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Lags in Real Property Revaluations and Estimates of Shortfalls in Property Tax Collections in North Carolina

Michael L. Walden and Zulal Denaux

ABSTRACT

Financing local public goods is a major issue in many communities, especially those that have experienced rapid growth. This paper analyzes problems associated with locally collected real property taxes where the real property tax base is only revaluated at long time intervals. Using counties in North Carolina as the subject of the analysis, we find that effective real property tax rates fall between revaluations. We calculate that a system of taxing *market* values of real property at a constant legislated tax rate would have yielded additional annual revenues of $320 million for North Carolina counties over 1980 to 1995.

Key Words: *local public finance, property taxation, real property revaluation.*

Three core principles of public finance are efficiency, equity, and ease of administration (Eckstein, 1979; Hyman, 1996; Rosen, 1999). To these can be added a fourth criterion, poliltical feasibility. The four principles can be used as a scoring procedure to evaluate the pros and cons of alternative taxes.

An operating standard of taxation that cuts across all four core principles is that tax revenues should grow with increases in the economic base to which the tax is applied. If the tax base automatically increases with increases in the economic base, then this standard is met. However, if the tax base increases at a slower rate than the economic base, then the tax *rate* must be increased to keep tax revenues commensurate with the economic base. But since there may be public resistance to continual increases in tax rates, political feasibility may prevent tax rates from rising enough to maintain the relationship between tax revenues and the economic base. In this case, shortfalls in tax revenues can lead to shortfalls in public goods as the economic base grows.

A type of tax where this situation can arise is real property taxation, which is taxation of real estate. Property taxation is a major revenue source for local governments, accounting for 74 percent of locally collected tax revenues nationwide in 1996 (Tax Foundation, 2000), and real property tax revenues are the biggest component of total property tax revenues. However, real property is often only revalued at long intervals. In 1999, only eight states annually revaluated real property, and only one of these states (Florida) was in the South.[1] Also, of the 42 states plus the District of Co-

Michael L. Walden is William Neal Reynolds Distinguished Professor, Dept. of Agricultural and Resource Economics, North Carolina State University, Raleigh. Zulal Denaux is assistant professor, Meredith College, Raleigh.

[1] The South is defined to include Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia.

lumbia that revalued real property at an interval longer than a year, thirteen did not use some method to update the assessed values between revaluations.[2] Six of these states (Arkansas, Kentucky, Louisiana, North Carolina, South Carolina, and Virginia) were in the South (International Association of Assessing Officers, 2000). This means that during periods of rising real property values in many states, county *assessed* real property values lag *market* real property values in periods between revaluations.[3]

Several potential consequences of this process can serve as hypotheses. First, legislated tax rates are more likely increased as the time from the last revaluation increases. Second, there will be large increases in assessed property values at each revaluation, since each revaluation includes an accumulation of real property value changes over several years. The jump in assessed property values at each revaluation may prompt a reduction in the legislated tax rate in the revaluation year. Third, in a period of rising real property values, the *effective* tax rate may fall as the time from the last revaluation increases. The effective tax rate is the legislated tax rate per market real property value. If the legislated rate doesn't rise at a pace commensurate with increases in real property values between revaluation years, then the effective tax rate will fall during that time period.

The purpose of this paper is to investigate the real property revaluation and tax process and its implications in one state, North Carolina. In 1999, property taxation accounted for 68 percent of locally collected tax revenues in North Carolina (North Carolina Office of State Budget and Management, 2000). North Carolina presents a good example of this process because the time period between revaluations in the state is eight years. Also, the state has no method for updating assessed property values between revaluation years. Even new real property in North Carolina is not valued at its current market value but is placed at a value estimated to have existed at the last revaluation. Obviously, this maintains the equitable position of new real property with existing real property.

The current eight-year revaluation cycle in North Carolina evolved over time. In the early 19th century, real property revaluations were conducted annually by townships. However, a state study in 1961 found some counties had not conducted real property revaluations in 50 years. Consequently, legislation was enacted to require full revaluations, based on actual visitation and observation, at least once every eight years, with mid-point (four-year) revaluations based on economic trends. Yet, at the time, appraisal experts argued that equitable revaluations could only be accomplished with actual visitation and inspection. Hence, the eight-year revaluation cycle became the norm in the state.

The plan of the paper is as follows. The next section describes the data and, importantly, the calculation of market real property values. The third section presents trends in legislated property tax rates, assessed real property values, and property tax collections. In the fourth section trends are compared for assessed and market real property values and for legislated and effective tax rates. Potential shortfalls in real property tax revenue collections as a result of using assessed property values rather than market property values as the tax base are estimated and analyzed in section five. In the concluding section the four core principles of public finance are used to compare the current property taxation system with an alternative system that uses annual estimates of changes in market property values.

Data

The majority of data for the analysis was taken from the North Carolina "LINC" (log into

[2] The most common updating methods were use of computer models to derive new values for properties and applying a general percentage factor to change the value of properties.

[3] The reader should note the technical difference between valuation, assessment, and revaluation. A property is initially valued or appraised. When the property's value is put on the tax rolls, that value is then termed the *assessed value*. When the property is reappraised it is revalued. The new value—the revaluation—then becomes the assessed value on the tax rolls. In North Carolina the assessed value is 100 percent of the market value at the last revaluation.

North Carolina) data set. LINC includes the following variables for each of North Carolina's 100 counties relevant to the study: assessed value of real property, legislated tax rate applied to assessed real property value, current year, year in which property tax revaluations are taken, and real property tax collections. These data are available for a 16-year period from 1980 to 1995. Hence, an average of two revaluation cycles in each county are covered by the study period.[4]

An important issue is the development of *market* real property values. The North Carolina Association of County Commissioners reports annual surveys of the market values of real properties in each county.[5] These market values are then compared to the assessed values of the same properties to form average assessment ratios ((assessed value/market value) * 100) for each county. The county average assessment ratios are available for each year from 1988 to 1995 (North Carolina Association of County Commissioners, 1989–1996). *Market* real property values for these years are formed by dividing the county assessed value in the year by the assessment ratio in that year.

Of interest are the determinants of the county average assessment ratios. The determinants are investigated with the following regression equation using the data for 1988 to 1995:

(1) ASSESSRT

= f(YRSINCE, POPGRO, INCGRO,

YRSINCESQ, POPGROSQ,

INCGROSQ, SOUTHRT,

COUNTY),

where:

ASSESSRT = county average assessment ratio,
YRSINCE = number of years since the most recent real property revaluation,
POPGRO = percentage change in county's population from the previous year,
INCGRO = percentage change in the county's aggregate personal income from the previous year,
YRSINCESQ = $YRSINCE^2$,
POPGROSQ = $POPGRO^2$,
INCGROSQ = $INCGRO^2$,
SOUTHRT = single family house inflation rate in the Southern region in current year
COUNTY = representing fixed effects of the individual counties.

The variable YRSINCE is measured in number of years, COUNTY represents 100 categorical variables for North Carolina counties, and all other variables are measured in percentage terms. POPGRO and INCGRO are calculated from data in the LINC data set. SOUTHRT is calculated from data from the U.S. Census (U.S. Bureau of the Census, 2001) and is used as the housing value inflation rate in the absence of any consistently measured state or county level housing inflation rates. YRSINCESQ, POPGROSQ, AND INCGROSQ are quadratic terms used to test for non-linear relationships between them and ASSESSRT.

It is expected that the more years since the last revaluation, the lower will be the assessed value as a percentage of the market value, and so the parameter estimate on YRSINCE should be negative. Likewise, the greater the housing inflation rate (SOUTHRT), the lower should be ASSESSRT. POP and INC are included to control for growth impacts on ASSESSRT. We would expect that faster growth in either population or personal income should result in faster growth in real property values and a lower ASSESSRT. The 100 county cat-

[4] The data and study only apply to *county* real property taxes. Real property taxes levied by municipalities are not included. However, county real property taxes account for 73 percent of all property taxes collected in North Carolina (North Carolina Association of County Commissioners; North Carolina League of Municipalities).

[5] Studies of the surveys by professional appraisal firms show them to be accurate within 2.5 percent of the true market values (personal communication with Mr. Johnny Bailey, Property Tax Division, North Carolina Department of Revenue).

egorical variables allow for a different intercept value for each county.

The results of estimating equation (1) are in Table 1. The fixed effects of the 100 county categorical variables were statistically significant but are not shown.[6] The parameter estimates for YRSINCE, POPGRO, and SOUTHRT have the expected negative signs. The parameter estimate on INCGRO is positive and statistically significant, contrary to expectations. Perhaps this means that, controlling for population growth, counties with greater growth in personal income have more resources devoted to revaluations and thus produce revaluations in which the assessed value is closer to the market value. However, the quadratic term, INCGROSQ, is negative and statistically significant, indicating that ASSESSRT increases with INCGRO but at a declining rate.

Trends in Legislated Tax Rates, Assessed Real Property Values, and Property Tax Collections

This section presents the results for trends in legislated real property tax rates, assessed real property values, and the resulting property tax collections. Changes in the measures are compared to the number of years since the last real property revaluation.

Figure 1 shows the average trend in legislated real property tax rates during the years of the revaluation cycle. During years when a revaluation of real property is made (years since last revaluation = 0), there is a substantial reduction in the legislated tax rate. Presumably, county commissioners enact this reduction in reaction to the large cumulative increase in real property values that occur in revaluation years. Subsequently, there is a gradual increase in the tax rate with each year past the revaluation year. At the end of the eight-year cycle, the cumulative rate change has recovered all the decrease that occurred in the revaluation year plus 2.1 cents per $100 real property value. Equation (2) in Table 1 shows that the percentage change in the legislated tax rate (RTCHG) is positively related to the number of years since the last revaluation and is lower in years when the inflation rate (SOUTHRT) is higher. The statistically significant negative coefficient on YRSINCESQ means the positive relationship between RTCHG and YRSINCE is non-linear, increasing with YRSINCE at a declining rate.

Correspondingly, Figure 2 shows the trend in assessed real property values between years when revaluations are made. As hypothesized, in revaluation years (years since last revaluation = 0) there is a large increase in assessed real property values. In the North Carolina data, the average inflation-adjusted increase is 72.2 percent.[7] In years until the next revaluation, there is modest change in assessed real property values resulting from new construction.

Figure 3 shows the resulting trends in changes in real property tax collections. There is a large increase in real property tax collections in the revaluation year. Real property values apparently increase more than the legislated tax rate is reduced. Thereafter, there are modest changes in real property tax collections.

Equations (3) and (4) in Table 1 show that the percentage change in both assessed real property values (ASSESSVL) and real property tax collections (TAXCOLL) are negatively related to years since the last revaluation, as revealed in Figures 2 and 3. In both cases the relationship is non-linear, with the declines being smaller as the time since the last revaluation increases. Also, the percentage change in assessed real property values is greater in years with a higher inflation rate (SOUTHRT).

[6] Fixed effects for year (categorical variables for each year) were also tested but were not statistically significant in this or any of the other equations reported in Table 1.

[7] Averages are calculated as means. There is no change in the pattern of findings when the median is used as the average. Inflation-adjusted real property values were derived using the chain-type GDP price index for personal consumption expenditures as the deflator. The nominal percentage changes were very similar in size.

Table 1. Regression Parameter Estimates (fixed effects for COUNTY not shown)

Equation	(1)	(2)	(3)	(4)	(5)
Dependent Variable	ASSESSRT	RTCHG	ASSESSVL	TAXCOLL	LOSS
Time Period	1988–95	1980–95	1980–95	1980–95	1988–95
YRSINCE	−4.117	9.835	−24.671	−7.548	1.633
	(−11.95)**	(25.22)**	(−30.25)**	(−18.06)**	(2.26)*
POPGRO	−0.054	−0.586	0.715	−0.157	−1.628
	(−3.96)**	(−1.45)	(0.85)	(−0.36)	(−1.94)
INCGRO	0.057	−0.185	0.414	0.170	1.254
	(3.75)**	(−1.02)	(1.08)	(0.87)	(3.55)**
YRSINCESQ	0.044	−1.126	2.762	0.821	−0.053
	(0.90)	(−20.71)**	(24.30)**	(14.01)**	(−0.52)
POPGROSQ	0.0001	0.164	−0.357	−0.012	0.382
	(1.95)	(1.69)	(−1.76)	(−0.12)	(1.88)
INCGROSQ	−0.0002	0.005	−0.005	−0.003	−0.047
	(−2.40)*	(0.63)	(−0.27)	(−0.28)	(−2.80)**
SOUTHRT	−0.686	−0.423	1.377	0.215	−0.706
	(−2.67)**	(−3.49)**	(5.44)**	(1.66)	(−1.31)
R^2	0.751	0.377	0.479	0.274	0.455
F-value	1410.71**	7.91**	16.68**	17.07**	7.02**
# observs.	800	1500	1500	1500	800

t-Ratios in parentheses. Significance levels: ** 1% or lower. * Between 1% and 5%.

Variable Definitions: ASSESSRT = assessment ratio (%); RTCHG = percentage change in legislated tax rate; ASSESSVL = percentage change in assessed real property values; TAXCOLL = percentage change in real property tax collections; LOSS = estimated loss in real property tax revenues as a percent of actual revenues; YRSINCE = number of years since the most recent real property revaluation; POPGRO = percentage change in county's population from previous year; INCGRO = percentage change in county's aggregate personal income from previous year; YRSINCESQ = YRSINCE^2; POPGROSQ = POPGRO^2; INCGROSQ = INCGRO^2; SOUTHRT = single family house inflation rate in the Southern region in current year.

Figure 1. Cumulative Change (cents per $100 value) in Legislated Tax Rate, 1980-1995

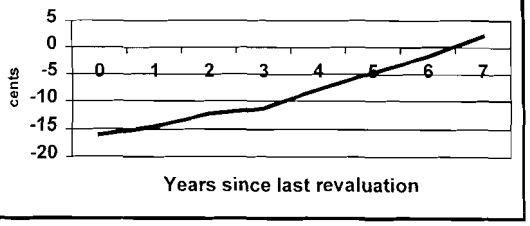
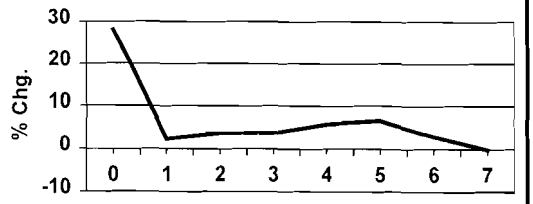


Figure 3. Average Percentage Change in Real Property Tax Collections, 1980-1995



Comparing Trends in Assessed and Market Real Property Values and Legislated and Effective Tax Rates

Changes in market real property values should display less volatility than changes in assessed real property values. In this section, trends in the two measures are compared for 1988 to 1995 when market values are derived directly from the county commissioner data.

Figure 4 compares the average percentage change in market real property values and assessed real property values for 1988 to 1995. Indeed, as expected, market values change at a much more even rate than assessed values. Assessed values have the pattern of a very large increase in the revaluation year followed by small changes in the other years. Another way to compare the differences in trends between assessed values and market values of real property is to compare legislated real property tax rates to effective real property tax rates. The legislated rate is the legal rate per assessed property value, whereas the effective rate is the legal rate per market property value. Based on the trends revealed in Figure 1, we expect the legislated rate to rise over the revaluation cycle. We expect the effective rate to rise less than the legislated rate or to fall over the revaluation cycle.

Figure 5 shows the comparison of legislated and effective real property tax rates over 1988 to 1995. The figure reveals a distinct pattern: legislated rates rise over the assessment cycle whereas effective rates fall.

Calculation of Potential Shortfalls in Real Property Tax Collections

The divergence of market values from assessed values over the revaluation cycle raises an important question. Are North Carolina counties losing real property tax revenues by not taxing real property at its market value each year? That is, which of the following two methods would yield greater property tax revenues over the revaluation cycle: the current method of taxing assessed values at a progressively higher rate over the revaluation cycle or a method of taxing the market value of

Figure 2. Average Percentage Change in Assessed Real Property Values, 1980-1995

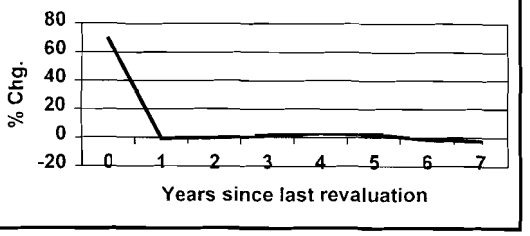


Figure 4. Average Percentage Change in Assessed and Market Real Property Values, 1988-1995

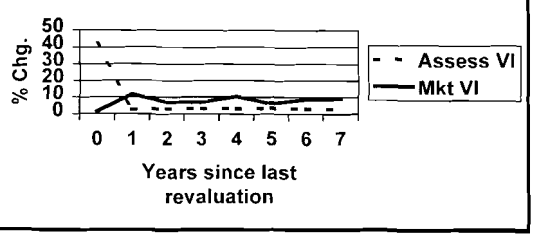


Figure 5. Legislated and Effective Real Property Tax Rates, 1988-1995

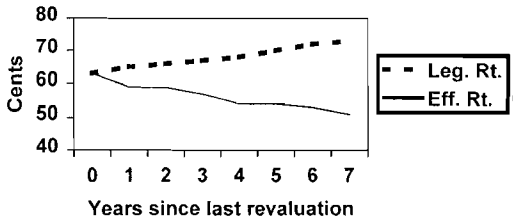
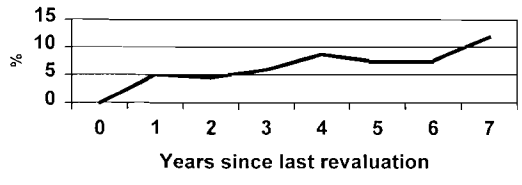


Figure 6. Average Percentage Difference Between Potential and Actual Real Property Tax Collections, 1988-1995



real property at a constant tax rate over the revaluation cycle?

To answer this question, the following calculations were made. First, *actual* real property tax collections were calculated for each county in each year of the revaluation cycle. Of course, this calculation uses legislated tax rates applied to assessed real property values. Second, estimated *potential* real property tax collections were calculated for each county in each year of the revaluation cycle in this way. For each revaluation cycle the tax rate was set at the rate in the year of the revaluation. Recall from Figure 1 that this is the lowest tax rate during the revaluation cycle. Then this fixed tax rate was applied to the market value of real property during each year of the assessment cycle. Third, the estimated real property tax *loss* was calculated as the difference between the estimated *potential* real property tax collections and the *actual* real property tax collections. The loss was expressed as a percentage of the actual tax collection. A positive value for the property tax loss percentage means estimated potential collections exceed actual collections, and a negative value means estimated potential collections exceed actual collections. These calculations were done for 1988–1995 when estimates of market real property values are available from the county commissioner data.

The results are displayed graphically in Figure 6. The figure indicates that estimated potential real property tax collections exceed actual real property tax collections, and the size of the difference increases with the time from the last revaluation. The potential loss percentage rises from approximately 5 percent in the first year after the revaluation to 12 percent in the seventh year since the revaluation. The monetary size of these potential tax losses is not trivial. The average annual total nominal dollar amount for all counties in North Carolina is $324 million.

Besides the number of years since the last revaluation we would expect the size of the potential loss to be positively related to economic growth. This is because market values of real property should increase more in counties that are growing faster, and this will increase the gap between market and assessed values. To test this hypothesis we regress the estimated percentage loss (LOSS) on the years since the last assessment (YRSINCE), the percentage change in population from the previous year (POPGRO), and the percentage change in personal income (INCGRO) from the previous year. Also included as regressors are the quadratric terms YRSINCESQ^2, POPGROSQ^2, and INCGROSQ^2, SOUTHRT and the county categorical terms (results not shown). This regression is estimated for 1988 to 1995.

The results are given in equation (5) of Table 1. For every year since the last assessment, LOSS is 1.6 percentage points higher. LOSS also increases with INCGRO but at a declining rate.

Finally, average values for LOSS were calculated for North Carolina's 100 counties, where the averages are over the years in a revaluation cycle for 1980 to 1995. Eighty-one of North Carolina's 100 counties have positive LOSS values with 19 having negative LOSS values. Negative LOSS values indicate that

legislated real property tax rates were increased more than enough over the revaluation cycle to counteract the gap between market values and assessed values.

Evaluation and Conclusions

This study has identified a potential problem in the collection of real property taxes. The problem is that in states where real property is revalued only at long time intervals the tax base of assessed real property does not necessarily grow with the economic base. In North Carolina, a state where infrequent real property revaluations occur, we found that county commissioners usually increase the legislated tax rate during the period between revaluations. However, for most counties in North Carolina the increase was found to not be sufficient to produce revenue equal to that derived from taxing the market value of real property at a constant tax rate.

Indeed, the data for North Carolina counties for 1988 to 1995 indicate that significant gains in real property tax revenues could occur from taxing the market value of real property at a constant tax rate over the revaluation cycle. Over half of North Carolina's 100 counties could have realized average annual real property tax revenue gains of more than 10 percent from such a system. The gains are greater in counties with a higher rate of growth in personal income.

However, to anticipate problems and issues related to a move away from the current property tax system, evaluation of the current system against a new system of applying a constant property tax rate to annually updated real property market values can be accomplished by using the four principles of public finance.

It can be argued the current system is *inefficient* in two ways. First, the decline in the *effective* property tax rate with years since the last revaluation may encourage delayed investments in real property. Second, our finding that the current system yields less tax revenue than a system of applying a constant tax rate to annually updated market values can obviously lead to underinvestment in public goods. It can also explain the often-heard claim that local economic growth doesn't "pay for itself", in the sense that local tax revenues derived from growth are not adequate to fund the local public goods required by the growth (Burchell and Listokin, 1978).

The current system is also not *equitable* over time because property owners in different years pay different effective tax rates, depending on how long ago the last revaluation occurred. But a new system of annual estimates of real property values can also introduce inequities. Any system of estimating real values based on sampling, predictive computer models, or simply applying the same rate of increase to all properties will introduce some degree of error. Some owners will have their properties overvalued and others will have undervalued properties.

The current system gets high marks on *ease of administration.* Each year local political leaders set the tax rate, and administrators then apply the rate to assessed values. Only when on-site revaluations are done every eight years (in North Carolina) is substantial administrative effort needed to implement the revaluation and evaluate and rule on appeals from property owners.

In contrast, a new system of annually adjusting assessed values to approximate market values would require additional administative costs. Property tax administrators would first need to decide on the method for annually adjusting assessed values. In states where this is done, three alternative methods are used: adjusting all property values by the same external factor (such as the change in the Consumer Price Index), adjusting all property values in the same class (single family, multi-family) by an external factor specific to the class, or using a sample of annually surveyed market values together with a computer program to individually adjust properties.

In addition, administrators would need to establish a procedure for dealing with past over-adjustments or under-adjustments when full on-site revaluations are done. On this point several "sticky" questions would have to be resolved, such as what recourse does a property owner have whose on-site revaluation reveals his or her past *estimated* values have been too high and he or she has consequently over paid past property taxes?

The *political feasibility* of the current system is based on the ability of political leaders to annually increase property tax rates. The political difficulty in accomplishing this probably accounts for the shortful in tax revenues compared to the alternative system of applying a constant rate to annually estimated market values. However, for citizens to accept the alternative system they will have to believe the process of annually updating property values without universal on-site evaluation is accurate and fair.

In conclusion, our analysis has revealed that a property tax system with long periods between revaluations cannot guarantee that tax revenues increase at the same rate as the economic base. Although an alternative system of annually updating the real property tax base without full on-site inspections would appear to be more efficient, it is not necessarily superior on the basis of equity, ease of administration, and political feasibility. Local political leaders therefore have two imperfect systems to choose from. Whichever system is used, it would behoove political leaders to explain to citizens the system's relative advantages and disadvantages.

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