R_i is the assessment-to-price ratio (AV/SP) for property i,
R^{med} is the median of these ratios within the county.

The *COD* measure is thus the average percent deviation from the median.[41] A *COD* of 29, for example, would be interpreted to mean that, on average, assessment ratios within

39. IAAO, *Standards on Ratio Studies* (Chicago: International Association of Assessing Officers, 1999).

40. In general, the tests using (*AV*/*SP*) examine whether the average ratio differs between high-value properties and low-value properties (G. S. Sirmans, B. A. Diskin, and H. S. Friday, "Vertical Inequity in the Taxation of Real Property," *National Tax Journal* 48, no. 1 (1995): 71–84).

41. In general, the *COD* is used only by the public sector but, Mark J. Garmaise and Tobias J. Moskowitz ("Confronting Information Asymmetries: Evidence from Real Estate Markets," in *NBER Working Paper Series* [Cambridge, MA: National Bureau of Economic Research, 2002]) indicate that private appraisers in some situations also examine *CODs* to validate their appraisals.

the county will vary from the median assessment ratio by 29 percent.[42] Obviously, the lower the *COD,* the more uniform the overall appraisal process. A large *COD* indicates that the presumption of uniform assessment has been violated and the effective property tax (tax price) differs among similar properties.[43]

The literature reports a variety of factors that influence the size of a *COD*. The reported research has generally been based on cross-sectional analysis of data from a single state, portions of a single state, or a single city. The model for the research is frequently represented as

$$COD = f(E, H, AS, JR) \tag{4}$$

where

COD is the coefficient of dispersion,
E is the vector of economic variables,
H is a vector of housing variables,
AS is a vector of individual assessor characteristics,
Jr is a vector of institutional practices adopted by a taxing jurisdiction.

The model assumes that *E* and *H* represent factors that influence the rate and direction of change in housing values but are beyond the control of the assessor. These factors can either complicate or simplify the assessment process and need to be controlled for when trying to examine assessor performance. For example, Sjoquist and Walker[44] indicate that change in population may have a positive or negative influence on assessment outcomes. Common *E* and *H* variables include the percent change in housing values, percent change in the number of housing units, age distribution of the housing stock, percent of housing units with more than one person per room, percent of the land that is agricultural, percentage of citizens below the poverty level, percent that is nonwhite and the percent of population with high school or university degree.[45] As noted in the introduction of this paper, variables used to account for assessor characteristics (*AS*) have included the age, education, and appraisal training of the assessor.[46] Research has also examined the influence of part-time versus full-time employment for an assessor.

42. The general consensus is that the (*AV*/*SP*) is not normally distributed and thus the *COD* is appropriately a nonparametric measure (John H. Bowman and John L. Mikesell, "Uniform Assessment of Agricultural Property for Taxation: Improvements from System Reform," *Land Economics* 64, no. 1 [1988]: 28–36).

43. Bowman and Mikesell, "Uniform Assessment of Property: Returns from Institutional Remedies."

44. David L. Sjoquist and Mary Beth Walker, "Economies of Scale in Property Taxation," *National Tax Journal* 52, no. 2 (1999): 207–220.

45. Bowman and Mikesell, "Uniform Assessment of Property: Returns from Institutional Remedies"; David L. Chicoine and J. Fred Giertz, "Uniformity in a Dual Assessment System," *National Tax Journal* 41, no. 2 (1988): 247–256; Geraci and Plourde, "The Determinants of Uniform Property Tax Assessment"; David L. Sjoquist and Larry D. Schroder, "An Investigation of the Causes of Variations in Property Tax Assessments," *Assessor's Journal* 11 (1976): 221–233.

46. Geraci and Plourde, "The Determinants of Uniform Property Tax Assessment."

The characteristics of the jurisdiction (*JR*) have been represented by the use of property tax maps, size of assessment district, government form (county versus township), contract appraisal firm versus public appraisal, elected versus appointed appraiser, and frequency of appraisal.[47]

The assumptions articulated by the models have most commonly been tested by use of ordinary least squares (OLS) regressions. The research indicates that vectors *E* and *H* account for most of the explained variation in the models,[48] accounting for over 70 percent of the variation in the *COD* in some models.[49] The assessor's background does play a modest role in improving the *COD*, as do some of the jurisdictional attributes such as size. Surprisingly, assessor characteristics such as appointed versus elected status generally are found to have little effect on the *COD*.

Our model differs from the earlier models in several ways. In prior studies, the time frame of the research is generally tied to data reported in the decennial census and is nearly always based on analysis of cross-sectional data. Linking to the decennial census offers numerous socioeconomic variables that contribute to the analysis, but this data limits any analysis of longitudinal trends. The alternative is to use annual data, which provides a better longitudinal look at assessor practice, but forfeits some of the richness provided by independent variables that are not available on an annual basis. As a result, our model does not include specific assessor characteristics (*AS*). Institutional practices (*JR*) include the state policy variables reflecting legal efforts to either cap tax revenue increases or limit increases through full public disclosure. In addition, we include the institutionally important variable of centrally assessed property. We are able to include two economic variables (*E*): population and income. One limitation of the current model is that it does not include more on housing characteristics. Rather, our examination of assessor practice employs a standard pretest/posttest design in which we compare the *COD*s prior to the adoption of full disclosure to the *COD*s reported after the adoption of full disclosure. As stated above, we posit that *COD*s should be lower following the passage of a full disclosure law.

The model we use begins with the published residential *COD* for each of Utah's 29 counties for the 32 years between 1970 and 2002.[50] These data allow a comparison of appraisal outcomes in 17 periods prior to the passage of a full disclosure law to appraisal outcomes for 15 periods after passage of the law. The average *COD* prior to adoption of full disclosure was 24.4 (std. dev. = 10.9) and for the years since 1986, the *COD* has

47. Bowman and Mikesell, "Elected versus Appointed Assessors and the Achievement of Assessment Uniformity"; Bowman and Mikesell, "Uniform Assessment of Property: Returns from Institutional Remedies"; Chicoine and Giertz, "Uniformity in a Dual Assessment System."

48. Chicoine and Giertz, "Uniformity in a Dual Assessment System."

49. Bowman and Mikesell, "Elected versus Appointed Assessors and the Achievement of Assessment Uniformity"; Bowman and Mikesell, "Uniform Assessment of Property: Returns from Institutional Remedies."

50. Commission, *Assessment/Sales Ratio Study* (Salt Lake City: Property Tax Division, Utah State Tax Commission, various).

averaged 18.1 (std. dev. = 7.6), thus providing an initial indication that uniformity did improve following full disclosure. As we saw with the pattern in Figure 1, however, it is important to control for other factors at work during this 32-year period.

The explanatory variables for our model are taken from data covering the same 32-year period. But, as noted, the longitudinal analysis forced a limited selection of independent variables. In terms of the *E* vector described above, the model controls for population and real per capita personal income levels in each of the 29 counties. Larger and more affluent counties are more likely to have the resources and expertise for more sophisticated assessment processes. Higher income communities are also likely to see greater public attention and pressure for quality assessment. We thus posit that population and real personal income generally have a negative relationship with the *COD*.

An additional variable in the *JR* vector has to do with the makeup of Utah's economy. We use a variable to control for the proportion of the appraised value in each county that is assessed by the Utah State Tax Commission. We posit that the presence of such property reduces the pressure on an assessor to accurately value residential property because state-assessed property moderates the burden on residential property. We also include a variable for the effective property tax burden, measured as the ratio of property tax collected over total personal income in the county. Following Borland and Lile,[51] we speculate that a higher effective tax burden increases the visibility of property tax and presumably increases taxpayers' scrutiny of appraisals. Finally, we include dichotomous variables for the period when tax increases were explicitly capped and for the period when full disclosure was in place. The bottom half of Table 1, labeled Panel 2, lists the summary statistics for the variables used in the model.

The results from the panel data analysis are listed in Table 3. Standard diagnostics suggest that the model does not suffer from multicollinearity. Further exploration of the data indicates the presence of both first-order autocorrelation and contemporaneous correlation between county cross-sections. For this reason, we employ the Parks method[52] to efficiently estimate the model parameters shown in Table 3. All variables listed in the table emerge as important predictors of *COD* levels except for the burden measure, property tax as a percent of personal income. On average, more populous counties with higher per capita income levels reported lower *COD*s. This is consistent with our prediction that such jurisdictions likely have more sophisticated systems and also experience greater scrutiny of valuation judgments.[53]

The model also suggests that counties with more state assessed property as a percent of the total taxable base have higher *COD*s. Again, this is consistent with our prediction

51. Borland and Lile, "The Property Tax Rate and Assessment Uniformity."

52. The models assume a first-order autoregressive process with contemporaneous correlation between cross sections, and are estimated using the Parks method (R. W. Parks, "Efficient Estimation of a System of Regression Equations When Disturbances Are Both Serially and Contemporaneously Correlated," *Journal of the American Statistical Association* 62 [1967]: 500–509).

53. The model is estimated using the Parks method which assumes contemporaneous and first-order serial correlation between cross sections.

TABLE 3
Time Series-Cross Section Model with COD as the Dependent Variable

Variable	Parameter Estimate	Standard Error
County population (1,000s)	−0.016	0.001***
Per capita personal income (1,000s, constant $)	−0.692	0.031***
Proportion centrally assessed property	5.829	0.462***
Property tax as percent of income	1.669	3.788
6% increase cap years (dummy)	−8.073	0.329***
Full disclosure years (dummy)	−8.469	0.361***
Intercept	39.028	0.627***
Model R^2	0.718	

Significance levels:
*0.05; **0.01; ***0.001.

that there is less pressure on local assessors in their residential valuations if the state assumes responsibility for a relatively large portion of the tax base. We also found evidence that the state policy changes intended to cap property tax growth in the early 1980s resulted in reduced *COD*s.

Of course, of greatest interest for our central argument is the observation that, on average, county residential *COD*s in the years following implementation of full disclosure were systematically and significantly lower than in prior years. Indeed, the average improvement in the *COD* appears to have been by over 20 percent following implementation of full disclosure, controlling for other factors in the model. This result must be seen as a largely unintended consequence of full disclosure since proponents sought merely to limit tax increases and were not focused on improved administration.

DISCUSSION AND POLICY IMPLICATIONS

In this article we have argued that the full disclosure law in Utah appears to have contributed to increased uniformity in the administration of the property tax. We believe this is a significant finding that suggests that a full disclosure law can be an instrument to improve uniformity in the property tax, even though its utility as a control on property tax increases may be limited.

We are unable to point to a specific behavior on the part of assessors that caused this improvement but suggest the following. The need to reappraise property and monitor changes in the property tax are not foreign concepts to public assessors. However, having the right tools, including political protection, when property is appraised is not common. A full disclosure law, such as the one described in this article, may allow assessors and those who supervise them to do reappraisals without putting their positions in jeopardy. Requiring elected officials to adjust rates in order to hold revenue constant or to notify

their constituents publicly that a tax increase is pending appears to place the political burden on those who set budgets and tax rates rather than those who value property. In our eyes, the resulting contribution to tax fairness is important.

On the other hand, it is important to give local officials the tools needed to raise revenues adequate for the service demands in their community. The impact of full disclosure on local governments' ability to provide services and on the structure of local government finances in Utah are important questions that merit further consideration.

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