Use Value Assessment of Rural Land in the United States

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INTRODUCTION AND BACKGROUND

Nearly all states across the United States permit and even require local assessors to value *some* parcels of undeveloped land far below their fair market values for the purpose of levying local property taxes. This practice, often called *use-value assessment* (UVA), is perfectly legal and represents a major policy shift in local taxation during the last fifty years or more. But, valuing rural land in this way may have important efficiency and equity effects deserving of careful consideration. The purpose of this paper is to provide a review and critique of UVA programs and to suggest reforms.

The next section of this paper presents a history of UVA programs and their design features. That is followed by a section reviewing UVA conceptual issues. Empirical evidence on UVA programs and their impacts is covered in the subsequent section. The paper concludes with a critical assessment of UVA programs and suggestions for their reform.

Use-value assessment deserves to be closely inspected and carefully analyzed because taxation of real property has always been and still remains a key pillar of our federal fiscal and political system. During 2011, for example, tax revenues of municipalities, counties and school districts equaled $578 billion. Of this total, $429 billion came from local property taxation. During recent times, property taxes have been the source of roughly a third of state and local government tax revenue in the United States (Barnett and Vidal 2013).

UVA programs have been adopted across the nation in part because of concerns about the loss of farms, ranches and forests resulting from long-term growth of metropolitan regions. During the quarter century after 1982, the developed areas of

Arizona, Florida and Georgia roughly doubled. Texas had already developed more than five million acres by 1982 but added more than two-thirds to that area by 2007. Even slowly growing states such as Illinois, Massachusetts and New York developed substantial amounts of rural land during the same period. From 1982 to 2007, the developed area of the entire United States grew from 3.76 percent of its total land area to 5.89 percent, an increase of more than two percentage points (NRCS 2007, Table 1).

This continuing urbanization of the American landscape has prompted state and local governments to adopt a number of public policies that aim to regulate the conversion of rural land to developed uses. These policies include agricultural zoning, development impact fees, urban growth boundaries, and conservation easements. In this paper, we explore the use of another policy in some detail - preferential assessment of rural land under the real property tax. This tax policy is often called *use value assessment* or *current use assessment*.

One can begin to grasp UVA's importance by inspecting Table 1, which shows the extent of UVA application in three states: California, New Hampshire, and Ohio. Over 61 percent of Ohio's total land area is enrolled in its Current Agricultural Use Value (CAUV) program, for example. Some of the nation's most valuable farmland can be found in California, where the owners of more than fifteen million acres presently enjoy reduced property taxes under the state's Williamson Act program. This tax policy has been in place in California since 1965. Use value assessment is even a major facet of property taxation in tiny New Hampshire, where nearly three million acres (most of it forested) has been enrolled in the state's Current Use program.

Tax preferences of this magnitude have major implications for the revenue – generating capacities of municipal governments and public school districts (Bowman, Cordes and Metcalf 2009). Consider Ohio as an example. In the Buckeye State, numerous owners in both urban and rural counties enjoy major reductions in their property tax bills because of the CAUV program. Looking at Table 2, we see that the differences between use-value assessments and market-value assessments are the greatest in the urban counties containing Cleveland (Cuyahoga County), Columbus (Franklin County) and Cincinnati (Hamilton County).

Table 1: Extent of Use Value Assessment Programs in Selected States

	Total land area (millions of acres)	Land in UVA program (millions of acres)	UVA land as percentage of total land area
California (2008)	101.0	15.69	15.5 %
New Hampshire (2010)	5.74	2.95	51.4
Ohio (2009)	26.21	16.13	61.5

Sources: CA Department of Conservation, *2010 Williamson Act Status Report*; NH Department of Revenue Administration, *2010 Current Use Report*; and Ohio Department of Taxation, *Taxable Current Agricultural Use Value (CAUV) of Real Property, Taxable Value of Real Property before CAUV, and Number of CAUV Acres and Parcels, by County, Calendar Year 2009*, Table PD-32.

In Franklin County, for example, valuing UVA parcels at their "highest and best use" would result in assessments averaging more than three thousand dollars per acre. But enrollment in the CAUV program reduces those assessments below market value by an average that is greater than 2,500 dollars per acre. This implies both a substantial loss of property tax revenue going to local governments and also financial pressure on those localities to raise the tax rates that they levy on assessed property values to pay for local public services.

Table 2: Ohio Current Agricultural Use Value Program, Selected Counties, 2009

	Number of parcels	Average parcel size (acres)	Average use value per acre ($)	Average highest & best use value per acre ($)
Cuyahoga	189	12.3	1,064	5,924
Franklin	1,700	42.7	472	3,007
Hamilton	1,255	22.7	655	4,355
Darke	7,488	46.1	233	1,295
Hardin	5,351	51.7	196	759
Seneca	6,321	49.5	202	983

Source: Ohio Department of Taxation, Table PD-32 (September 22, 2010).

Inspecting Table 2 once again, one notices that the reduction in assessed value per acre is significantly lower in the three largely rural counties of Darke, Hardin and Seneca. However, an assessment reduction on CAUV parcels of six hundred to one thousand dollars per acre still has a negative fiscal impact on local governments in counties with thousands of enrolled agricultural parcels.

Perhaps this tax preference for farmland could be justified if it actually worked to "save the family farmer," as was stated in many of the original policy discussions establishing this tax practice. However, one is struck by the small average size of CAUV parcels in urban and rural counties alike. Because the average farm size in Ohio is 185 acres, one suspects that many of these parcels are not commercially viable farms but rather are valuable pieces of developable real estate whose owners enjoy substantial property tax breaks because of the CAUV program (National Agricultural Statistics Service 2014).

Despite their stated purpose of preserving rural lands from urban development, it is possible that UVA programs have had several unintended and negative consequences. One result is erosion of the legal and constitutional principle of *uniformity of taxation*. Another is *shifting of the local tax burden* to other property owners, perhaps in a

regressive manner. According to the Texas Comptroller of Public Accounts, use-value appraisal of farm, ranch and forested lands reduces the property tax base in Texas by $ 2.7 billion, a whopping sum even in the Lone Star State. The resulting shift in property tax burden to other property owners costs low – and middle – income households hundreds of dollars annually (Combs 2013, Table 34). We will discuss this issue of tax incidence and other policy questions in later sections of this paper.

USE VALUE ASSESSMENT: HISTORY AND DESIGN FEATURES

The adoption of use-value assessment (UVA) programs in the United States was driven principally by a combination of two factors: rapid urbanization and rising land values relative to farm income. Additional factors related to tax assessment practices also contributed to UVA adoption. Berry and Plaut (1978, 155), for example, estimated that an annual average of 902 thousand acres in the U.S. had been converted from rural to urban uses between 1959 and 1969. More recently, Alig, Plantinga, Ahn and Kline (2003, 10) have estimated that the nation's developed area more than doubled between 1960 and 1997, from 25.5 to 65.5 million acres.

This expansion of metropolitan regions into the countryside helped to launch a political movement from the 1960s through the 1980s that favored preferential assessment of rural land. In his major study of use-value farmland assessment for the International Association of Assessing Officers, Gloudemans (1974, 10) argued that this movement was motivated by "two major concerns: (1) concern for the economic viability of the farmer, and (2) concern over land use and the environment."

The first concern was that farmers on the metropolitan fringe faced growing property tax burdens for a pair of reasons. One is that newly arriving households and businesses demanded higher municipal service levels. The other reason is that farmland prices and land value assessments escalated because of the growing development potential of rural parcels. In their study of seven counties in the metro Kansas City region during the early 1960s, Blase and Staub (1971) found a higher level and more rapid growth of property tax per acre in the more suburban and urban counties of the region. They also found that "the proportion of gross farm income absorbed by the property tax was approximately four times greater in the urban county than the average for the entire study area" (1971, 173). Hence, support for preferential assessment of rural land was sometimes framed as a measure to protect family farmers and ranchers from financial pressure and even ruin. The second concern mentioned by Gloudemans (1974, 12) was the fear that growth of metropolitan regions would destroy wetland and forest ecosystems, eliminate wildlife habitats and scenic vistas or otherwise degrade environmental values: "Environmentalists … contend that these remaining [rural] lands … will be swept away in the tide of urban sprawl unless afforded some protection."

During the sixties and seventies, dozens of state governments enacted use-value assessment programs for specific categories of rural land. This nationwide wave of state tax reform began in Maryland in 1957. That starting point can be explained, at least in part, by two empirical facts. One is that large swaths of Maryland farmland were converted to suburban uses immediately after World War II. From 1940 to 1960, the populations of Montgomery and Prince George's counties *quadrupled* whereas the population of Baltimore County more than *tripled* (U.S. Census Bureau 2011).

Associated with this rapid suburbanization of Washington D.C. and Baltimore City, there was a 330 percent increase in the ratio of farmland prices to net farm income in Maryland from 1950 to 1971 (Gloudemans 1974, Table 23). This pair of facts helps us to understand the 1957 action taken by the Maryland legislature that was intended to protect the state's remaining farmland from development.

The rapid spread of UVA programs to other states cannot be understood, however, simply by looking at state population growth and farm income data during that era. Brigham (1980) offers a fascinating historical sketch of how the local property tax had been administered in many states *before* 1957. He points out that local assessors frequently gave *de facto* tax preferences to farmers (and homeowners) despite state constitutional provisions requiring uniformity and equality of taxation. These assessment practices resulted in dramatic differences in assessment ratios among taxable properties within the same jurisdiction.

After World War II, the expansion of state aid programs required the use of numerical formulas to distribute state grants to counties, cities, towns and school districts. Property wealth per resident or pupil often played a major role in those state aid formulas. Thus, pressure mounted at the state level for uniform assessment practices within and among localities in order to ensure an equitable distribution of state grants. The subsequent elimination of *de facto* tax preferences at the local level of government resulted in higher property tax bills for many rural landowners and fueled efforts to gain *de jure* tax preferences for agricultural and forest properties. Hence, efforts to launch

use-value assessment programs were often a political reaction to recent trends in both real estate markets and also state and local intergovernmental relations.[1]

With the almost universal adoption of UVA by state governments since 1957, we think it is time to look at the similarities and differences among those programs in order to learn how UVA has been implemented and whether it is effective in reaching its policy objectives.

One important feature of UVA program design is how easy it is for rural landowners to file the paperwork to enroll their properties. Of the 18 state or county jurisdictions surveyed in Anderson and England (2014, appendix 2.2), nearly all require submission of an application form no longer than two pages in length. However, some states also require attachment of supporting documents such as federal tax returns, detailed property maps or forest management plans. New York stands out as a state requiring a fairly long application (five pages, to be exact) for use value assessment of agricultural land. This *simplicity of the application process* in most jurisdictions has certainly encouraged enrollment in UVA programs, especially by owners of smaller rural properties that qualify for inclusion. In those states that impose a development penalty when rural land no longer qualifies for UVA, a main purpose of the application form seems to be informing the owner about the financial consequences of future land development before he or she enrolls in the program.

Of greater importance than the length of the application form are the *eligibility criteria* that qualify some rural properties but not others for enrollment in UVA programs. A common eligibility requirement is that a parcel should meet or exceed a certain

[1] In Anderson and England (2014), we provide five detailed case studies of state adoption of UVA programs following the 1957 adoption by Maryland.

minimum acreage in order to qualify for the state's program. What is striking about these acreage minima is how small they are in most states. As Table 3 shows, parcels as small as three or five acres qualify for UVA in some states. We seriously doubt that parcels so small can be commercially viable sources of crops, livestock or timber. Montana appears to be exceptional in requiring a sizeable acreage in order to enroll a farm or ranch for preferential tax assessment.

Table 3: Use Value Assessment Acreage Minima, Selected States

Acres	Agricultural land	Timber land
3	Louisiana, Maryland	Louisiana
5	Idaho, Maine, Massachusetts, North Carolina, Rhode Island	Idaho, Maryland
7	New York	
10	Delaware, Kentucky, Minnesota, New Hampshire, Ohio, Pennsylvania	Delaware, Kentucky, Massachusetts, New Hampshire, Pennsylvania, West Virginia
15	Tennessee	Montana, Tennessee
20	Nevada, South Dakota, Washington	Minnesota, North Carolina
25	Vermont	
160	Montana	

Source: State statutes cited in Anderson and England (2014, appendix 2.3).

Another common eligibility requirement for agricultural UVA is that the owner needs to document or at least attest that the property has generated at least a minimum amount of gross income or sales revenues from agricultural activities during recent years. As Table 4 demonstrates, this commercial agriculture minimum is quite modest in most states. Hence, many owners of parcels that qualify for agricultural UVA are not full-time farmers who rely on farming for their livelihood. These owners are sometimes referred to as "hobby farmers" or "gentleman farmers" in popular parlance.

In some states, but not most, a parcel that previously qualified for UVA can lose its eligibility prior to an actual physical change in land use if there is evidence that the

property will or might be developed in the near future. In Arizona, an undeveloped property is no longer eligible for preferential assessment if there has been an application to rezone the parcel for urban use, recording of a subdivision plat, or recent installation of survey stakes or utility services. In Indiana, rezoning of an enrolled property or its subdivision disqualifies the land for continued use value assessment. In Nebraska, rural land that is now within the boundaries of any sanitary or improvement district or a city is ineligible unless subject to a conservation easement.

Table 4: Farm Income or Sales Requirement for UVA Enrollment, Selected States

Alaska	Owner or lessee derives at least 10 percent of annual gross income from farming.
Delaware	Gross sales of agricultural or forestry products of at least $1000 per year during the two preceding years.
Kauai County, Hawaii	Filing of IRS Schedule F from previous year documenting profit or loss from farming.
Maine	Gross farm income of at least $2000 per year during one of two preceding years.
Maryland	Average gross farm income of at least $2500 if under 20 acres.
Massachusetts	At least $500 of annual sales receipts from farming activity.
Montana	Over half of owner's Montana gross income derives from agriculture and minimum of $1500.
New Jersey	Gross annual sales of $1000 for 1st five acres plus average of $5 per acre for each acre over the 1st five.
New York	Annual gross farm sales of $10,000 or more during preceding two years.
North Carolina	Average gross farm income of at least $1000 during preceding three years.
Ohio	Average gross income of at least $2500.
Oregon	Gross income of at least $3000 if 30 or more acres. Smaller income amounts if smaller parcels of farmland.
Pennsylvania	At least $2000 of gross farm income during the 3 previous years.
Rhode Island	At least $2500 of gross farm income during one of last two years.
South Dakota	At least one third of total family gross income from farming.
Tennessee	Gross income from farm sales, farm rent or federal farm support payments averaging $1500 per year over 3-year period.
Texas	Agriculture as primary occupation of owner and primary source of income.

Source: Statutes cited in Anderson and England (2014, appendix 2.3).

What happens if the owner of a rural parcel enjoys lower property taxes for a number of years because of UVA enrollment but then develops the parcel for a residential, commercial, or industrial use? Since the property no longer qualifies for preferential assessment, its assessed value will increase quite substantially and the owner will owe

significantly higher property taxes on the parcel's land value in years to come. But will the owner face a development penalty after benefitting from years of reduced property taxes because of UVA enrollment?

As reported in Table 5, twenty-one states do not levy a development penalty on some or all parcels that have been enrolled in a UVA program when those parcels lose their eligibility for preferential assessment. In the remaining 28 states with UVA programs, landowners are subject to development penalties when their properties no longer qualify for preferential assessment.[2] These states have adopted some variant of either a *rollback tax* or *conveyance tax* to recapture some of the property taxes foregone during the years of program enrollment and to discourage parcel development. Rollback taxes typically recover several years of property tax savings, or property taxes deferred, because of use-value assessment. In some states, those deferred property taxes are subject to interest charges as well. Conveyance taxes apply a tax rate to the market value of the land parcel during the year when it no longer qualifies for preferential assessment. This tax rate varies inversely in some states with the number of years that a parcel has been enrolled in the UVA program. Massachusetts is unusual in that it has both rollback and also conveyance tax provisions in its UVA statutes.

[2] In Hawaii, the development penalty varies by county.

Table 5: States with No UVA Development Penalty

Arizona	Iowa	Nebraska
Arkansas	Kansas	New Mexico
Colorado (Agricultural land)	Kentucky	North Dakota
Florida	Louisiana	Oklahoma
Idaho (Agricultural land)	Mississippi	South Dakota
Illinois (Farm and forest land)	Missouri	West Virginia
Indiana (Agricultural land)	Montana	Wyoming

Source: Statutes cited in Anderson and England (2014, appendix 2.3).

Table 6 summarizes the penalty provisions in the states with rollback taxes. Note that states vary significantly in the number of years of deferred taxes that the owner of a disqualified parcel owes to the state or local government. The deterrent to land development is presumably stronger in those states that collect more years of deferred taxes if development occurs. Table 7 summarizes the penalty provisions in states with conveyance taxes. Note that these states are clustered along the East Coast or West Coast, not in the agricultural heartland of the nation.

Table 6: States with UVA Rollback Penalties

Alabama 3 years of deferred taxes	Massachusetts 5 years of deferred taxes plus 5 percent interest	South Carolina Deferred taxes for current and 5 preceding years
Alaska 7 years of deferred taxes plus 8 percent interest	Minnesota 3 years of deferred taxes	Tennessee 3 years of deferred taxes for agricultural and forest parcels; 5 years for open space parcels
Colorado 7 years of deferred taxes for conservation easement land	Nevada Deferred taxes for current and 6 previous years	Texas 3 years of deferred taxes plus interest for farmland; 5 years for open space land
Delaware 10 years of deferred taxes	New Jersey Deferred taxes for current and 2 previous years	Utah Maximum of 5 years of deferred taxes
Georgia Deferred taxes plus interest with years declining with period of enrollment	New York 5X taxes saved in most recent year plus 6 percent interest	Virginia 5 years of deferred taxes plus interest, with local option to modify penalty
Idaho Up to 10 years of deferred taxes for forestland	North Carolina Deferred taxes for current and 3 previous years plus interest	Washington 7 years of deferred taxes plus interest plus additional 20 percent of that total
Illinois 3 years of deferred taxes plus 5 percent interest for open space land	Ohio Deferred taxes for 3 previous years	Wisconsin Complicated rollback described in Appendix 2.3
Indiana Up to 10 years of deferred taxes plus 10 percent interest on forestland	Oregon Deferred taxes for 5 or 10 years	
Maine 5 years of deferred interest plus interest on agricultural land	Pennsylvania 7 years of deferred taxes plus 6 percent interest	

Source: Statutes cited in Anderson and England (2014, appendix 2.3).

Table 7: States with UVA Conveyance Penalties

California 12.5 percent of market value of land parcel, with local option for higher percentage	New Hampshire 10 percent of market value of land parcel
Connecticut 10 percent of market value of land parcel within one year of classification, with tax rate falling to zero after ten years	Rhode Island 10 percent of market value of land parcel if 6 or fewer years of classification with tax rate falling to zero after 15 years
Maryland Tax rate of 3 to 5 percent of sales price for agricultural land, with rate based on parcel size and condition	Vermont 10 percent of market value if classification for more than 10 years; 20 percent if 10 or fewer years

Source: Statutes cited in Anderson and England (2014, appendix 2.3).

USE VALUE ASSESSMENT: CONCEPTUAL ISSUES

How land will be used at any given location in an urban area is determined by the rents that may be earned under competing potential land uses. Bid-rent functions illustrate the amount that users of land would be willing to bid for land at each location. The commercial bid-rent function is the steepest since location matters more critically for commercial uses than for residential or agricultural uses. Bid-rent functions are flatter for the residential and agricultural land uses since location is not so important for those uses in comparison to commercial use. At any given distance from the center of the city, the highest bid-rent curve determines the use for which land is employed.

If the bid-rent curve for any of the land uses were to shift, perhaps due to a change in the price of the product or service produced in that land use, there will be changes in land use. A reduction in the effective property tax rate for agricultural property as a result of use-value assessment causes the bid-rent curve for agricultural land use to shift upward. That shift can theoretically cause land use at the urban periphery to be retained in agricultural use. In a growing urban area the residential bid-rent curve is shifting upward over time, which by itself would cause land use to change from agriculture to

residential use. Use-value assessment, causing an upward shift in the agricultural bid-rent curve, may have the ability to counteract the urbanization pressure and result in the retention of agricultural land uses, at least temporarily.

Land value fundamentals have been described by Capozza and Helsley (1989) as consisting of four components: (1) agricultural land value, (2) the value of expected future rent increases, (3) the cost of conversion to developed use, and (4) the value of accessibility. The total value of land at any given distance from the center of a metropolitan region is the sum of these four components. As distance increases, the value of accessibility declines. The urban land value gradient measures the rate at which land value falls with distance and reflects this fact. Land users who value proximity to the central business district (CBD) are willing to pay a high price for land at closer locations. Farther from the CBD the value of accessibility diminishes.

Urban land has also been developed with water and sewer lines, street lighting, and other features that distinguish it from undeveloped land. The cost of development conversion is the second component of land value. That cost is invariant with respect to distance and is constant out to the metro region fringe and zero thereafter. The third component of urban land value is the value of expected future land rent increases. Landowners expect that urban growth in the future will increase the value of their land within the urbanized zone of the city. The stronger those expectations are, the larger this component of urban land value will be. Of course, those expectations may or may not be fulfilled. The fourth and final component of urban land value is the agricultural land value of a parcel. Even if it is not developed or used a more intensive way, urban land has value in that it is capable of producing agricultural crops or hosting other rural uses.

Understanding these components of land value provides insight into how to think about use-value assessment of agricultural land. At very distant locations from the city, or in very rural areas, there may be no substantial difference between the market value of land and its agricultural use value. Taxing land on the basis of use value rather than market value will therefore have virtually no impact on tax liability. Hence, use-value assessment is unnecessary in this geographical context.

Near the urban fringe, however, there may be a very substantial difference between market value and agricultural use value. At these locations, the large difference in value means that use-value assessment will reduce the effective tax rate substantially.

If we isolate the particular components of land value related to undeveloped agricultural land, we have components (1) and (2) listed above. That is, agricultural use value depends upon the pure agricultural value of land and the expected future rent increases that may be relevant, depending on location. The second component is relevant near the urban border and decays with distance from the city.

In this case, the agricultural land price is simply the sum of the capitalized values of the agricultural rent stream and the expected value of future rent changes. This view of agricultural land value recognizes that the land is valuable both for its ability to generate a stream of net rental income and also for the possibility that future growth will increase the rent earning ability of the land.

If we take a more narrow view of the agricultural land value, we ignore the expected future rent increases due to growth and designate the agricultural land value as only the first component—the capitalized net agricultural rent. In that case, land value

can be written as the familiar perpetuity formula where the agricultural land price is the annual net income $\tilde{A}$ divided by the discount rate *r*.

$$P^a(t) = \frac{\tilde{A}}{r}. \quad (1)$$

In the presence of a property tax system, the familiar perpetuity formula must also include the effective property tax rate (τ) to account for the capitalization of the tax into the land price:

$$P^a(t) = \frac{\tilde{A}}{(r+\tau)}. \quad (2)$$

The first number required to estimate agricultural land price is an estimate of the net income stream generated by agricultural land. Most states require the use of some form of equation (2) to estimate use value, so we need to begin with a consideration of how to estimate the numerator of that equation. The simplest version of equation (2) is a simple perpetuity, assuming a constant amount of net income is generated each year, forever. In that case we need an estimate of the representative annual net income generated by the land. Net income is gross income generated via agricultural production minus the cost of inputs used in that production. This measure of net income should be a broad measure, including all of the sources of net income that are attributable to the agricultural or rural use of the land and other real property. A narrow measure of net income, such as that which might be reported on IRS Form 1040 Schedule F, has the effect of understating the use value of the property.

States often specify assessment methods that use estimates of agricultural productivity for various commonly planted crops as the starting point to estimate gross revenue. For example, in Iowa land parcels are rated by the corn suitability index, reflecting the major crop produced in the state. With an assumed productivity per acre of

land (perhaps adjusted for soil quality, topography, and other conditions) and commodity price data an estimate of total revenue can be computed. Assumed costs of production can then be netted out to obtain an estimate of net income per acre of land. Rather than use a single year's data as representative, however, many states require that a moving average of several years of income and cost data be used to estimate a representative net income in equation (2). Several detailed examples of the way that states estimate net income are included in Anderson and England (2014, chapter 4).

Because rental data are often readily available for agricultural land in some states, assessors sometimes begin their estimation of net income by using the annual rent paid for use of the land. While that number may be more readily available than other income data, it may not be appropriately representative. The assessor must assess all agricultural land parcels, whether rented to a tenant farmer or farmed by the owner. This raises the difficulty that rented parcels may systematically differ in some way from non-rented parcels that are used in agricultural production. It may be that landowners are reluctant to rent out prime agricultural land to tenant operators whose land stewardship practices may differ from the owner's, resulting in only inferior quality land being rented. Or, it may be that rented land is more likely to be non-irrigated and therefore less productive. Despite this potential difficulty, assessors often use rental incomes as their starting point for all parcels. Gross rents are then adjusted by deducting estimates of the cost of inputs.

Another complication in using rental income is that the very presence of a preferential method of taxation has an economic impact on the land use. Keene et al. (1976, 35) explain the issue this way,

> …in many areas…rental values are distorted by the very existence of differential assessment. Investors and developers are willing to rent out land

> to a nearby farmer for little more than the real property taxes attributable to the land, so as to qualify it as agricultural land in order to obtain the benefits of differential assessment. Observed rents in such situations may bear little relationship to the economic surplus attributable to the land in agricultural use.

The problem is that land rents may systematically differ in areas where use value assessment is permitted. This difficulty in estimation is the econometric issue of endogeneity. While we do not pursue the issue here in detail, it should be acknowledged. Future research is needed to develop proper statistical methods to correct for this conceptual difficulty.

Application of equation (2) to estimate use value requires the choice of an appropriate discount rate to use in the denominator. Ultimately, the discount rate should reflect the opportunity cost of capital. While that sounds like an easy task, it is not. Analysts decompose the discount rate into five components: a riskless rate (r*), an inflation premium (*IP*), a default risk premium (*DRP*), a liquidity premium (*LP*), and a maturity risk premium (*MRP*).

$$r = r^* + IP + DRP + LP + MRP \qquad (3)$$

Anderson (2012) discusses which of these factors should be included in the discount rate and used to estimate use value. He indicates that if the income stream is nominal (measured in current dollars) and covers several years, then the appropriate discount rate should include both the risk-free rate and the expected rate of inflation over the same period (an inflation premium). Of course, the interest rate chosen should also match the term structure with the time period used for the income measure in the numerator of equation (2). A *DFP* term is generally not needed because the interest rate chosen as the starting point in (3) already incorporates default risk. An *LP* term and/or an *MRP* term

may be appropriate to include in the discount rate as well, depending on the base rate chosen. Proper choice of the discount rate is critical to accurate use-value assessment. If an artificially high discount rate is chosen, the use-value estimate will be biased downward. A review of commonly used discount rate choice methods in Anderson (2012) indicates that state estimates often suffer from this bias.

One of the motivating factors for implementing UVA is to delay conversion to developed uses, thereby preserving open space and prime agricultural land temporarily. Whether and to what extent such delay may occur has been the subject of a number of studies. Skouras (1978) and Anderson (1986) have explored the theoretical possibilities. A well know result in public finance is that if the property tax is unrelated to current land use, the tax has no effect on the timing of development or its capital intensity and is therefore said to be neutral (Tideman, 1982). If, however, the property tax *is* related to current land use as a result of assessment practices biased in favor of current use, it may well be non-neutral in its effects.

Anderson (1993*b*) provides analysis of the potential impacts of UVA on land use, land value, timing and capital intensity of development. He shows that under certain circumstances there can be both impacts on the timing of development, with UVA delaying development, and impacts on the capital intensity of land development. England and Mohr (2006) show that the capacity of UVA to delay land development depends upon the presence of a development penalty and its specific design.

Use-value assessment reduces tax liability for owners of eligible land parcels and thereby thereby creates a tax expenditure. In effect, state and local governments are spending money on preserving open space or prime agricultural land, general assistance

to farmland owners, or whatever the stated objective of the UVA program may be. The size of that tax expenditure can be substantial in areas where the difference between market value and use value is large. The largest tax expenditures occur near the periphery of urban areas.

Whether the reduced tax burden is sufficient to prevent farmland from being developed is questionable, however. The value of the tax savings due to UVA may well be swamped by the potential gain from selling rural land on the metropolitan fringe to a developer. For a given level of public expenditure by the local government units relying on the property tax (school district, city, county, etc.) the preferential tax treatment for UVA land causes property tax rates to be higher for all other property owners in the jurisdiction. Hence, UVA causes a tax shift from agricultural landowners to residential, commercial and industrial landowners. Therein lies a substantial social cost of UVA programs.

Because UVA reduces the tax liability on a parcel of land, while the services provided by the local government are presumed to remain constant, the lower tax liability is capitalized into a higher land value. In terms of equation (2), a lower effective tax rate in the denominator increases the value of the land. At the point when UVA legislation is passed and this preferential tax method goes into effect, the value of land jumps up by the capitalized value of the future stream of reduced taxes. That confers a wealth increase to the landowner at the time of UVA adoption. Subsequent sales of the land occur with knowledge of the UVA tax regime and anticipation (appropriate or not) of the continuation of the UVA regime. Hence, subsequent buyers are unaffected. UVA has no further impact on land values after the first sale subsequent to UVA adoption.

Any change in a UVA program to either expand or scale back the program will confer windfall gains or losses to current landowners, making such changes politically difficult. Proposals to scale back a UVA program will be met with resistance by current landowners who would suffer capital losses. On the other hand, current landowners in areas where policy makers are contemplating the adoption or expansion of a UVA program will find support from current landowners who would benefit from a windfall gain in land value.

Anderson (1993*a*) modeled the capitalization effects of preferential tax treatment of agricultural land (via a circuit breaker) and identified the factors determining the size of the initial effect. He found that for a given farm income stream and a given potential developed income stream the capitalization effect is larger the (1) greater the effective property tax rate, (2) lower the discount rate, and (3) more generous the preferential tax mechanism (circuit breaker income threshold).

USE VALUE ASSESSMENT: EMPIRICAL EVIDENCE

The empirical literature on UVA is not extensive, but we do have some evidence about how this tax policy has worked in practice. Anderson and Griffing (2000*b*) found that the tax expenditure associated with use-value assessment is quite substantial in the metro areas of Lincoln and Omaha, Nebraska. Their estimates indicate that the tax expenditure for land parcels given UVA tax treatment is approximately 36% of total revenue that would have otherwise been collected on those parcels in Lancaster County, Nebraska, and 75% of in Sarpy County, Nebraska. Anderson and Griffing (2000*a*, 2000*b*) also estimated the difference between market value and use value for agricultural land

surrounding the two largest urban areas in Nebraska. They found that the difference between market value and use value declines with distance from the center of Lincoln for a sample of land parcels in Lancaster County and from the center of Omaha for a sample of parcels in the southwesterly direction from Omaha in Sarpy County. Table 8 details those empirical findings.

Table 8: Market and Use Values for Land Parcels around Lincoln and Omaha, Nebraska

Lincoln, Lancaster County		Omaha, Sarpy County	
Distance (miles)	Difference between market value and use value ($/acre)	Distance (miles)	Difference between market value and use value ($/acre)
3	988	6	6,386
10	444	10	4,343
20	141	20	1,657
24	89	25	1,024
Mean ratio of use value to market value	0.639	Mean ratio of use value to market value	0.2477
Mean distance (miles)	13.04	Mean distance (miles)	16.47
Mean parcel size (acres)	86.37	Mean parcel size (acres)	72.05
Gradient of difference between market value and use value	0.115	Gradient of difference between market value and use value	0.093

Source: Anderson and Griffing (2000*a*, 2000*b*).

Anderson and England (2014, Table 4.1) documents the diversity of capitalization rates used by state agencies to convert agricultural net income estimates into agricultural use values. In some cases, these capitalization rates are completely arbitrary and not grounded in theory and current economic conditions.

In perhaps the only empirical study of use-value assessment of national scope, Morris (1998) uses interstate differences in the year that preferential assessment was introduced to measure its cumulative impact on the availability of agricultural land in

nearly 3000 counties across the United States.[3] From 1959 through 1987, the mean percentage of a county's land in farming fell from 63.9 percent to 52.5 percent. The author's empirical question is whether earlier state adopters of preferential assessment had a substantially higher percentage of farmland in their counties at the end of the study period.

Morris correlated the percentage of farmland in a county during a particular year with a series of dummy variables measuring the number of years since adoption of preferential assessment plus county and year fixed effects. The results suggest that after twenty years of use-value assessment, a state's counties would tend to have ten percentage points more land in farming associated with this tax policy. If one distinguishes between counties with rollback penalties and those with no development penalties, one finds that counties in states with rollback penalties had a significantly *greater* loss of farmland than those with penalty-free preferential assessment. Morris (1998, 151) interprets these results to mean that states adopting deferred tax policies were the ones more prone to lose farmland in the first place.

In an effort to correct for this statistical endogeneity problem, Morris augments her original regression equation with control variables for population density, property tax per capita, value of farm sales per acre, and value of farmland and buildings per acre. The augmented regression implies that "preferential assessment of farmland can indeed delay the conversion of farmland to other uses. The policy produced a gradual but significant difference in the loss of farmland that after a 20-year period amounted to about 10 percent more of the land in a county being retained in farming … The results

[3] Forty-seven states introduced use-value assessment between 1957 and 1986, with a peak period of adoption during the late sixties and early seventies (Morris 1998, Figure 7.1).

also … suggest that the policy may be more effective when property tax burdens are higher" (p. 156).

Polyakov and Zhang (2008) offer a study of use-value assessment that is statistically rigorous and rich in empirical detail. After assembling a panel data set describing land uses on more than 13 thousand private parcels in Louisiana during four years from 1982 through 1997, they estimate the Markov transition probabilities for these parcels. That is, they observe transitions between agricultural, forestry and developed uses during various years and try to explain the likelihood of changes in land use. Their hypothesis is that a higher pre-tax return per acre or a lower property tax per acre associated with a specific use increases the probability that any parcel will be retained in or shifted to that use. The authors use returns and taxes at the parish level to approximate actual returns and taxes at the parcel level of observation.

Their main conclusion is that "the probabilities of land-use transition or retention are relatively inelastic with respect to property taxes" (p. 405). More specifically, the authors find that the elasticity of the transition probability from agricultural to developed use with respect to the property tax per acre in agricultural use equals 0.0319. The elasticity of the transition probability from forestry to developed use with respect to the property tax per acre of forestland equals 0.0184.

These small effects do not mean, however, that Louisiana's current-use assessment program has been inconsequential. The authors simulate complete repeal of the program in 1992, an action that would have doubled the property tax per acre of forestland and tripled the property tax per acre of agricultural land. Their simulation

suggests that Louisiana would have lost an additional 162 thousand acres of farmland by 1997 if repeal had taken place.

Dunford and Marousek (1981) study the impact of the 1970 passage of the Open Space Tax Act (OSTA) in Washington State on the distribution of the property tax burden in Spokane County. They employ an algebraic model of the impact of UVA on the aggregate tax base and on the property tax rate hike required to hold total revenue constant.[4] According to the authors, relatively large increases in the taxes on unenrolled properties should be expected in localities with a small total tax base where a large portion of the total tax base is eligible for and enrolled in the UVA program and where enrolled land receives a large percentage reduction in assessed value.

Eight years after enactment of the OSTA program, roughly 444,000 acres in Spokane County had been enrolled, forty percent of the county's total land area. The authors calculate that the revenue-neutral increase in property taxes paid by nonparticipating properties to offset the tax cuts enjoyed by owners of enrolled parcels would equal 1.3 percent. Hidden within this countywide average, however, are huge differences among communities. Although the tax shift to nonparticipating properties would be less than 2 percent in many localities, it would range from 0.6 to 21.9 percent. The larger tax shifts would occur in mostly rural communities with a high proportion of the local tax base eligible for OSTA enrollment.

In the most comprehensive effort to measure the tax expenditure associated with UVA programs across the U.S., Heimlich and Anderson (2001) apply a state's average property tax rate to the difference between the market value of the state's rural land and

[4] Their algebraic formulas do not account for the possibility that the tax savings from preferential assessment could be capitalized into land prices so that purchasers of land already enrolled in the OSTA program might not gain from the program.

the use value of that land. They then sum these results and conclude that the national tax expenditure on state UVA programs in 1995 equaled $1.07 billion, with $218 million in California alone. Although these findings are impressive, they should be accepted with caution because the authors include Michigan (not a UVA state) in their total and because their estimate appears to be based on the value of all rural land in a state, not just rural parcels actually enrolled in its UVA program.

USE VALUE ASSESSMENT: CRITICISMS AND REFORM RECOMMENDATIONS

In this final section, we detail the criticisms that some elected officials, journalists and economists have lodged against the UVA approach to land conservation since its inception. We close our paper by proposing several policy reforms that could improve the effectiveness and fairness of UVA programs.

A persistent problem with UVA programs has been that some owners enroll their rural parcels and enjoy the tax benefits of doing so even though they fully intend to develop their acreages in the near future. This lack of a *long-term commitment* to rural uses of a land parcel can be detected in a number of ways. The owner, for example, may have earned negligible revenues and net income from selling agricultural commodities or forest products during recent years. The owner might also have requested a change in zoning that would permit commercial, industrial or residential uses of his or her parcel or filed subdivision plans with local planning officials. Even if site preparation and construction have not yet begun on a "farm" or other rural parcel, either the absence of significant income from its undeveloped use or actions taken to prepare for physical development of the parcel should raise serious concerns about the intentions of the owner.

New Jersey's legislature and governor have attempted to mitigate this problem of "fake farmers" with the enactment of Senate Bill 589 in April 2013. That legislation raised the threshold for UVA eligibility from $500 to $1000 of agricultural or horticultural annual gross sales. Although a threshold of $1000 is probably still too low to prevent UVA eligibility of some "fake farmers," this recent policy change in the Garden State is a move in the right direction**.** The new law also requires the State Farmland Evaluation Committee to review that minimum gross sales standard every three years. Frequent review of a state's minimum sales or income threshold for UVA eligibility would become especially important if the inflation rate in the U.S. were to increase from its low level of recent years.

Another way to eliminate "fake farmers" from the UVA eligibility rolls is to look for evidence that the landowner is preparing to develop his property in the near future. In Arizona, for example, state law directs local assessors to disqualify rural parcels if any of the following conditions exist:

- There is a pending application for rezoning that permits non-agricultural uses.
- A subdivision plat has been recorded, especially if the land is divided into lots of one acre or less.
- There has been recent installation of survey stakes or roads suggesting nonagricultural development.
- Utility services not required for agricultural use are in place.

This approach to verifying UVA eligibility is probably more costly from a local administrative point of view than simply inspecting the owner's federal tax return. However, detecting these recent actions by a landowner could be a way to disqualify rural properties that are about to be developed.

Still another reason to suspect that some parcels enrolled in UVA programs are ineligible for preferential assessment is that enrollment in some states relies on *self-reporting* of eligibility by property owners. The absence of supporting documentation filed by applicants or auditing by local officials suggests that some UVA parcels are, in fact, ineligible for tax preferences under current statutes and administrative regulations.

Another reason one might worry that some land parcels already enrolled in a UVA program should not receive preferential assessment is that the minimum acreage requirements in most states are quite low. As noted in Table 3, agricultural parcels as small as three acres are eligible in Louisiana and Maryland. Farm properties as small as five acres are eligible in Idaho, Maine, Massachusetts, North Carolina and Rhode Island. In an era when many commercial farms occupy hundreds or even thousands of acres, some might find it hard to believe that properties this small are really "farms." However, with the growth of organic farming and community sustainable agriculture in recent years, small farms using labor-intensive methods have begun to reappear alongside large-acreage farms that rely heavily on machinery and chemical inputs. Hence, we do not favor increases in minimum farm size as a requirement for UVA eligibility. To do so could impose a competitive disadvantage on a new generation of "small farmers."

Another criticism of UVA programs is that many states have failed to design their programs in a way that actually encourages owners of eligible rural parcels to postpone conversion of their land to urban uses. With the exception of a few states like California, private landowners are free to develop their properties at any time if they are willing to make higher property tax payments when their land value assessments increase sharply. Owners who have enrolled their undeveloped land in a UVA program will actually delay

development only if they face a properly designed *development penalty* when their land no longer qualifies for use value assessment (England and Mohr 2006). In the absence of a development penalty, most landowners will simply pocket the tax savings from UVA enrollment and develop their land just as soon as they would have done if UVA did not exist at all.

If a development penalty is imposed when a rural parcel no longer qualifies for UVA, that penalty will have a weak effect on the timing of development if it consists of just a few years of tax savings from past UVA enrollment. A landowner is likely to keep his property in a UVA program for a decade or more only if there is a *heavy* development penalty during the early years of UVA enrollment and that penalty becomes *smaller* during later years. A penalty with these design features is more likely to induce a landowner to wait a substantial number of years before giving in to development pressures. Unfortunately, very few states have well designed development penalties that reward landowners for postponing land use change for a substantial number of years.

Land taxation is a very efficient form of taxation, generating little or no distortion in the land market and the broader economy. See Dye and England (2009) on the efficiency aspects of the land value tax, in particular. Hence, state and local governments relying on the property tax in primarily agricultural or rural areas should be reluctant to move away from property taxation that includes valuation of land based on market values. Compared to other forms of taxation (income, sales, excises, etc.), land taxation is preferable on efficiency grounds. Hence, state and local governments should consider carefully calls to reduce property taxes on land in favor of taxing other forms of economic activity.

UVA programs may be used to shift property tax burdens from agricultural and rural landowners to residential, commercial, and industrial landowners. If the tax burden is shifted to residential property owners, however, especially in a housing market that includes a large number of relatively low-income homeowners, the incidence of UVA will be regressive.

If state or local governments wish to address equity concerns, property tax relief measures other than UVA should be considered. Classification of the property tax system is one option, with a whole class of property given a preferential tax rate. This form of tax relief is a blunt policy instrument, however, because it provides tax relief to the entire class of property. A property tax circuit breaker can be considered as an alternative, with property tax relief provided to property owners whose property tax is high relative to income. Bowman, Kenyon, Langley and Paquin (2009) address the use of circuit-breaker mechanisms to provide property tax relief.

In light of these and other criticisms, we believe that reform of UVA programs should be on the political agendas of governors and state legislatures. Our suggested reforms range from relatively modest ones to a proposal for a major restructuring of UVA programs across the United States. First, each property owner should be required to file an annual application for renewal of UVA eligibility. As part of this renewal application, the owner should provide documentary evidence that the property has generated a substantial amount of revenue during the previous year from sale of agricultural, horticultural or forest products. Because legitimate farms and other rural enterprises lose money during some years, a minimum revenue test for continued eligibility is preferable to a minimum net income criterion.

The application form should include a checklist of conditions that would reveal intent of the owner to develop his or her property in the near future. This list would include existing zoning for an urban use, a pending application to rezone the parcel for an urban use, recording of a subdivision plan, or installation of streets or utilities not required for rural use. The presence of any of these conditions should disqualify the land parcel for UVA eligibility. Failure to declare any of these conditions on the application form should result in a serious fine levied on the owner. These fines and application fees should fund administrative review of UVA applications and random on-site inspections of enrolled parcels to verify their eligibility.

Second, it must be recognized that a UVA program without any development penalty is bad public policy. Such a program confers property tax breaks on (often wealthy) rural landowners but does nothing to deter development of their properties. Some of those states that did incorporate development penalties in their original statutes adopted extremely weak provisions and those need to be amended.

We recommend that every state enact a development penalty with a strong deterrent effect. In those states with a rollback penalty, the owners of properties that no longer qualify for UVA should be required to pay the tax savings during all years of enrollment (plus a commercial rate of interest on those savings), up to a maximum of 12 years. In those states that impose a land use change tax on the market value of the property when it is developed, it seems reasonable to levy a tax rate of 20 percent during the first decade of enrollment and 10 percent thereafter.

Third, appropriate application of UVA requires accurate estimation of property value in its current use rather than its highest and best use. The measurement of income

must reflect current and expected net income, that is, gross income net of the cost of production. To do this, a time frame must be chosen over which to analyze gross income, production cost, and the opportunity cost of capital. Conceptually, by using a moving average over time long-term measures of these entities can be used to more accurately estimate use value. Due to annual fluctuations in commodity prices, input prices, and interest rates a longer time frame is appropriate.

Whatever time frame is chosen, it is essential that moving averages all three measures (commodity prices, input prices, and interest rates) be consistent in two ways. First, the time frames must match. If a five-year moving average is used for commodity prices, then the same five-year averaging process should be used for estimates of input prices and interest rates. Second, all three measures must be consistent in their treatment of inflation. If nominal measures of gross income and input costs are used in the numerator, which include the effects of inflation, then a nominal measure of the discount rate must be used in the denominator. Inflation treatments must be consistent across all measures used in the UVA income approach. Consistency in measurement of both net income and the discount rate is essential for accurate UVA application.

The choice of a discount rate is both very important and difficult as must accurately reflect the opportunity cost of capital. If the income stream is measured in nominal terms, the discount rate should include a risk-free rate and an expected rate of inflation that covers the same time frame. States should not constrain the choice of the discount rate by placing a minimum or maximum value in statute. The discount rate must reflect the current and anticipated opportunity cost of capital in capital markets which are not static or constrained. The discount rate must also include a measure of the effective

property tax rate that applies to rural and agricultural property. Care should be taken to assure that the tax rate is an effective tax rate, not a nominal tax rate.

Finally, although a fundamental restructuring of UVA programs might be difficult to achieve politically, we believe that citizens and state officials should consider adopting a more targeted approach to preserving rural lands from urban development. This approach would require the applicant to demonstrate that preferential assessment of his or her rural parcel would result in the production of a significant amount of ecosystem services benefitting society as a whole. [5] Undeveloped land would no longer be eligible *per* se for enrollment in a UVA program. Designing the eligibility criteria to implement this new approach would require the participation of a wide range of experts including hydrologists, soil scientists, wildlife and forestry managers, climate scientists and resource economists.

In the final analysis, we need to strive for the proper balance between urban and rural uses of our land. Much of our rural landscape ought to be preserved because of its high ecological value. Other portions of our landscape, however, need to be available for construction of affordable housing, commercial properties and even industrial facilities. For those rural parcels that await development (and appropriately so), we see no reason to provide their owners with property tax breaks.

[5] For a more detailed discussion of ecosystem services and their relevance to UVA programs, see Anderson and England (2014, chapter 5).

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