Research Abstract # 061505-01 of the UNO Real Estate Research Center.

This Real Estate Research Center Report summarized the results and findings of the recent publication:

Shultz, S., N. Schmitz, and J. Leitch. 2007. "A Spatial Evaluation of Agricultural Property Tax Inequity Associated with Productivity-Based Assessments." *Journal of Property Tax Assessment and Administration*. 3(3) 53-65.

Agricultural Property Tax Equity in North Dakota

Dr. Steven Shultz,
Baright Professor of Real Estate & Land Use Economics, University of Nebraska-Omaha

Nicholas Schmitz,
Research Associate, UNO Real Estate Research Center

Dr. Jay Leitch,
Dean Emeritus (College of Business) & Professor, School of Natural Resources,
North Dakota State University.

Summary Abstract:

The assessment of agricultural land in North Dakota using a productive capacity approach is shown to result in tax inequity throughout most of the State. The range of county level median assessed-to-sale value ratios (A/S ratios) is quite large. Similarly, coefficients of dispersion (CODs) measuring how closely ratios array around median ratios are high (72% of all counties had a COD exceeding 20 over the 2000 to 2004 time period). The mapping of A/S ratios based on 3,125 actual market transactions demonstrated strong spatial variations in A/S ratios within many counties which demonstrates the limitations of relying on a single (county-wide) A/S ratio to evaluate tax uniformity. Based on correlation coefficients and multiple-regression analyses, cases of particularly high A/S ratios and tax inequity, were found to be concentrated in distinct locations (most often in areas of rapidly increasing land values). It was also demonstrated that smaller and less productive parcels were relatively over-assessed. The likely cause of non-uniform A/S ratios and tax inequity is the inability of county tax directors to quantify land productivity of both township assessment districts and individual properties. North Dakota should evaluate the feasibility of switching to a market-based approach to assess agricultural land. The United States Fish and Wildlife Service should re-evaluate their current policy in North Dakota of calculating wetland/grassland easement payments with non-uniform A/S ratios as this does not generate accurate estimates of the true and full value of agricultural land.

Objectives:

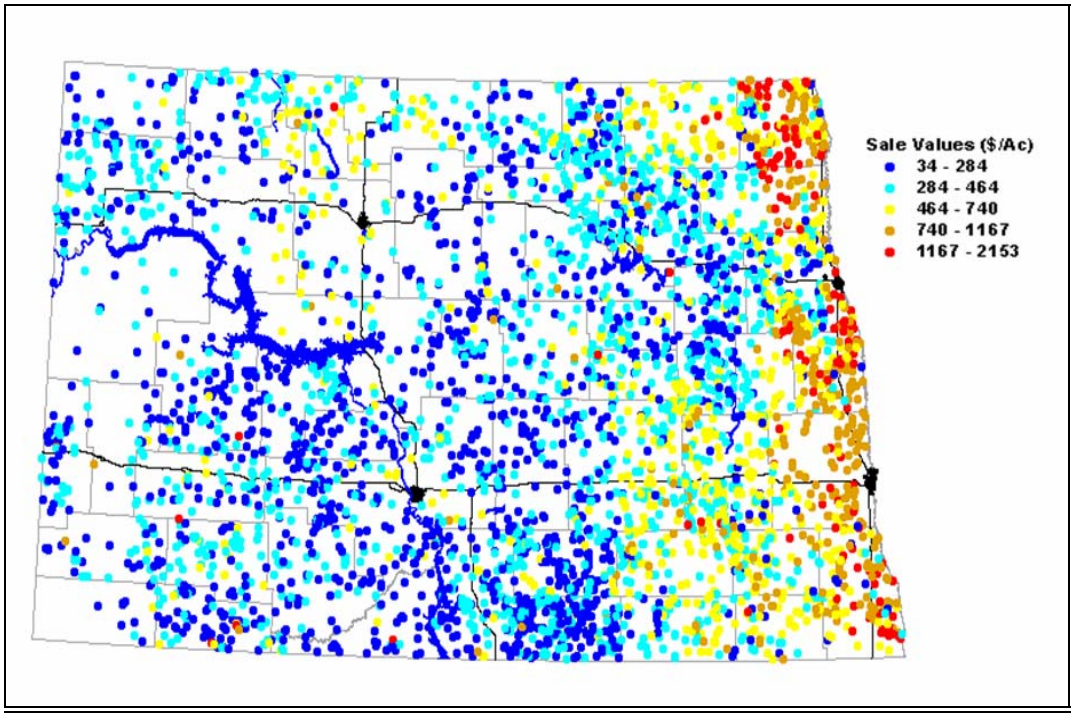
North Dakota currently bases agricultural land taxes on the productive capacity of land rather than market values. This research compares the equity of this productivity approach by comparing the ratio of assessed tax values to actual market sales (A/S ratio) at the county, regional and sale-parcel specific levels of analysis from 2000 to 2004. A ratio if .50 indicates that the assessed tax value is half of the market value. Also of interest are coefficients of dispersion values which measure how closely ratios are arrayed around median ratios and indicate the degree of uniformity in assessments. The International Association of Assessing Officers (IAAO) guidelines state that coefficients of dispersion greater than 20 indicate potential tax inequities.

Procedures:

A/S ratios of 3,125 arms-length agricultural land parcel sales across the State from 2000 to 2004 were calculated based on data collected from the Office of the State Tax Commissioner and individual county Tax Directors. Analyses were made at the county, regional, and parcel-specific levels. Site-specific investigations were possible since the boundary of each sale was digitally mapped. The center locations of all sales represented by their values on a per acre basis are shown in Figure 1.

Finally, a multiple regression model was estimated to evaluate what factors influence A/S ratios. Of particular interest were the size, value and type of parcels. Such an analysis was possible since the boundaries of sale parcels were mapped which allowed the estimation of cropping patterns, size and soil productivity for each parcel.

Figure 1. The Location of 3,125 Agricultural Land Sales in North Dakota (2000-2004)



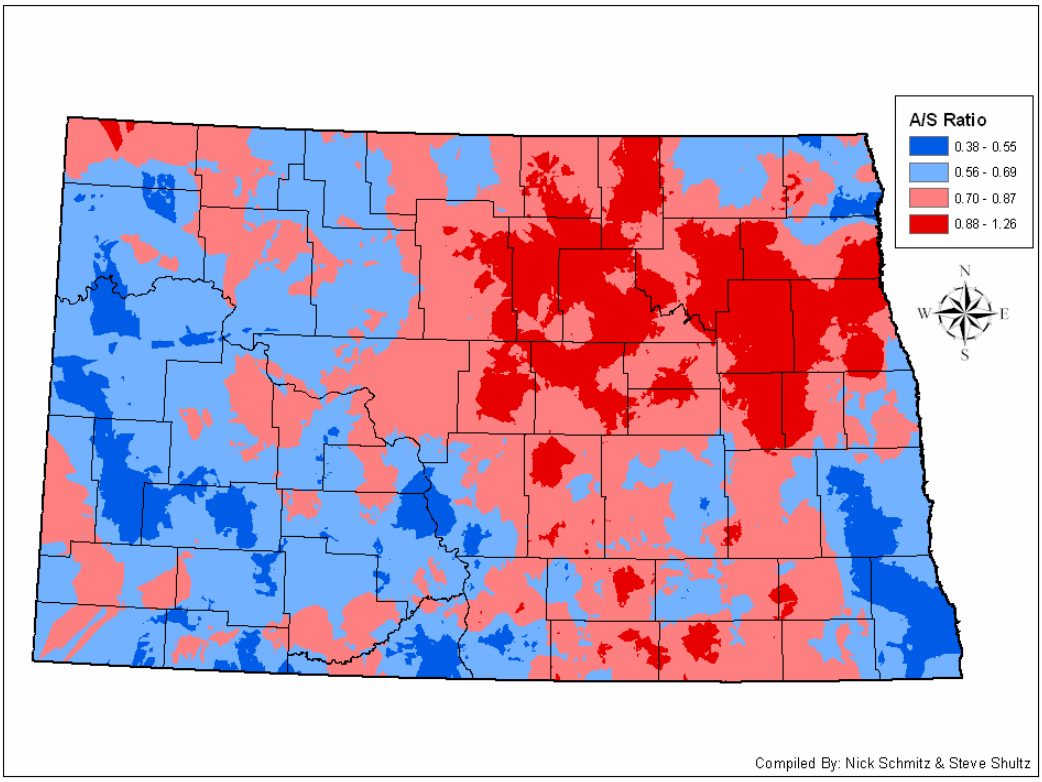
Results:

Median A/S ratios and coefficients of dispersion reported by the state indicate that these values fluctuate over time. Our analyses involve the data over a 5-year time period to obtain a more robust and consistent understanding of the relationships between assessed tax values and market sale prices.

Regardless of what geographical level of analysis evaluated, sharp variations in A/S ratios for agricultural properties occur across state from 2000 to 2004. Analysis of parcel specific assessed and sale values averaged at the county level of analysis indicates that 72% of the counties in the State had high coefficients of dispersion (in excess of 20 which exceed IAAO standards).

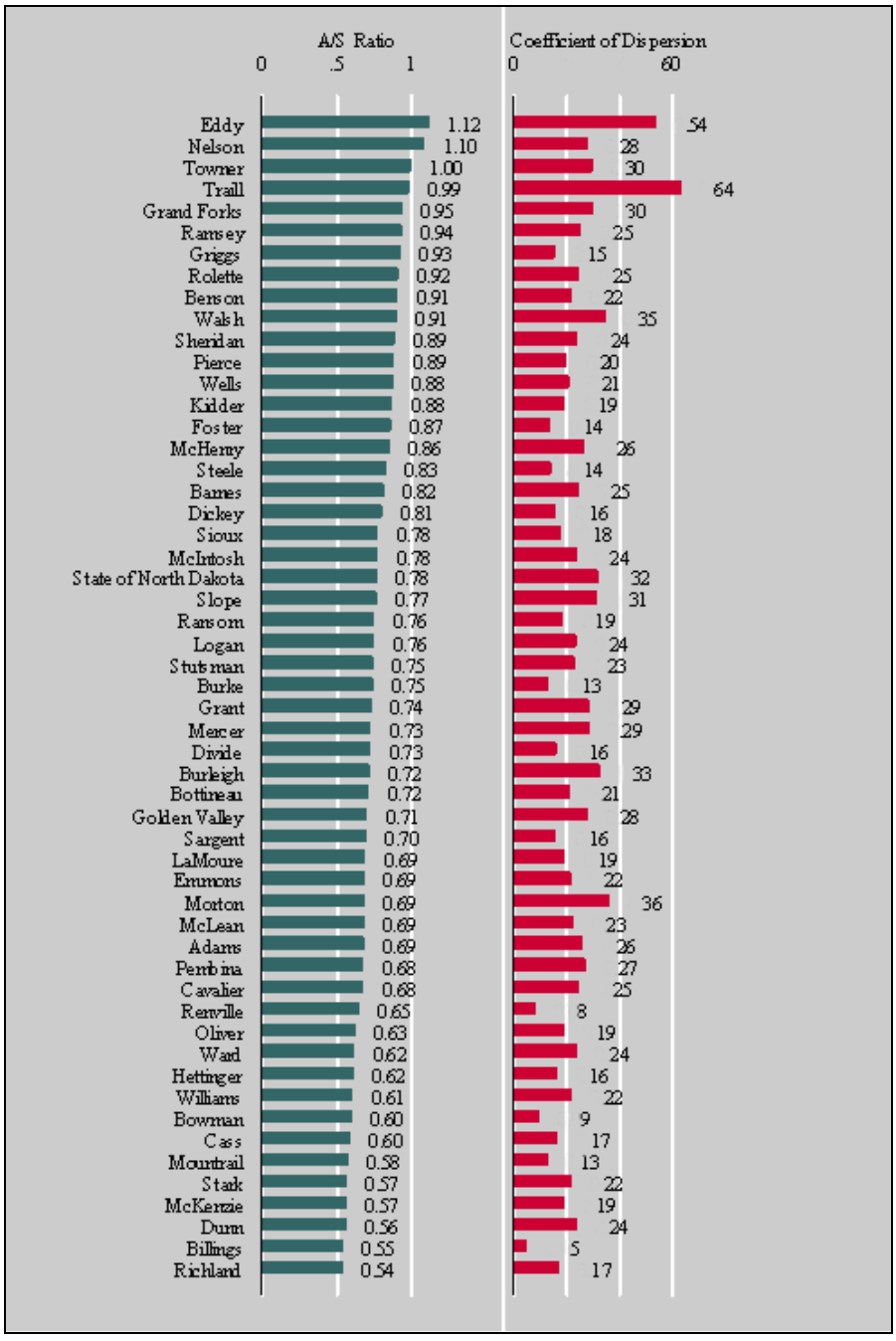
Patterns of tax inequity were also visible from the mapping of A/S ratios across counties (Figure 2) which demonstrates concentrated areas of the state that have clusters of relatively high and low A/S ratios. All 53 counties in the state are ranked by their A/S ratios in Figure 3. Eddy county in the northeast part of the State has the highest A/S ratio at 1.12 meaning that on average assessed tax values exceed market values by 12%. In contrast, Richland county in the southeast part of the state has the lowest A/S ratio at 0.54 meaning that assessed value are only about half of market values. The average A/S ratio statewide is 0.78. Coefficients of dispersion are also reported in figure 3, and appear to be highest in cases of high A/S ratios but there are some exceptions.

Figure 2. Areas of the State with Varying A/S Ratios (2000-2004)



Cases of systematic inequality were also found to occur in a regressive manner with regards to the size and value of properties (A/S ratios were relatively lower for high valued and larger properties). Finally, tax inequity was prevalent in counties with relatively large increases in property values over the last five years (both in areas of changing production practices and hunting/recreation sales).

Figure 3 Rank of North Dakota Counties by A/S Ratios (Average Values, 2000-2004)



Conclusions and Recommendations:

Summary:

North Dakota and the nearby states of Montana and Wyoming all use the productivity or use value approach, yet all of the nearby states with similar forms of production agriculture (Minnesota, South Dakota, and Nebraska) use a market value approach to assess agricultural land. Based on these study results, it is suggested that North Dakota re-evaluate accuracy and equity of its current productive value approach for assessing agricultural land.

This study has determined that sharp variations in A/S ratios for agricultural properties exist statewide and within many individual counties over the 2000 to 2004 time period. These variations were evident when using the state of North Dakota's own data at the county level of analysis, or spatially related site-specific data associated with individual properties (evaluated both statewide and by regions)

The aggregated county-level analyses demonstrated that 72% of the 53 counties in the state counties had high coefficients of dispersion (in excess of 20), indicating a lack of uniformity in A/S ratios and ratio values that exceed IAAO standards. These patterns of tax inequity were also visible from the kriging-based mapping of A/S ratios across counties. That is, the mapping of A/S ratios also demonstrated there are concentrated areas of the state that have clusters of relatively high and low A/S ratios. This concentration of high/low A/S ratios (in contrast to random cases scattered statewide) indicates that they are likely a result of an inherent or systematic flaw in the state approach of valuing the gross production values for counties.

There are two primary implications of these findings. First, property owners within many counties across the state are systematically being under or overtaxed compared to other county taxpayers. The reporting of county average A/S ratios may in some cases mask this form of tax inequity, but these inequities are visible when A/S ratios are mapped. Since most property taxes remain within individual counties, these highly variable A/S ratios do not translate into a statewide tax inequity issue, but rather, a tax inequity issue within particular counties.

Implications for the USFWS Wetland Easement Program:

However, the statewide inaccuracy of assessed agricultural tax values does have an important statewide implication in the form of inaccurate estimates of the market value of wetland and grassland easement payments by the USFWS. Specifically, in areas of the state with particularly high A/S ratios (the dark areas in Figure1), USFWS easement payments will be significantly lower than if payments were based on actual market values. In contrast, in areas of the state with relatively low A/S ratios landowners will receive USFWS easement payments that are artificially high. Unfortunately a significant portion of current USFWS wetland and grassland easement purchases are being made in

areas of the state with the relatively highest A/S ratios. An ongoing study is attempting to estimate total value of over and underpayments associated with USFWS wetland and grassland easement payments in the state since 2004. It may also be prudent for USFWS to evaluate the accuracy wetland easement payments in South Dakota and Minnesota where the agency similarly relies on A/S ratios to calculate easement payments. However, it should be pointed out these neighboring states also assess the taxable value of agricultural land using market values so the problems discovered by this study in North Dakota may not necessarily exist in these states.

How to Resolve these Tax Inequity Problems

It is the authors opinion that observed county-specific tax inequities across North Dakota are for the not a direct result of the productivity value approach itself (at the county level of analysis). One exception to this statement is that the county-level productivity valuation approach does not appear to work particularly well in areas of either rapidly changing land values resulting from rapidly changing agricultural practices or increasing levels of recreational and hunting-based land purchases.

Rather, we believe that the majority of the cases of agricultural tax inequity in North Dakota result from the inability of county tax directors to adjust or apportion county land values (from the productivity approach) to individual assessment districts (townships) within counties based on the relative productivity of townships within a county. An often discussed solution to this problem is to have county tax assessors obtain more accurate township and parcel level productivity data by using GIS-based SSURGO soils data). However as demonstrated in a previous study (Shultz, 2005); this might not result in more accurate agricultural tax assessments for four reasons:

1) SSURGO digital soils data is relatively outdated with regards to crop yield data (by 10 to 20 years in many counties) and the newer productivity index (PI) is still based on yield estimates from outdated empirical data.

2) SSURGO does not in any way account for a variety of other factors influencing land prices including subsidy programs, creation of drought tolerant crop varieties, and the influence of recreational use.

3) SSURGO soils data is inadequate without detailed knowledge of the cropping patterns of individual parcels i.e. good and bad soil may ‘average out’ in a parcel but other barriers to production that are prevalent in a young glaciated landscape may preclude the parcel from the use implied by the productivity estimate.

4) The use of GIS based soils and land use data is most likely beyond the financial and technical capacities of many county tax assessors. It would be more cost effective for the State to coordinate such research, data collection and analyses in a centralized location and provide the results to counties.

Should North Dakota Switch to a Different System for Assessing Agricultural Land?

The implication of so many different factors influencing the lack of uniformity of A/S ratios across the state is that the simple adjustments to the current tax assessment approach in North Dakota is not likely to be effective in reducing tax inequity (either statewide) or within individual counties. This is probably why most of the states surrounding North Dakota utilize a market-based approach to assess agricultural land rather than the problematic productivity value approach. It would be prudent to compare the uniformity of A/S ratios and the frequency of tax inequality for similar types of agricultural land in those states.

Similarly, the state should evaluate the feasibility and distributional implications of switching to a market-based approach of assessment, or perhaps even a hybrid approach that combines market sales with some aspects of productive capacity and land use (cropping patterns). Such a market-based approach that takes advantage of digitizing property sale locations and the use of GIS-based kriging techniques to interpolate and map land values spatially has considerable potential and has, in fact, already been completed statewide for the 2000 to 2004 time period (Shultz, 2006).

Citations:

Shultz, S. 2005. Alternative soil productivity measures to equalize North Dakota agricultural taxes. Journal of Property Tax Assessment and Administration. 2(1): 5-13

Shultz. S.2006. Differences between agricultural land value surveys and market sales. Journal of the American Society of Farm Managers and Rural Appraisers 69(1): 142-149.

Shultz, S., N. Schmitz, and J. Leitch. 2007. “A Spatial Evaluation of Agricultural Property Tax Inequity Associated with Productivity-Based Assessments.” *Journal of Property Tax Assessment and Administration*. 3(3) 53-65.