

Use Value Assessments and the Costs to Local Governments

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Abstract

This paper addresses several issues related to states' programs for use-value assessments on agricultural and forest land. The paper identifies and describes each state's preferential use-value assessment program and focuses on specific program characteristics, like eligibility requirements, standards for implementation, benefits, costs, and distributional consequences. This discussion is followed by a review of the literature on current-use value assessment programs. A case study of Wayne County, Ohio is presented to illustrate the impact of use value assessments which are seen to cause the county to forego significant property tax revenues, to undermine the uniformity of the property tax, and to distort property tax liabilities across both agricultural and other property types.

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Table of Contents

| | |
|---|----|
| Introduction..... | 1 |
| Description of State Programs | 2 |
| Agriculture: Program Characteristics | 7 |
| Agriculture: Value Methodologies | 9 |
| Forestry: Program Characteristics..... | 11 |
| Forestry: Valuation Methodology..... | 12 |
| Penalty for Change of Use | 13 |
| Are the actual recipients of preferential assessments those property owners targeted by the program? | 16 |
| Does the program preserve the intended type of land use? | 17 |
| What are the costs to local taxing jurisdictions?..... | 18 |
| Ohio Case Study | 19 |
| Wayne County | 20 |
| Data | 21 |
| Impact of the CAUV Program on the Property Tax Base and Revenue..... | 21 |
| Impact of CAUV on Uniformity..... | 22 |
| Distributional Consequences of CAUV Preferential Assessments..... | 24 |
| Conclusion | 25 |
| References..... | 27 |

Use Value Assessments and the Costs to Local Governments

Introduction

Historically, state governments have provided tax benefits to owners of agricultural and timber land. In fact, all fifty states, including those where farming represents an insignificant part of the economy, provide some form of tax break for owners of agriculture land. Forty-six states explicitly assess agricultural land at current use value for property tax purposes. The other four states either use an income approach (which is implicitly a current use valuation) or provide some other method of property tax relief for agricultural land. Nationwide, current use valuation significantly reduces the amount of revenue that can be raised from property taxes on agricultural and other categories of rural land.

Similar to agricultural land, timber land has received favorable property tax treatment. Twenty-eight states value timber land under some form of current use, and the other 32 tax timber land on a flat per acre or productivity basis. Most states explicitly (via statute) treat timber land exactly as they do agriculture land for property tax purposes. In other cases state statutes, regulations, or administrative rulings define timber separately. In general, 39 states provide fractional assessments of timber land.

Thus, there is widespread use of preferential assessment programs for farm and timber land. Malme (1993) states that in most cases preferential assessments are offered to preserve land use, to discourage urban development, and to protect natural resources (p. 6). In some instances agricultural and timber industries exert influence on the political process with their economic power to achieve legislation viewed favorably by their industries. Because of popular and industry support for preferential assessments there has been no retrenchment in the number of laws aimed at providing tax relief to farmers and timber owners, which has resulted in significant loss of property tax revenue for state and local governments. And, despite almost universal use of preferential assessment programs, relatively little is known about their costs.

This paper seeks to address several issues related to use-value assessments. First, the paper identifies each state that offers preferential assessments and then describes the state's programs' main eligibility requirements, the specifics of the program, and how the program is implemented. This information is based on research collected in the George Washington Institute of Public Policy and Lincoln Institute of Land Policy's Significant Features of the Property Tax website. Next, the paper discusses the benefits, costs, and distributional consequences of the assessment. This section incorporates information from the Lincoln database as well as the academic literature on preferential assessments. Finally, the paper presents a case study that analyzes the consequences of current agricultural use value assessments as a means of providing preferential property tax treatment to farm land. The case study analyzes the impact of use value assessments on the local tax base and property tax revenues, as well on the distribution of tax liabilities and the overall uniformity of the property tax.

Description of State Programs¹

In an effort to reduce the property tax burden for owners of eligible land, taxing jurisdictions often value land at its current use rather than highest and best economic use (Malme, 1993). This section describes state programs providing preferential assessments for various categories of rural land. Penalties for changing the use of land to non-agricultural or non-timber uses are also identified. Penalties typically require that the property owner pay back the difference in property tax liabilities between the market- and use-values during the years the property received preferential assessment, or that the property owner pay some percentage of market value. Occasionally, those penalties include interest on the foregone revenue. Some states impose no penalties. Table 1 lists each agricultural and forest land preferential assessment program, the program's land use eligibility, the method of preferential assessment, and, if they exist, penalties for changing the use of the land.

Table 1: 2009 Preferential Property Tax Assessments for Specific Property Types

| State | Program Name | Eligible Land Uses | Eligibility Criteria | Penalty for Change of Use? |
|-------|---|--|--|----------------------------|
| AK | Farm Use Land Assessment Program | Agricultural/Farmland | Income Production Prerequisite Designation or Certification | Yes |
| AL | Agricultural Use Value | Agricultural/Farmland Forest Land/Timber Production | No Criteria | Yes |
| AR | Use Valuation of Agricultural, Pasture, and Timber Land | Agricultural/Farmland Forest Land/Timber Production Other Land Uses | No Criteria | No |
| AZ | Agricultural Valuation | Agricultural/Farmland Conservation/Open Space | Plot/Land Size Income Production Multi-Year Commitment | No |
| CA | Williamson Act Program | Agricultural/Farmland Conservation/Open Space | Multi-Year Commitment | Yes |
| CA | Forest Land (Current Use Value and Yield tax) | Forest Land/Timber Production | Plot/Land Size Management Plan Multi-Year Commitment | Yes |

¹ Information for this section comes from Significant Features of the Property Tax, <http://www.lincolnst.edu/subcenters/significant-features-property-tax/>

| | | | | |
|----|--|---|--|-----|
| CO | Agricultural Valuation | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production | Plot/Land Size Income Production Prerequisite Designation or Certification Prior Year's Land Use | No |
| CT | Rule of Valuation for Farmland, Forest Land, and Open Space Land | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production Other Land Uses | Plot/Land Size Income Production Prerequisite Designation or Certification Prior Year's Land Use Multi-Year Commitment | Yes |
| DC | No agricultural assessment programs found | Agricultural/Farmland | N/A | N/A |
| DE | Farmland Preservation | Agricultural/Farmland | Plot/Land Size Location Income Production Multi-Year Commitment | No |
| GA | Bona fide Residential Transitional Property | Agricultural/Farmland Other Land Uses | Plot/Land Size Multi-Year Commitment | Yes |
| FL | Classified Use Value of Land Classified Agricultural | Agricultural/Farmland | No Criteria | No |
| HI | Agricultural Use Value | Agricultural/Farmland | No Criteria | Yes |
| IA | Assessment of Agricultural Property | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production Other Land Uses | Income Production | No |
| ID | Valuation of Agricultural Land (Speculative Value Exemption) | Agricultural/Farmland Conservation/Open Space Other Land Uses | Plot/Land Size Income Production Management Plan Prior Year's Land Use Multi-Year Commitment Other Eligibility Requirements | No |
| ID | Forest Land | Forest Land/Timber Production Other Land Uses | Plot/Land Size Management Plan Multi-Year Commitment | Yes |
| IL | Farmland, Open Space, and Forestry Management Plan [Farmland] | Agricultural/Farmland | Prior Year's Land Use | No |

| | | | | |
|----|--|---|---|-----|
| IL | Farmland, Open Space, and Forestry Management Plan [Forest] | Forest Land/Timber Production | Management Plan | No |
| IN | Agricultural Assessment | Agricultural/Farmland | Plot/Land Size | No |
| KS | Assessment of Agricultural Property | Agricultural/Farmland | Prerequisite Designation or Certification | No |
| KY | Agricultural Value Assessment | Agricultural/Farmland Forest Land/Timber Production Other Land Uses | Plot/Land Size | No |
| LA | Use Valuation for Agricultural, Timber, and Horticultural Land | Agricultural/Farmland Forest Land/Timber Production Other Land Uses | Plot/Land Size Income Production Prerequisite Designation or Certification Management Plan | Yes |
| MA | Farm Land Tax Law | Agricultural/Farmland Other Land Uses | Plot/Land Size Income Production Prior Year's Land Use Other Eligibility Requirements | Yes |
| MA | Forest Land Tax Law | Forest Land/Timber Production | Plot/Land Size Management Plan Multi-Year Commitment | Yes |
| MD | Agricultural Use Assessment Law | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production | Plot/Land Size Income Production Management Plan Multi-Year Commitment | Yes |
| ME | Farmland Tax Law | Agricultural/Farmland | Plot/Land Size Income Production Prior Year's Land Use | Yes |
| ME | Maine Tree Growth Tax Law | Forest Land/Timber Production | Plot/Land Size Management Plan Multi-Year Commitment Other Eligibility Requirements | Yes |
| MN | Agricultural Property Tax (Green Acres) | Agricultural/Farmland Other Land Uses | Plot/Land Size Location Income Production Prior Year's Land Use | Yes |
| MO | Valuation of Agricultural and Horticultural Land | Agricultural/Farmland Other Land Uses | No Criteria Other Eligibility Requirements | No |
| MS | Use Value of Agricultural Land | Agricultural/Farmland | No Criteria | No |

| | | | | |
|----|---------------------------------------|--|--|-----|
| MT | Valuation of Agricultural Land | Agricultural/Farmland | Plot/Land Size Income Production | No |
| MT | Valuation of Forestland | Forest Land/Timber Production | Plot/Land Size Prerequisite Designation or Certification | No |
| NC | Use Value | Agricultural/Farmland Forest Land/Timber Production Other Land Uses | Plot/Land Size Location Income Production Management Plan Prior Year's Land Use Multi-Year Commitment Other Eligibility Requirements | Yes |
| ND | Valuation of Agricultural Land | Agricultural/Farmland | Plot/Land Size Income Production Prior Year's Land Use | No |
| NH | Current Use Taxation Program | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production Parks/Recreation Other Land Uses | Plot/Land Size Income Production Management Plan | Yes |
| NJ | Farmland Assessment Act | Agricultural/Farmland | Plot/Land Size Income Production Prior Year's Land Use Other Eligibility Requirements | Yes |
| NM | Valuation of Agricultural Land | Agricultural/Farmland Forest Land/Timber Production Other Land Uses | Plot/Land Size | Yes |
| NV | Assessment of Agricultural Property | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production | No Criteria | Yes |
| NY | Agricultural Assessment | Agricultural/Farmland Other Land Uses | Plot/Land Size Income Production Multi-Year Commitment | Yes |
| OH | Current Agricultural Use Value (CAUV) | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production Other Land Uses | Plot/Land Size Location Income Production Prerequisite Designation or Certification Prior Year's Land Use | Yes |

| | | | | |
|----|--|--|---|-----|
| OK | Agricultural Use Value | Agricultural/Farmland Other Land Uses | No Criteria | No |
| OR | Conservation Easement | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production | Prerequisite Designation or Certification | Yes |
| OR | Forestland Program | Forest Land/Timber Production | Plot/Land Size Prerequisite Designation or Certification | Yes |
| OR | Farm and Forest Homesites | Other Land Uses | Plot/Land Size | No |
| PA | PA Farmland and Forest Land Assessment Act of 1974 | Agricultural/Farmland Conservation/Open Space Parks/Recreation | Plot/Land Size Income Production Prior Year's Land Use | Yes |
| SD | Valuation of Agricultural Property | Agricultural/Farmland Forest Land/Timber Production Other Land Uses | Plot/Land Size Income Production Prior Year's Land Use Other Eligibility Requirements | No |
| TN | Greenbelt Law | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production Parks/Recreation Other Land Uses | Plot/Land Size Income Production Prerequisite Designation or Certification Management Plan | Yes |
| TX | Agricultural Use Value | Agricultural/Farmland Other Land Uses | Income Production Multi-Year Commitment | Yes |
| TX | Valuation of Timber Land | Forest Land/Timber Production | Prerequisite Designation or Certification Prior Year's Land Use | Yes |
| UT | Farmland Assessment Act (FAA) | Agricultural/Farmland | Plot/Land Size Income Production Prior Year's Land Use | Yes |
| VA | Special Land Use Assessment | Agricultural/Farmland Conservation/Open Space Forest Land/Timber Production Other Land Uses | Plot/Land Size | Yes |
| VT | Agricultural and Farm Buildings Program | Agricultural/Farmland | Plot/Land Size Income Production Multi-Year Commitment | Yes |

| | | | | |
|----|--|---|--|-----|
| VT | Forest Land Program | Forest Land/Timber Production | Plot/Land Size Management Plan Other Eligibility Requirements | Yes |
| WA | Open Space Taxation Act - Farmland | Agricultural/Farmland | Plot/Land Size Income Production Multi-Year Commitment | Yes |
| WI | Agricultural Use Value Assessment | Agricultural/Farmland | No Criteria | Yes |
| WV | Valuation of Farmland and Structures | Agricultural/Farmland | Plot/Land Size Income Production | No |
| WV | Valuation of Timberland and Managed Timberland | Forest Land/Timber Production | Plot/Land Size Management Plan | Yes |
| WY | Valuation of Agricultural Land | Agricultural/Farmland Forest Land/Timber Production | Plot/Land Size Income Production Other Eligibility Requirements | No |

Source: Significant Features of the Property Tax, Lincoln Institute of Land Policy and George Washington Institute of Public Policy, <http://www.lincolninst.edu/subcenters/significant-features-property-tax/>

Agriculture: Program Characteristics

As of 2009, 46 states offered preferential assessment for agricultural land which value property at its current use. Only Michigan, Nebraska, Rhode Island, South Carolina, and the District of Columbia didn't offer such a form of preferential assessment. Nebraska assesses agricultural property at 75% of the assessment of other property. In South Carolina, agricultural land owned by an individual or partnership is valued at 4% of market value and property owned by corporation is valued at 6% of market value. In Michigan and Rhode Island, statute simply explains that the state determines the method for valuing the land. The District of Columbia offers no preferential treatment for agricultural property.

States have established several criteria for eligibility for preferential assessment. The most common criteria include plot or land size, income production, certification, a management plan, prior years' land use, or a multi-year commitment. Thirty-one states have a minimum plot or land size criteria. The minimum size ranges from one acre in New Mexico to 200 acres in Delaware. Most states require at least five acres (Georgia, Idaho, Massachusetts, Maryland, Maine, North Carolina, New Jersey, Utah, Virginia, Washington, West Virginia, and Wyoming), ten acres (Arizona, Illinois, Kentucky, Minnesota, North Dakota, New Hampshire, Ohio, and Pennsylvania), twenty acres (Montana and South Dakota), or 25 acres (Connecticut and Vermont) to qualify. In Indiana the local taxing jurisdiction determines plot or land size criteria. Some states add contingencies to their plot and land size requirements. For example, in Delaware a property can be eligible for preferential assessment if it is below 200 acres as long as it is within a 3-mile radius of an established Agricultural Preservation District, and in North Carolina, property below 5 acres is eligible as long as it annually produces at least 20,000 pounds of aquatic species for commercial sale.

Along with plot and land size requirements income production represents the other most popular eligibility criteria for agricultural property owners seeking a preferential assessment. Twenty-three states make no requirements of the land's income production. Alaska, Iowa, and Texas are the only states with an income production requirement which do not also have a plot or land size requirement.

Most often states demand that property earn a minimum amount of revenue per year to make it eligible for preferential assessment. States with a defined agricultural income from the land vary from at least \$300 plus \$10 per tillable acre in Minnesota up to at least an average of \$10,000 over two years in New York. Other common income floors are \$500 (Massachusetts, New Jersey, West Virginia, and Wyoming), \$1,000 (North Carolina and Idaho), \$1,500 (Montana, Tennessee, and Washington), \$2,000 (Louisiana, Maine, Pennsylvania, and Vermont), and \$2,500 (New Hampshire and Ohio). Some states demand that the agricultural revenue represent a percentage of the property owner's adjusted gross income. Income from the property must represent at least 10% in Alaska, 33 1/3% of a family's income in South Dakota, 50% in Connecticut, and 80% in Utah. In Minnesota, if a property owner fails to earn the \$300 plus \$10 per tillable acre then they must earn at least 33 1/3% of their income from agricultural land to be eligible.

Some states also require staggered income floors for a property. For example, Vermont requires that in one of the previous two or three of the previous five years that property earned at least \$2,000 for properties up to 25 acres, and then \$75 per acre for each acre over 25, with the total income required not exceeding \$5,000. In Maryland the State Department of Assessment and Taxation may elect to apply a \$2,500 gross income requirement. Other states are less discriminating and require that the property simply generate some profit (Arizona, Delaware, and Iowa) or be the property owner's primary occupation (Colorado and Texas). North Dakota represents the exception in its method for determining income production eligibility in that it requires that land produce revenue less than the county average of revenue per acre for non-agricultural land as calculated by the agricultural economics department of North Dakota State University.

Besides plot or land size and income requirements a few states also require prior certification, and in one state evidence that the owner is participating in a management plan. Four states (Alaska, Colorado, Louisiana, and Tennessee) require prior certification from the state or local assessor for agricultural land, and only North Carolina requires a management plan for agricultural property seeking a preferential assessment. The state's Sound Management Plan is only necessary if the property owner cannot present evidence that the property meets the \$1,000 income production floor.

Prior years' land use and the need for a multi-year commitment represent the two final major eligibility requirements for property owners seeking preferential assessments for their agricultural property. Fourteen states require a minimum number of years that the land has been used for agricultural property. Seven states require at least two years or seasons (Colorado, Illinois, Massachusetts, North Dakota, New Jersey, New York, and Utah), four require three years or seasons (Idaho, North Carolina, Ohio, and Pennsylvania), South Dakota requires five years, Minnesota requires seven years, and Maine requires one of the previous two or three of the

previous five years. Of the nine states that require a multi-year commitment most demand a minimum of ten years in the program (California, Delaware, Georgia, Idaho, and Washington), and three states require fewer than ten years (Arizona—7, Maryland—5, and Texas—3). North Carolina does not require a multi-year commitment but still imposes a penalty if the land changes its use unless the property is enrolled in a federal, state, local government, or nonprofit conservation reserve program.

Agriculture: Value Methodologies

Determining agricultural use-value is complicated (Locken, Bills & Boisvert, 1978). States rely on one of four approaches to valuation. Often states use formulas that take a range of factors, such as gross income, soil productivity, production costs, and potential rental income, into account to estimate the property's agricultural value. States like Alabama, Florida, Maine, and Mississippi, fall into this category. For example, in Alabama crop production, revenues, return, and income flow determine use-value. Florida relies on factors that include: the quantity and size of the property; the condition of the property; the present market value of the property as agricultural land; the income produced by the property; the productivity of land in its present use; and, the economic merchantability of the agricultural product. Maine's Department of Agriculture, Food and Rural Resources considers farmland rentals, farmer-to-farmer sales, soil types and quality, commodity values, topography and "other relevant factors." The Mississippi State Tax Commission advises assessors to use soil types, productivity, and an income capitalization rate of at least 10% with a moving average of at least 10 years. Similarly, some states, like Louisiana, rely on formulas with fewer factors, such as net income divided by the capitalization rate.

Income-producing capacity represents a second common approach states use to estimate use-value. States, like New Hampshire, South Dakota, Texas, and Washington, rely on this method. New Hampshire defines income-producing capability based on the current use solely for growing agricultural crops. South Dakota identifies the agricultural income value of agricultural land based on the capitalized annual cash rent of the agricultural land. Texas established use-value according to the land's capacity to produce agricultural products, which is determined by capitalizing the average net income the land would have yielded under prudent management from production of agricultural products during the five preceding years. Similarly, in Washington the assessor considers the earning or productive capacity of comparable lands from crops grown most typically in the area averaged over a period of at least five years.

Anderson illustrates the complexity associated with states' efforts to measure the income-producing capacity of a property. Anderson's review of issues varies from seemingly basic factors, such as definitions, to the intricacies of capitalization rates. For example, he notes that a key question is whether the agricultural land comprises forestland or wetlands, and both commercial and residential agricultural land? With respect to capitalization rates, Anderson believes some states might experience challenges in selecting appropriate discount rates (p. 10) and in structuring interest rates (p. 11). He identifies myriad efforts to establish capitalization rates. Some states rely on a computed rate that is subject to limitations; others include a risk or liquidity adjustment, or make some sort of assumption about the financing of the land (p. 12).

Regardless, he notes that for any method aimed at estimating net income, an inherent challenge associated with use-value assessments exists in that “the very presence of a differential method of taxation would have economic impacts” (p. 8).

A third technique for estimating use-value for agricultural land is to use an index, usually one that measures soil productivity. For example, Missouri values productivity based on soil productivity guidelines set by the State Tax Commission. In Pennsylvania use-value is measured based on the United States’ Department of Agriculture’s (USDA) Agricultural Land Capability Classification system and other information available from USDA, Pennsylvania State University and the Pennsylvania Agricultural Statistics Service.

Finally, some states, like Alaska, Connecticut, Oregon, Vermont, and West Virginia, are less explicit in how they determine use-value. For example, Alaska assesses eligible property at true use as farm land, not at its highest and best value. Vermont values property according the price per acre that the land would command if it were required to remain in agriculture. Similarly, West Virginia identifies a fair and reasonable value for farming purposes regardless of what the value of the property would be if used for another purpose.

In light of these efforts, Anderson recommends improvements to lead to more accurate use-value estimates. He suggests that states impose penalties for removal from a use-value program, consider other types of rural land (i.e., forests and wetlands), and establish consistency and coherency in their approaches to income capitalization (p. 22–23). In addition, he believes that states fail to appropriately value non-tangible qualities of rural land, and that they obfuscate programs with inaccurate and inconsistent methods for valuation (p. 24–25).

Besides eligibility requirements and how states determine use-value, researchers are interested in the participation of such programs. The available enrollment data suggest that preferential assessments for agricultural property affect many property owners and provide considerable relief (or, cost to local and state Departments of Revenue and Taxation). For example, in Florida, the just value of land classified as agricultural in 2009 was \$78,067,975,274; however the use value of that land was \$8,010,436,058. Minnesota estimated that its Green Acres agricultural property tax relief granted \$62,300,000 in relief in 2009. In New Hampshire, although property tax values aren’t available, the state reports that 65,112 parcels account for a total of 2,902,123.27 acres that benefit from a preferential assessment. Similarly, while information on property tax revenue for Tennessee’s Greenbelt Law isn’t available, the state reports that 208,601 parcels meet eligibility requirements. In New York, 71,048 exemptions were issued, which equaled \$5.10 billion. Utah’s Farmland Assessment Act (FAA) has 102,176 parcels of land enrolled in the program. Finally, Vermont’s use-value appraisal program provided agricultural and forest land owners with \$48,971,339 in savings for 2,188,570 acres in 2009 (Significant Features of the Property Tax, 2011).

Lower assessments, while beneficial to agricultural property owners can come at a considerable cost to local governments as the benefits reduce local property tax revenue. A question arises as to which level of government will bear those losses. For all but three states, local governments absorb all of the property tax losses or the respective state’s statute is silent on its role in reimbursing local governments. In Alaska and Connecticut states and local governments share

the local tax loss. In Alaska the state's support for lost revenue is subject to legislative appropriations, which offers no guarantee that local governments will recoup lost revenue. In Connecticut, the state provides yearly grants to local governments for property tax relief; however the grants are based on total population rather than the amount of local tax loss. Vermont represents the only state where the state government fully reimburses local governments for lost revenue associated with agricultural preferential assessments. (Under the Williamson Act, California used to disburse hundreds of millions of dollars to the counties but the state's economic and fiscal crises caused it to suspend the disbursements.) The failure of state governments to compensate local governments for their lost revenue from use-value assessments not only constrains local governments but it can burden non-participating tax payers (Carman & Polson, 1971).

Forestry: Program Characteristics

As of 2009, 28 states offered some form of a preferential assessment that values forest land at its current-use rather than market value. Similar to preferential assessment programs for agricultural property, eligibility for property owners of forest land depends primarily on plot or land size, income production, certification, a management plan, prior years' land use, or a multi-year commitment. Six states (Alabama, Arizona, Iowa, Illinois, Nevada, and Texas) have no minimum plot or land size criteria. Of the 22 states with a minimum plot or land size criteria, the minimum size ranges from one acre in New Mexico to 40 acres in Colorado. Individual states require at least five acres (Idaho, Maryland, North Carolina, and Wyoming), ten acres (Kentucky, Massachusetts, Maine, New Hampshire, Ohio, Pennsylvania, and West Virginia), fifteen acres (Montana and Tennessee), twenty acres (South Dakota and Virginia), or 25 acres (Connecticut and Vermont) to qualify. Oregon requires two acres and Louisiana requires three. Ohio and South Dakota include contingencies on their plot or land size requirements. In Ohio if a property falls below ten acres it must meet the income requirement of producing at least \$2,500 in annual sales. In South Dakota twenty acres represents the minimum requirement assuming the land is platted; if not platted the land must be a part of at least 80 contiguous acres. Finally, in California counties set the minimum acreage requirement, but state law prohibits the acreage requirement from exceeding 160 acres.

Income eligibility requirements are less stringent for forest land owners than they are for agricultural property owners seeking a preferential assessment. This might be expected considering the variety of public goods (such as strengthening the ecosystem) that forests generate in addition to providing timber. Twenty-one states (Alabama, Arizona, California, Connecticut, Idaho, Illinois, Kentucky, Massachusetts, Maine, Montana, New Mexico, Nevada, New Hampshire, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Virginia, Vermont, and West Virginia) make no requirements of the forest land's income production. Of the seven states that do require income production, the annual gross incomes are as follows: Wyoming (\$500), North Carolina (three-year average of \$1,000), Louisiana (\$2,000), and Ohio and Maryland (\$2,500). Colorado and Iowa only require that the land be used in good faith to obtain profit.

With respect to prior certification as a requirement for eligibility for preferential assessment, Colorado, Connecticut, Louisiana, Oregon, Tennessee, and Texas require certificates. In Colorado, Louisiana, and Tennessee property owners simply need their land certified by a local (i.e., country, district, or parish) assessor. Texas demands certification by the chief appraiser and Connecticut requires that a certified forester from Forestry Division of the Connecticut Department of Environmental Protection approve the land. Finally, forest land in Oregon is obligated to meet the stocking and species standards under the Oregon Forest Practices Act.

Management plans are much more common for forest land than they are for agricultural land (where only North Carolina requires one). Thirteen states (California, Colorado, Idaho, Illinois, Louisiana, Massachusetts, Maryland, Maine, North Carolina, New Hampshire, Tennessee, Vermont, and West Virginia) require a forest management plan. California, Idaho, Illinois, Louisiana, North Carolina, Tennessee, and West Virginia simply state that property owners must have a forest management plan. In addition to having a plan, Massachusetts, Maine, and Vermont require that the plan is updated every ten years. New Hampshire requires that it is updated every five years. Colorado and Maryland demand more. In Colorado the plan must be executed between the owner of forest land and the Colorado State Forest Service or a professional forester. Once approved, the property is annually inspected. Similarly, in Maryland, a professionally registered forester and the property owner are required to demonstrate compliance with the terms of the plan.

Prior years' land use and the need for a multi-year commitment represent the two final major eligibility requirements for property owners seeking a preferential assessment for forest land. Two states require a minimum number of years that the land has been used as forest property. In North Carolina, forest property must have been in use for at least three years to gain eligibility. In Texas, the property must have been designated to timber or forest production for five of the preceding seven years. With respect to multi-year commitments, California, Connecticut, Idaho, Massachusetts, and Maine require a ten-year commitment, and Maryland demands that land must be possessed for fifteen years if the property owner sought a preferential assessment after July 1, 1984.

Forestry: Valuation Methodology

States that offer preferential assessments for forest land typically define use-value as some function of income or productivity related to the land. For example, Montana determines use-value by capitalizing the value of the average yearly growth production plus other agriculture-related income and subtracting annualized expenses. States that use a similar method to Montana include Idaho, Louisiana, Maine, Maryland, Massachusetts, New Hampshire, Texas, West Virginia, and Wyoming. Illinois and North Carolina use income-production to determine use-value but establish some limit or rate at which the land can be taxed. Arizona and Kentucky rely on an income-production method but use formulas that incorporate more factors. For example, in establishing the productivity value of timber Arizona calculates capitalization rates with long-term federal security rates, risk rates, management rates, and "other appropriate financial rates." Oregon determines use-value based on the typical price paid for forest land while taking location and growth capacity into account. Connecticut and Vermont are less descriptive in defining use-

value. For example, Vermont defines it as the price per acre that the land would need if it remained in forest use. California and Virginia differ slightly from other states in that the Advisory Council in Virginia and the State Board of Forestry in California determine the factors that define use-value.

With respect to enrollment data, available information indicates that preferential assessments for forest land are less popular than those for agriculture. In New Hampshire, Tennessee and Vermont the state combines agricultural and forest property to report participation (the data for these three states are cited in the *Agricultural* section). In Oregon, farm and forest land, which include forestland and small tract forest, was valued at \$18,094,723. In Idaho in 2009, the taxable value of timber was \$985,662,104. Finally, the FY 2010 state expenditure for Maine's tree growth law was \$4,964,373. This total reflects 90% of the per acre tax revenue lost due to tree growth assessed value (as opposed to actual undeveloped acreage assessed value) (Significant Features of the Property Tax, 2011).

Similar to preferential assessment programs for agricultural property, local governments bear the burden of absorbing the lost property tax revenue. With the exception of Connecticut, Maine, and Vermont local governments are required to absorb all of the tax loss or the respective state's statute is silent on the state's role in reimbursing local governments. Similar to agricultural relief in Connecticut, the state provides yearly grants to local governments for property tax relief; however the grants are based on total population rather than the amount of local tax loss. In Maine, the state Tax Assessor provides reimbursement to each municipality in proportion to the product of the reduced tree growth valuation in the municipality multiplied by the property tax burden of the municipality. The reimbursement is calculated on the basis of 90% of the per acre tax revenue lost. Vermont represents the only state where the state government fully reimburses local governments for lost revenue associated with the preferential assessments.

Penalty for Change of Use

States and taxing jurisdictions impose penalties for change of land use to ensure that programs benefit farmers and foresters, and not developers and speculators. The success of penalty programs is debatable (Malme, 1993). Some research shows that preferential assessments exhibit modest but positive effects in preserving forest and agricultural land use (Fortney & Arano, 2010; Meyer, 1995). Barlow, Ahl, and Bachman (1973) argue that a primary weakness of use-value assessments is that they provide a benefit to a specific group of taxpayers without sufficiently implementing responsibility to maintain specific land use (p. 210).

Where a jurisdiction establishes zoning restrictions on land use, evidence suggest that zoning requirements change too frequently to guarantee that the targeted recipients of a preferential assessment will be the only ones to receive the benefit (Alden & Shockro, 1969). Yet, the recapture of back taxes proves limiting because policymakers struggle in balancing efforts that either reclaim an insufficient amount, which fails to deter property owners, or rely on unlimited recapture, which proves too punitive (Fortney & Arano, 2010). Thus, finding an appropriate balance in recapturing back taxes is critical. Malme (1993) found that the appropriate mechanism to ensure agricultural land use isn't necessarily recapture of back taxes, but rather an effort to

“link tax preferences with requirements that will enhance the long-term viability of agriculture” (p. 28).

Among states offering preferential assessments in 2009, nineteen impose no penalty for change of use for agricultural property and six impose no penalty for change of use for forest property. Arkansas represents an exception in that although the state doesn't assess a penalty, it reserves the right to impose a three-year penalty on property owners that fail to notify the government of their plans to change use. For property qualifying for an agricultural preferential assessment, most states that impose a penalty specify a number of years of back taxes that the property owner is responsible for refunding state and local taxing jurisdictions. From the point at which the property became ineligible for the use-value assessment states demand back taxes for two years (Minnesota and New Jersey), three years (Alabama, Ohio, Tennessee, and Texas), four years (Maryland and Massachusetts), five years (Maine, Utah, and Virginia), six years (Nevada), seven years (Arkansas, Pennsylvania, and Washington), ten years (Connecticut and Hawaii), and for all years that the property received the benefit (Georgia, Louisiana, New Mexico, North Carolina, and Oregon). For this latter group there exist some state-specific contingencies. For example, Louisiana demands a penalty of five times the difference between market-value and use-value assessment. New Mexico is less punitive and only demands the greater of \$25.00 or 25% of the difference of the benefit. Oregon requires only five years for farmland not in an exclusive farm use zone, and ten years for land in an exclusive farm use zone that is outside an urban growth boundary.

Texas, Massachusetts, Maine, North Carolina, Virginia and Washington require that property owners whom change land use include interest but the states don't specify an interest rate. Arkansas (8%) and Pennsylvania (6%) are the only states that demand interest and specify the rate. In addition to recouping back taxes² a few states, like Washington (10%) and North Carolina (20%), impose a penalty on top of back taxes and interest. Similarly, Maine demands a conveyance tax of the total sale price of the land (in the event it is sold to developers), which declines for each additional year that the property owner participated in the program.

Other state-specific penalties for change of agricultural use include California's "cancellation fee" of 12.5% of the full market value of a property, which may be increased or waived by taxing authorities, and New Hampshire's 10% land use change tax of the full and true value of the land. Vermont subjects all enrolled land to a lien and once the land is developed the property owner must pay a land use change tax, which is 10% or 20% of the fair market value of the developed portion prorated on the basis of acreage divided by the common level of appraisal. (Land enrolled for more than 10 years is taxed at 10%, and land enrolled for 10 years or less is taxed at 20%.) In Wisconsin the county administers a penalty that equals the number of acres multiplied by the county's prior year average fair market less its use-value multiplied by 5% if greater than 30 acres (or 7.5% if between 10 and 30 acres, or 10% if less than 10 acres). New York, perhaps the most punitive state, requires repayment for land conversion equal to five times the taxes saved in the most recent year that the land received use-value assessment. In addition, interest of 6% per year compounded annually is added to the payment amount for each year that the land

² Which are also commonly called "roll back taxes", which is the difference between the taxes paid under the preferential assessment and the taxes which would have been paid had the property been assessed at market value.

received an agricultural assessment up to five years. Failure to notify an assessor in New York of land-use change within 90 days can also result in a payment of up to \$500.

With respect to forest land, twenty-two states that offer preferential assessments impose a penalty for change of land use. In most cases, a taxing jurisdiction collects back taxes plus interest over a set number of years. In Oregon, Texas, and West Virginia the land owner must repay back taxes for up to five years prior to the change in land use. Texas imposes a 7% interest rate and West Virginia a 9% interest rate on back taxes. Maine demands interest; however, the state also reserves the right to make the property owner subject to payments for whatever is higher between a conveyance tax and a roll-back tax. Identical to the penalty for agricultural property, Vermont subjects all enrolled land to a lien and once the land is developed the property owner must pay a land use change tax, which is 10% or 20% of the fair market value of the developed portion prorated on the basis of acreage divided by the common level of appraisal. Idaho presents a simpler penalty and assesses and taxes the property as real property, without regard to its ability to produce timber or forest products. Finally, California allows counties to determine the penalty for change of land use.

Literature

Hady and Sibold (1974) state that preferential assessment laws are created to reduce inequities in the property tax for targeted groups, and to influence specific types of land use. But critics of such programs claim that they can be inequitable. In some instances, use-value assessments are regressive because taxing jurisdictions take a smaller share of property taxes from higher-value property (Meyer, 1995). Wunderlich (1997) cites data from the Agricultural Economics and Land Ownership survey, which showed that owners of agricultural property valued over \$5 million paid one-third the rate of owners of agricultural property valued at less than \$70 thousand (p. 220). In addition, many preferential assessments tend to favor land while penalizing farm buildings, which absorb a larger share of the tax burden (Wunderlich, 1997, p. 219).

Another issue arises with private market valuation of such assessments. Anderson (2005) contends that preferential property tax rates are capitalized into higher land values (p. 418). In the end, Malme (1993) states that in addition to being inequitable, use-value assessments are inefficient and fail to preserve land-use (p. 8). This claim identifies the crux of the policy issue related to use-value assessments. More specifically, researchers and policy makers are interested in: Are the actual recipients of preferential assessments those property owners targeted by the program? Does the program preserve the intended type of land use? What are the costs, in particular to local taxing jurisdictions?

Are the actual recipients of preferential assessments those property owners targeted by the program³?

There is evidence that use value assessments benefit the intended recipients. Hickman and Crowther's (1991) study of agricultural and forest use-value assessments in the East Texas Pineywoods Region showed that the programs were widely used by intended recipients (p. 18). Most of the literature on use-value assessments touches on this important limitation. While farmers typically receive the benefits, those with property with the potential for development appear unaffected by the benefit and unobligated to its requirements (Brooks, 1999).

Use value assessments intended to benefit farmers and foresters, also benefit unintended recipients, such as developers and land speculators. In their analysis of agricultural land in Maryland, Nickerson and Lynch (2001) showed that voluntary agricultural preservation programs exhibited no effect on the price of agricultural land⁴. The authors assumed that this might have been the case because participating farmers expected to get out of binding restrictions once they decided to sell their property, or because they planned to divide land into parcels, which would qualify for development (p. 350). Mecham (2003) reported that this latter practice also occurred in Georgia. In their case study on efforts to protect farmland in Habersham County, Georgia, Nelson, Fowler, and Dorfman (2001) found that in places where development was likely some developers were even willing to compensate farmers for the penalties associated with a change in land use in addition to paying for the land (p. 35). With respect to forest land, Clendenning and Stier (2002) report that tax incentives fail to appeal to or benefit targeted recipients and are typically abused by developers. Fortney & Arano (2010) argue that preferential assessment programs for forest land in West Virginia have a history of being inefficient, of providing inadequate benefits to targeted groups, and of resulting in unfairly distributed property taxes.

In general, farmers receive the benefit; and, if the purpose of a preferential assessment is simply to provide tax relief to farmers then use-value assessments suffice (Barlow, Ahl, & Bachman, 1973). But the failure to instill concomitant responsibility for participants encourages speculators and developers to hold qualifying land (Barlow, Ahl, & Bachman, 1973; Cushing, 2006). Thus, use value assessment's inability to act as a mechanism that preserves land-use among all recipients qualifies its success.

³ It is worth noting the perception of the public with regard to the efficacy and goal of preferential assessment programs. For example, in some states programs are aimed at protecting "family farmers" or some socially beneficial land use. In others, such as New Hampshire, the state is indifferent to the intentions or status of the landowner as long as they preserve the specified landscape. Interestingly, in their survey of Rhode Island residents, Kline and Wichelns (1996) found that while residents approved of preservation so as to preserve environmental and aesthetic values, residents didn't perceive preventing the development of agricultural land as grounds for preferential assessment (p. 547). This all leads to broader normative questions related to use-value assessments, such as: Who exactly should benefit from such assessments (i.e., individual farmers, agribusiness, etc.)? Whose interests should be counted in assessing the efficacy of such a program? What types of land justify preservation in the name of social good? These questions, while critical, are beyond the scope of this paper.

⁴ This conflicts with Anderson's (2005) argument because the benefit doesn't appear to be capitalized into land values.

Does the program preserve the intended type of land use?

Much of the literature suggests that use-value assessments marginally preserve land use. At a national scale, Plantinga, Lubowski, and Stavins (2002) found that in counties near urban centers, the potential for development can account for more than half of agricultural land values (p. 578). Then it should come as little surprise that Livanis et al (2006) determined that proximity to urban areas limits assessors' abilities to base agricultural land values on agricultural returns (p. 928). Therefore, in urban areas, farmers would demand considerable compensation to forego development. But England's (2012) extensive survey of the literature and of empirical analysis on use-value assessments suggests that the criticism might be somewhat overstated.

In their analysis of agricultural land values in New York, Plantinga and Miller (2001) found that increases in agricultural net returns through use-value assessments had a minimal effect on preserving land use when development was perceived as imminent (p.66). Veseth (1979) argued that preferential assessments are only effective at removing tax pressure from agricultural property owners interested in farming because the lowered taxes fail to compensate for restricting land use (p. 108). In fact, there's evidence of unintentional disincentives associated with forest use-value programs. Clendenning and Stier (2002) cite cases of destructive harvesting prior to joining a program, of converting forest to farmland to gain eligibility, and of dividing and developing property while maintaining undeveloped portions to receive program benefits.

Chicione (1981) argues that preferential assessment programs are only indirectly related to local land-use planning (p. 361). Wunderlich (1997) claims that they are ineffective at preserving agricultural land use because "vast areas of agricultural land are not value-impacted by intensive nonagricultural uses; therefore, the differential between preferential and nonpreferential value is small (p. 219)." Morris (1998) showed that use-value assessments preserve approximately ten percent of agriculture in comparison to a county with no preferential assessment program. A US Department of Agriculture survey was less optimistic and found that they fail to preserve any agricultural land use (Meyer, 1995). Coughlin, Berry, and Plaut (1978) contend that they are less effective in influencing land use than soil productivity and the demand for development.

Pan's (2005) analysis of Georgia's Conservations Use Valuation Assessment program and Stewart and Libby's (1997) case study of DeKalb County, Illinois found that use-value assessments had little effect on landowners' decision to preserve use or to retain land. Looking at 458 land transactions in New York between 1982 and 1985, Vitaliano and Hill (1994) illustrated that farmers were opposed to joining use-value programs that would prevent them from selling their land for development. The authors argued that voluntary restrictive land-use, use-value programs prove unpopular because of the potential adverse effect on the land's market value (p. 222).

Although sporadic data exists on Oregon's preferential assessment program for agricultural land, Brooks (1999) reported that it had little effect on land conservation and that lenient participation requirements likely led to abuse by beneficiaries (p. 10). With respect to forestry, Williams et al (2004) evaluated Tennessee's Forest Greenbelt Program and found that it failed to protect forest land, and that few eligible beneficiaries knew of the program. Of those enrolled, most participants said that their involvement in the program wouldn't preclude them from changing

land use in the future. Mecham (2003), Ellingson (1975), Malone and Ayesh (1978), Veseth (1979), and Atkinson (1977) found that preferential assessments don't influence land-use because their penalties fail to deter change of use and opined that zoning mandates and restrictive agreements would be more effective.

While use-value preferential assessments fail to sufficiently protect agricultural and forest land, evidence suggests that they at least delay its development (Hyde, Boyd, & Daniels, 1987). Blewett and Lane (1988) exhibited that preferential assessments only function to delay development, which at times can subsidize speculation. Further, Polyakov and Zhang's (2008) analysis of panel data on land-use from USDA's National Resources Institute showed that land conversion was inelastic in response to property taxes (p. 406). All else equal use-value assessments delay development the greater the difference between agricultural use-value and the developed market value and the greater the property tax rate (Anderson, 1993, p. 26).

But not all of the research on use-value assessments is so critical. In fact, Polyakov and Zhang (2008) present the most methodologically rigorous analysis and illustrate the efficacy of use-value assessments. Their study of Louisiana from 1992 to 1997 showed that use-value assessments slowed the development of rural land, and prevented the conversion of marginal agricultural land to forest-use (p. 406). As to why this might be the case, Malme (1993) states that preferential assessments are more effective at maintaining marginal farm operations on less productive land than they are in protecting prime farmland from urban expansion (p. 8–9). And, Miller's (1996) analysis of California's Williamson Act, showed that high participation was critical to preserving agricultural land despite high growth in certain regions.

What are the costs to local taxing jurisdictions?

The costs of use-value assessments can usually be measured in one of two ways. Either the local taxing jurisdiction bears the burden of lost revenue, or non-beneficiaries in the taxing jurisdiction absorb the reduction to the tax base through higher tax rates. With respect to local taxing jurisdictions, Ellingson (1975) found that local governments in South Dakota assumed most of the cost through lost tax revenues (p. 569). Hickman and Crowther (1991) reported that agricultural and forest use-value assessment in the East Texas Pineywoods Region represented over a third of local tax revenue lost to all forms of property tax relief (p. 19). In Oregon in the 1970's, Brooks (1999) showed that preferential assessment programs came at the greatest cost to the least prosperous counties, some of which had to forgo \$20 million in property tax revenue (p. 13).

There is also a shift in property taxes from program beneficiaries to ineligible land owners (i.e., non-agricultural and non-forest land owners). Nelson, Fowler, and Dorfman (2001) reported that Georgia's Conservation Use program—which grants farmers use-value assessments of their land—came at substantial cost to non-agricultural land owners. While some farmers saved over \$6,000 in property taxes, the loss in revenue for Habersham County was \$830,860, which reflected an increase in property taxes of about \$40 for each non-beneficiary (p. 34). In their analysis of the Williamson Act in California, Carman and Polson (1971) showed that the preferential assessment of agricultural land presents a financial burden that adversely affects ineligible property owners in taxing jurisdictions with low participation (p. 456). Research also

suggests that agricultural use-value assessments shift statutory costs from agricultural property owners to taxpayers through increased state school aid contributions (Chicoine & Hendricks, 1985, p. 270). And, Meyer (1995) determined that revenue losses from new applicants seeking preferential assessments exceeded the revenue gained from lands leaving a preferential assessment program. There's even evidence that taxing jurisdictions' methods for determining use-value further compromises their access to property tax revenue. Giertz and Chicione (1984) state that common income capitalization approaches used for valuing agricultural land can lead to taxable property values that are not only below the market-value but also below the current use-value (p. 255). Thus, Malme (1993) argued that such preferential assessment programs waste public resources, distract from "more direct and cost-effective programs", and fail to protect farm land (p. 9).

Ohio Case Study

This section presents a case study analyzing the consequences of current agricultural use value (CAUV) assessments as a means of providing preferential property tax treatment to farm land. The first issue to address in a tax expenditure budget for property taxes is to estimate the revenues foregone because of agricultural use value assessment for farm land. This determination is based on the difference between estimated market value and assessed value for tax purposes under a current agricultural use value assessment.

After canvassing states with preferential assessment programs for agricultural and forest property, Ohio was selected as the demonstration state. Ohio's current agricultural use value (CAUV) assessment program is described in Ohio Revenue Code 5713.30–5713.36. While the Ohio Constitution requires real property (land and improvements) to be taxed uniformly, land devoted exclusively to commercial agricultural use may be valued according to its current use instead of its "highest and best" potential use. To qualify for the preferential assessment under this program land must meet one of the following requirements for three years before the year in which application for the current use treatment is made:

The land must have ten acres or more devoted to commercial agricultural use; or if under ten acres, the land must be devoted to commercial agricultural use and produce an average yearly gross income of at least \$2,500.⁵

According to Significant Features of the Property Tax⁶, a penalty is due when land receiving preferential treatment is converted from agricultural use to a different use. The penalty is an amount equal to the amount of tax savings on the converted land for the three tax years immediately preceding the year in which the conversion occurs. This is referred to as recoupment taxes and requires two values for each property, the CAUV assessment for tax purposes and an estimated market value.

⁵ Significant Features of the Property Tax, <http://www.lincolnst.edu/subcenters/significant-features-property-tax/>

⁶ Ohio Rev. Code § 5713.30 ~ 5713.38 (in effect for 2010) cited in <http://www.lincolnst.edu/subcenters/significant-features-property-tax/>

To analyze the impact of the current use assessments for farmland in Ohio, data was obtained from the Auditor's Office of Wayne County Ohio. These data include two values for each parcel of land participating in the program—an estimate of market value and an estimate of current agricultural use value. Current agricultural use values for taxing farmland in Ohio are determined by calculating the farm's projected gross income from agricultural production, subtracting projected non-land production costs to get the farm's net income, then dividing this by an adjusted capitalization rate to arrive at the farmland's agricultural worth.

Projected gross income from agricultural production is computed starting with typical cropping patterns for the soil types found on a farm, applying the previous five year's statewide average yields per acre for each crop in the pattern, then multiplying these average yields by the previous five years' average price for each crop. The 3,080 different soil types found in Ohio have been collapsed into six typical cropping patterns for the purpose of calculating a farm's projected gross income. Then non-land production costs are calculated to determine the farm's projected net income. These costs are five-year averages of such inputs as seed, fertilizer, fuel oil, grease, repairs, drying fuel and electricity costs, fuel for trucking, labor charges, and machinery and equipment charges. Each of these costs is estimated from Ohio Crop Enterprise Budgets, published by The Ohio State University's Department of Agricultural, Environmental, and Development Economics.

In order to convert an estimate of net income from agricultural activities into taxable land value, the income stream estimated as described above must be capitalized using an appropriate interest rate. This is standard practice for applying the income approach to valuation to any income producing property. The capitalization rate for CAUV purposes is based on the following factors: (1) the average Farm Credit Service rate on a loan amounting to 60% of assets, payable over 15 years; and (2) the previous five years' average interest rate applied to the remaining 40% of assets in equity.

Wayne County

Wayne County is in northeast Ohio. Its easterly border is approximately 10 miles west of Canton and 10 miles southwest of Akron. The county is 555 square miles with a population of 114,520 in 2010; or 206.4 people per square mile, compared to a state average of 282.3 people per square mile. Wooster is the largest city in the county with a population of 26,119. In 2010 there were 45,847 housing units in the county, and a homeownership rate of 75.7 percent, compared with a homeownership rate of just 69.2 percent in the state⁷.

In calendar year 2010 the county had 6,680 agricultural parcels totaling 263,090 acres enrolled in the CAUV program. Under the current agricultural use value program these agricultural properties were valued at \$62,305,630. In comparison, if valued at their highest- and best-use, these agricultural properties would have an estimated market value of at \$343,300,520.⁸ Alternatively, in 2011 there were 6,727 properties enrolled in the CAUV program totaling

⁷ US Census Bureau, QuickFacts, Wayne County, Ohio.

⁸ Ohio Department of Taxation, Table PD-32 No. 56 (2011), Taxable Current Agricultural Use Value of Real Property, Taxable Value of Real Property Before CAUV, and Number of CAUV Acres and Parcels by County, Calendar Year 2010

262,366 acres with an estimated CAUV value of \$104,252,250 and an estimated market value of \$343,833,360. From 2010 to 2011 CAUV assessments increased 67.3 percent while the market value of properties enrolled in the CAUV program increased just 1.6 percent. This might reflect the rapid growth in agricultural incomes over the last couple of years and a reduction in the capitalization rate used to convert the estimated annual stream of agricultural income into the estimated CAUV for each property.

Data

The Wayne County Auditor's Office provided data for properties participating in the agricultural current use value assessment program in 2011. The data come from two sources. The first consists of the Current Agricultural-Use Valuation (CAUV) special report, which the county sends to the state each year and which lists the CAUV's for all qualifying properties. It contains information on 6,727 individual properties, and lists information for each individual property including a unique identifier for each parcel, the number of acres qualifying for current agricultural use value assessment, the estimated current agricultural use value of the land, the estimated taxable agricultural use value of the land (taxable value is 35 percent of estimated current agricultural use value), estimated market value of the land based on analysis of sales data, and the estimated taxable market value of the land (taxable value is 35 percent of estimated market value).

A review of the data identified several properties with anomalies in the data. For example, there were two properties with an estimated current agricultural use value equal to zero. In addition, there were four properties with an estimated market value of zero while they had estimates of the current agricultural use value greater than zero. Finally, there were 23 properties that had estimated current agricultural use values that were greater than estimated market values. These 29 properties were deleted from the data file leaving 6,698 properties for analysis.

The second source was the Wayne County property tax roll for all property types. The tax roll, which is far more comprehensive, lists specific property identifiers, the tax district and land use code, acreage, and the true and assessed value of buildings and land for all Wayne County properties. After eliminating properties classified as "Exempt" or "Tax Abatement" 56,503 properties were left for analysis.

In the case of current agricultural use value assessments, the first issue is to determine the extent to which such preferential treatment has reduced the property tax base. However, because a tax expenditure budget treats relief as an expenditure rather than tax policy, a number of other issues emerge. For example, what is the impact of the preferential assessments on local property tax revenues? What is the impact of the preferential assessments on uniformity and horizontal and vertical equity? These issues are explored below.

Impact of the CAUV Program on the Property Tax Base and Revenue

In order to estimate the impact of the CAUV assessments in Wayne County on the taxable property tax base the difference between the estimated taxable market value and the taxable

CAUV was calculated for each property.⁹ Summing the differences estimates the extent to which the estimated taxable market values are reduced because of the CAUV program. For the 6,698 properties analyzed, the taxable market value of the parcels examined was estimated to be \$343,833,360, while the estimated CAUV assessed value was estimated to be \$104,252,250. Thus, as a result of the preferential treatment of farm land under the CAUV program, the property tax base in Wayne County was reduced by \$239,581,110. In other words, valuing these 6,698 parcels at current agricultural use value instead of estimated market value reduces the taxable property tax base for these properties by 69.7 percent.

The estimated impact of the CAUV program on the property tax base of the properties examined falls in the middle of other estimates of the impact of use value assessments on the property tax base in other states. For example, Green and Weiss (2009, 65) estimate that use value assessments reduce the property tax base of agricultural properties in Wisconsin by 44 percent. Green and Weiss also refer to a study by Fisher and Gile that estimates that use value assessment reduce the agricultural property tax base in Kansas by 80 percent.¹⁰ Anderson and Griffing's (2000) analysis of two urban fringe counties in Nebraska offers another perspective. As would be expected the authors showed that the difference between market and use values declines with distance from a central business district. But they also calculated the tax expenditure—\$6.42 per acre in Lancaster County and \$59.75 per acre in Sarpy County—thus granting some insight on the significant cost of use-value assessments.

The 6,698 properties examined here are distributed across 73 tax districts in Wayne County. Each tax district applies a different tax rate to assessed values in the district to determine tax liabilities for individual properties. The tax rates include property tax rates for the county, township, municipality, school district, vocational school district and other entities. Total tax rates range from \$41.05 per \$1,000 assessed value in Chippewa Township to \$68.34 per \$1,000 assessed value in Wooster City–Wooster SD.

Each property in the data base has a unique identifier and the first two digits in that identifier indicate which tax district the property is located. Assigning the appropriate tax rate to each individual property and multiplying it by the taxable CAUV assessment for each property indicates that these 6,698 properties generated \$5,143,857 in property tax revenues in 2011. If these same tax rates were applied to the estimated taxable market value for each property, these 6,698 properties would have generated \$17,027,318 in property tax revenues. The CAUV program results in a reduction of property tax revenues of \$11,883,461, or 69.8 percent in 2011.

Impact of CAUV on Uniformity

Assessment uniformity implies the fair and equitable treatment of individual properties. Uniformity results when individual properties are assessed at the same percentage of market value. This ensures that property tax liabilities are distributed across individual properties, and types of properties, in relation to their share of the total value of the tax base. Systematic

⁹ Taxable value equals 35 percent of estimated CAUV and market value for each property.

¹⁰ Richard K. Green and Elaine Weiss, 2009, "Property Tax Exemptions, Revenues and Equity: Some Lessons from Wisconsin," in Nancy Augustine, Michael E. Bell, David Brunori and Joan M. Youngman, *Erosion of the Property Tax Base: Trends, Causes and Consequences*, Lincoln Institute of Land Policy: Cambridge, MA.

differences in assessed values relative to market values can lead to both horizontal and vertical inequities. (Eckert, 516) Such non-uniformities may be endorsed by taxpayers and voters as the cost of achieving other social objectives. The point here is that taxpayers, voters and public decision makers need to understand the extent and consequences of any non-uniformities and weigh those costs against the intended, and actual, social benefits achieved by the program.

Two measures are used to evaluate the uniformity of assessments. The coefficient of dispersion measures the horizontal uniformity of assessments. Low coefficients of dispersion tend to be associated with good assessment uniformity. (Eckert, 534) The price-related differential measures the vertical uniformity of assessments. A price-related differential greater than 1 indicates that high-valued properties are under-valued, while a price-related differential less than 1 indicates that low-valued properties are under-valued. (Eckert, 539–40)

These two metrics are used to analyze the impact of the CAUV program of preferential property tax treatment of farm land in Wayne County Ohio. In calculating these metrics, estimated market value is treated as the market value of each property and the CAUV estimates are treated as the assessed value reflecting the impact of preferential treatment of farm land. Table 2 presents the results from this analysis.

Table 2: Impact of CAUV on Uniformity of Assessments

| | Coefficient of Dispersion | Price-Related Differential |
|------|---------------------------|----------------------------|
| 2011 | 43.0% | 0.986 |

The coefficient of dispersion for CAUV assessments is 43.0 percent.¹¹ This is a relatively high coefficient indicating significant non-uniformity of CAUV assessments. This is not surprising since the market value of land near a metropolitan area will be higher relative to the agricultural value of land than the market value of land in rural areas. For example, 177 parcels have CAUV assessments that are 75 percent, or more, of market value. These would be parcels in rural areas where market value is close to CAUV assessments. Alternatively, 2,631 parcels have CAUV assessments that are less than 25 percent of market value. These would be parcels near urban areas where there is a greater difference between CAUV assessments and market value. The median (or middle) assessment ratio is 28.6 percent while the mean (or average) assessment ratio is 30.6 percent.

The price-related differential is 0.986, which is at the lower end of the acceptable range.¹² A low price-related differential suggests assessment progressivity where high valued properties are

¹¹ According to Eckert (540), for income producing properties the coefficient of dispersion should be 20.0 or less.

¹² According to Eckert (540), the price related differential should range between 0.98 and 1.03.

generally over assessed and low value properties are generally under assessed relative to market value.

Distributional Consequences of CAUV Preferential Assessments

There are a number of dimensions to explore when analyzing the distributional consequences of the CAUV program in Wayne County. For example, there could be a bias in the manner in which the program is administered benefiting either low or high value properties. The price-related differential discussed above indicates there is no such systematic bias in the way the program is currently administered.

Alternatively, there could be a systematic bias in the program because most of the reduction in property tax liabilities goes to properties in urban areas which have the greatest difference between market and current use values. In fact, the correlation coefficient between the absolute dollar reduction in tax liabilities resulting from the CAUV program and the estimated market value of each property is 0.966; the largest reductions in tax liabilities are associated with properties with the highest market value. That is how the program is designed.

The most important source of distributional consequences of the CAUV program is the result of an increase in tax rates required to maintain a certain level of revenue in the face of an eroding property tax base as a result of current use value assessments. To understand these distributional consequences across various land types, it is important to define two situations. Scenario 1 reflects the revenue generated under the current property tax system in Wayne County. It lists revenue and property tax liability by property type under current CAUV valuation and tax rates. Wayne County consists of 73 different taxing jurisdictions and each has a distinct effective tax rate for residential/agricultural property, and a second rate for all other property types. Applying the appropriate rate to the taxable value of each property determines that property's tax liability. After determining the property tax liability for all 56,503 properties, we calculated the total property tax liability for all properties under each property type. For example, agricultural property in Wayne County generated \$12.6 million in property tax revenue, which was 10.3 percent of all property tax revenue raised in the county.

Scenario 2 mirrors Scenario 1 except in estimating property tax revenue we used the estimated market value of each property rather than the CAUV value. The actual property tax rate used in Scenario 1 was applied to the estimated market value for each property. Under this scenario total property tax revenues increased to \$134.1 million, while agricultural properties generated \$24.2 million in property tax revenues, which was 18.1 percent of total property tax revenues.

Finally, Scenario 3 estimates property tax revenues the same way as Scenario 2, in terms of using market values as the tax base, however it differs from Scenario 2 by using what is referred to as the Equal Yield Rate (EYR), rather than the actual effective tax rate used in Scenarios 1 and 2. The EYR reflects the rate that would exist when total taxable value generates the same tax revenue as CAUV. It is calculated by dividing the tax revenues under the CAUV in Scenario 1

by the market value of land and buildings under Scenario 2. The chart¹³ below presents data for these three scenarios.

| Revenue & Liability by Property Type | | | | | | |
|--------------------------------------|---|--|---|--|--|--|
| | Scenario 1: Revenue with CAUV Value & Current Rates | Scenario 1: Share of Property Tax Liabilities by Land Use Type | Scenario 2: Revenue at Market Value & Current Rates | Scenario 2: Share of Property Tax Liabilities by Land Use Type | Scenario 3: Revenue at Market Value & Equalized Land Yield Rates | Scenario 3: Share of Property Tax Liabilities by Land Use Type |
| Ag | \$12,559,767.82 | 10.3% | \$24,214,144.98 | 18.1% | \$19,894,971.04 | 16.3% |
| Commercial | \$18,515,473.59 | 15.2% | \$18,555,074.17 | 13.8% | \$16,556,836.60 | 13.5% |
| Industrial | \$8,440,323.67 | 6.9% | \$8,514,626.89 | 6.3% | \$7,569,409.82 | 6.2% |
| Mineral | \$449,903.89 | 0.4% | \$449,903.89 | 0.3% | \$351,077.47 | 0.3% |
| Residential | \$77,731,917.77 | 63.6% | \$77,885,485.74 | 58.1% | \$74,062,762.22 | 60.6% |
| Utilities | \$4,503,469.58 | 3.7% | \$4,503,469.58 | 3.4% | \$3,765,795.56 | 3.1% |
| Grand Total | \$122,200,856.32 | 100.0% | \$134,122,705.24 | 100.0% | \$122,200,852.71 | 100.0% |

The chart illustrates that in comparison to an assessment based on market value (Scenario 2), that the use of CAUV (Scenario 1) greatly benefits agricultural property owners. Under Scenario 2 property owners for every non-agricultural property type are better off when agricultural property is assessed at its market value. Maintaining market value assessments but using the EYR rather than the current tax rate also exhibits a substantial increase in property tax liability over the current method (Scenario 1) for agricultural property owners. Comparing the distribution of property tax liabilities across property types in Scenario 3 with that in Scenario 1 shows a substantial increase in property taxes from agricultural properties and a significant increase in its share of total property taxes. The actual dollar amount of property taxes and the share of total property taxes is lower for all property land use types in Scenario 3 than their corresponding values and shares in Scenario 1. For example, the share of property taxes paid by commercial properties falls by 11.2 percent from Scenario 1 to 3, while the share of property taxes paid by residential properties falls by just 4.7 percent.

Conclusion

The case study described herein shows that the preferential assessment of agricultural land cost Wayne County, Ohio over \$11.8 million in foregone property tax revenues in 2011. The CAUV program undermines the uniformity of the property tax, thereby causing distortions in the allocation of property tax liabilities across both agricultural properties and all land use classes.

Since these foregone revenues are being considered as expenditures rather than tax policies, it is important to also consider the distributional consequences of the program. Using an equal yield analysis, the CAUV program shifted a large portion of the property tax liability to residential and commercial property owners. Relying on market-value assessments not only potentially

¹³ The difference in property tax revenue between Scenario 1 and Scenario 2 (\$11,921,849) differs very slightly from the estimated loss in revenue associated with CAUV as cited in the section *Impact of the CAUV Program on the Property Tax Base and Revenue* (\$11,883,461) because the data on all Wayne County properties includes the 29 properties that were deleted from the CAUV database.

increases revenue but, also, ensures greater proportionality in the distribution of taxes among property owners of all land types.

Property tax relief programs, like the current-use assessment program in Ohio, constrain the ability of state and local governments to raise revenue. As state and local governments face increasing pressure to balance the provision of public services with limited streams of revenue policymakers should consider the implications of property tax expenditures. The framework described above can be used to assess the costs and other consequences of preferential assessment programs across the United States

References

- Alden, R. F., & Shockro, M. J. (1969). Preferential assessment of agricultural lands—preservation or discrimination? *Appraisal Journal*, 37(4), 597. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=5358312&site=eds-live>
- Anderson, J. E. (in press). Agricultural Use-Value Property Tax Assessment: Estimation and Policy Issues. *Public Budgeting & Finance*
- Anderson, J. E. (2005). Taxes and fees as forms of land use regulation. *Journal of Real Estate Finance & Economics*, 31(4), 413–427. doi:10.1007/s11146-005-3291-3
- Anderson, J. E. (1993). Use-value property tax assessment: Effects on land development. *Land Economics*, 69(3), 263–269. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=9401101619&site=eds-live>
- Anderson, J. E., & Griffing, M. F. (2000). Use-value assessment tax expenditures in urban areas. *Journal of Urban Economics*, 48(3), 443–452. doi:10.1006/juec.2000.2175
- Atkinson, G. W. (1977). The effectiveness of differential assessment of agricultural and open space land. *American Journal of Economics and Sociology*, 36(2), pp. 197–204. Retrieved from <http://www.jstor.org.proxygw.wrlc.org/stable/3486171>
- Barlowe, R., Ahl, J. G., & Bachman, G. (1973). *Use-value assessment legislation in the united states*. No. 49. University of Wisconsin Press. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=5361929&site=eds-live>
- Blewett, R. A., & Lane, J. I. (1988). Development rights and the differential assessment of agricultural land: Fractional valuation of farmland is ineffective for preserving open space and subsidizes speculation. *American Journal of Economics and Sociology*, 47(2), pp. 195–205. Retrieved from <http://www.jstor.org.proxygw.wrlc.org/stable/3486417>
- Bowman, W., Cordes, J., & Metcalf, L. (2009). Preferential tax treatment of property used for social purposes: Fiscal impacts and public policy implications. In N. Y. Augustine, M. E. Bell, D. Brunori & J. M. Youngman (Eds.), *Erosion of the property tax base: Trends, causes, and consequences* (). Cambridge, MA: Lincoln Institute of Land Policy.
- Brooks, D. R. (1999). *Is there still a need for the special assessment program within oregon's current land-use system?* Portland, OR: Portland State University,.
- Carman, H. F., & Polson, J. G. (1971). Tax shifts occurring as a result of differential assessment of farmland: California 1968–69. *National Tax Journal*, 24(4), 449–457. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=4585069&site=ehost-live>
- Chicoine, D. L. (1981). Farmland values at the urban fringe: An analysis of sale prices. *Land Economics*, 57(3), 353. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=5359960&site=eds-live>
- Chicoine, D. L., & Hendricks, A. D. (1985). Evidence on farm use value assessment, tax shifts, and state school aid. *American Journal of Agricultural Economics*, 67(2), pp. 266–270. Retrieved from <http://www.jstor.org.proxygw.wrlc.org/stable/1240678>

- Clendenning, J. G., & Stier, J. C. (2002). Ecosystem management and preferential property taxes for forestland in the united states. *Forstwissenschaftliche Beitrage—ETH Zurich*, 7(27), 47–10.
- Coughlin, R. E., Berry, D., & Plaut, T. (1978). Differential assessment of real property as an incentive to open space preservation and farmland retention. *National Tax Journal*, 31(2), 165–179. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=9295745&site=ehost-live>
- Cushing, T. L. *A comparison of the relative reduction in land expectation value due to taxation of private forest land in the united states*. (Unpublished PhD Dissertation). University of Georgia, Athens, GA.
- Ellingson, W. (1975). Differential assessment and local government controls to preserve agricultural lands. *South Dakota Law Review*, 570, 548–574.
- England, R. W. (2012) Preferential Assessment of Rural Land: Reform Proposals. *State Tax Notes*, 63, 383.
- Fisher, Glenn W. and Crystal Gile, 2006. *Erosion of the Kansas property tax base*. Wichita: Kansas Public Finance Center, Hugo Wall School of Urban and Public Affairs, Wichita State University (December).
- Fortney, J., & Arano, K. G. (2010). *Property taxes and forests in west virginia: A historical review* Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=edswsc&AN=000286809600005&site=eds-live>
- Giertz, J. F., & Chicoine, D. L. (1984; 1984). Tax valuation of farm land: Non-neutrality with respect to inflation. *National Tax Journal (Pre-1986)*, 37(2), 253–253. Retrieved from <http://proxygw.wrlc.org/login?url=http://search.proquest.com.proxygw.wrlc.org/docview/207199753?accountid=11243>
- Green, Richard K. and Elaine Weiss, 2009, “Property Tax Exemptions, Revenues and Equity: Some Lessons from Wisconsin,” in Nancy Augustine, Michael E. Bell, David Brunori and Joan M. Youngman, *Erosion of the Property Tax Base: Trends, Causes and Consequences*, Lincoln Institute of Land Policy: Cambridge, MA.
- Hady, T. F., Sibold, A. G., & Economic, R. S. (1974). *State programs for the differential assessment of farm and open space land. agricultural economic report no. 256*. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED324160&site=eds-live>
- Hickman, C. A., & Crowther, K. D. (1991). *Economic impacts of current-use assessment of rural land in the east texas pineywoods region*. No. SO-261). New Orleans, LA: US Department of Agriculture, Forest Service, Souther Forest.
- Hyde, W. F., Boyd, R. G., & Daniels, B. L. (1987). The impacts of public interventions: An examination of the forestry sector. *Journal of Policy Analysis & Management*, 7(1), 40–61. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=her&AN=6445167&site=eds-live>

- Kline, J., & Wichelns, D. (1996). Public preferences regarding the goals of farmland preservation programs. *Land Economics*, 72(4), pp. 538–549. Retrieved from <http://www.jstor.org.proxygw.wrlc.org/stable/3146914>
- Lincoln Institute of Land Policy and George Washington Institute of Public Policy. Significant features of the property tax. Retrieved 10/10/2011 from <http://www.lincolninst.edu/subcenters/significant-features-property-tax/>
- Livanis, G., Moss, C. M., Breneman, V. E., & Nehring, R. F. (2006). Urban sprawl and farmland prices. *American Journal of Agricultural Economics*, 88(4), 915–929.
- Locken, G. S., Bills, N. S., & Boisvert, R. N. (1979). Estimating agricultural use values in new york state: Reply. *Land Economics*, 55(3), 408–410. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=5362517&site=ehost-live>
- Malme, J. (1993). *Preferential property tax treatment of land*. (Lincoln Institute Product Code: WP93JM1 Cambridge, MA: Lincoln Institute of Land Policy.
- Malone, C. J., & Ayesh, M. (1978–1979). Comprehensive land use control through differential assessment and supplemental regulation. *Washburn Law Journal*, 18, 432–473.
- Mecham, C. L. (2003). *Land trust activity within the context of the property tax assessment in georgia, U.S.A.* (Unpublished Master's). University of Georgia, Athens, Georgia.
- Meyer, N. (1995). *The real property tax and K–12 education*. (Information Analyses No. ED 386 338). US Department of Education.
- Miller, E. D. (1996). *The california land conservation (williamson) act: 1993 to 1995 status report*. Sacramento, CA: State of California,.
- Morris, A. C. (1998). Property tax treatment of farmland: Does tax relief delay land development? In H. Ladd (Ed.), *Local government tax and land use policies in the united states* (). Northampton, MA: Edward Elgar.
- Nelson, N., Fowler, L., & Dorfman, J. (2001). *Protecting farmland in developing communities: A case study of the tax implications of agricultural conservation easements*. Athens, Georgia: The University of Georgia, Institute of Ecology.
- Nickerson, C. J., & Lynch, L. (2001). The effect of farmland preservation programs on farmland prices. *American Journal of Agricultural Economics*, 83(2), pp. 341–351. Retrieved from <http://www.jstor.org.proxygw.wrlc.org/stable/1244677>
- Pan, J. (2005). *Evaluation of ten-year implementation of the conservation use valuation assessment program in georgia*. (Unpublished Master of Science). University of Georgia, Athens, Georgia.
- Plantinga, A. J., Lubowski, R. N., & Stavins, R. N. (2002). The effects of potential land development on agricultural land prices. *Journal of Urban Economics*, 52(3), 561–581. doi:10.1016/S0094-1190(02)00503-X
- Plantinga, A. J., & Miller, D. J. (2001). Agricultural land values and the value of rights to future land development. *Land Economics*, 77(1), 56. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=4201900&site=eds-live&scope=site>

- Polyakov, M., & Zhang, D. (2008). Property tax policy and land-use change. *Land Economics*, 84(3), 396–408. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=33247784&site=ehost-live>
- Stewart, P., & Libby, L. W. (1997). *Farmland tax policy: The case of DeKalb county, Illinois*. No. CAE/WP97-4). DeKalb, IL: American Farmland Trust.
- Veseth, M. (1979). Alternative policies for preserving farm and open areas: Analysis and evaluation of available options. *American Journal of Economics & Sociology*, 38(1), 97–109. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=4670946&site=eds-live>
- Vitaliano, D. F., & Hill, C. (1994). Agricultural districts and farmland prices. *The Journal of Real Estate Finance and Economics*, 8(3), 213–223. doi:10.1007/BF01096992
- Williams, E. D., Gottfried, R. R., Brockett, C. D., & Evans, J. P. (2004). An integrated analysis of the effectiveness of Tennessee’s forest greenbelt program. *Landscape and Urban Planning*, 69(2-3), 287–297. doi:10.1016/j.landurbplan.2003.08.008
- Wunderlich, G. (1997). Land taxes in agriculture: Preferential rate and assessment effects. *American Journal of Economics and Sociology*, 56(2), 215–228. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=edsjag&AN=10.2307.3487260&site=eds-live>; <http://www.jstor.org/stable/3487260>