Preferential Assessment of Rural Land in the United States:

A Literature Review and Reform Proposals

Richard W. England

Lincoln Institute of Land Policy Working Paper

Lincoln Institute Product Code: WP11RE1

Abstract

This paper summarizes and evaluates the U.S. experience with *use-value* or *current-use* assessment of undeveloped land for tax purposes. In the sections that follow, I will survey the reasons that have been given for proposing preferential assessment of rural land in the first place. Then I will sketch several histories of its adoption by state governments. These legislative histories will then be followed by a description of interstate differences in the specific features of use-value assessment programs.

After describing the adoption and implementation of preferential assessment programs, I will offer a lengthy account of theoretical analyses of use-value assessment (UVA). Following this theoretical survey, I discuss various empirical studies of the impacts of use-value assessment in states ranging from Virginia to California to Hawaii. These empirical studies have tried to discover whether UVA programs have indeed protected family farmers and slowed down expansion of metropolitan regions, whether they influence the timing of development decisions, and in what ways they have redistributed the local tax burden among owners of real property.

This paper ends with a discussion of reforms that this and other authors have proposed that could improve the performance of UVA programs.

About the Author

Richard W. England is a professor of economics & natural resources at the University of New Hampshire and a visiting fellow with the Department of Valuation and Taxation of the Lincoln Institute of Land Policy. For the past decade, his research and publications have concentrated on the effects of property taxation on land development decisions and outcomes. He is the co-editor of *Land Value Taxation: Theory, Evidence and Practice*, an anthology published by the Lincoln Institute in 2009.

Table of Contents

Preferential Assessment of Rural Land in the United States:

A Critical Literature Survey and Reform Proposals

Introduction

More than fifty years ago, a slowly unfolding but very important process began to transform property taxation in the United States. Because this process took place at the state and local, not federal, levels of government and because its almost universal adoption spanned several decades, most citizens are only vaguely aware that *preferential assessment* of rural land has altered the local property tax in significant ways since 1957.[1]

This paper summarizes and evaluates this U.S. experience with *use-value* or *current-use* assessment of undeveloped land for tax purposes. In the sections that follow, I will survey the reasons that have been given for proposing preferential assessment in the first place. Then I will sketch several histories of its adoption by state governments. These legislative histories will then be followed by a description of interstate differences in the specific features of use-value assessment programs.

After describing the adoption and implementation of preferential assessment programs, I will offer a lengthy account of theoretical analyses of use-value assessment (UVA). As we shall see, these analyses range in sophistication from simple arithmetic examples to numerical simulations to mathematical optimization models. The purpose of these analyses has been to discover what factors might induce rural landowners to enroll in preferential assessment programs and, once enrolled, what factors might induce those owners to give up preferential tax status and convert their parcels to developed uses.

Following this theoretical survey, I discuss various empirical studies of the impacts of use-value assessment in states ranging from Virginia to California to Hawaii. These empirical studies have tried to discover whether UVA programs have indeed protected family farmers and slowed down expansion of metropolitan regions, whether they influence the timing of development decisions, and in what ways they have redistributed the local tax burden among owners of real property. Statistical research has also asked whether preferential assessment alters the volatility of local tax revenue and whether this tax preference is capitalized into rural land prices or not.

A number of authors have directed criticisms at preferential assessment of farm, forest and other rural lands. One is that this tax policy is an excessively costly and blunt instrument if one's policy goal is to preserve ecologically valuable land from development. Another is that the methods adopted by state governments to measure the use-values of rural land parcels are deeply flawed. These and other criticisms suggest the need for additional research on UVA practices and their impacts.

---

[1] For now, let us define preferential assessment as placing values on rural parcels below their market values for purposes of property taxation.

This paper closes with a survey of changes to UVA programs that this and other authors have proposed. These reform proposals include greater use of purchase of development rights instead of use-value assessment to regulate land development. Other possible reforms include stiffer penalties to discourage removal of parcels from use-value assessment programs and inclusion of option values as well as agricultural rents in the measurement of current-use land values.

Coming full circle, let us now take a look at the rationales for adopting use-value property assessment that were offered by its advocates and supporters decades ago.

Rationales for Adoption

It is now a commonplace to observe that the expansion of U.S. metropolitan regions after World War II resulted in the loss of tens of millions of acres of farm, ranch, forest and other rural lands. 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. Alig, Plantinga, Ahn and Kline (2003: 10) have recently estimated that the nation's developed area more than doubled between 1960 and 1997, from 25.5 to 65.5 million acres. An influential 1981 report issued jointly by the U.S. Department of Agriculture and President's Council on Environmental Quality noted the "major transition" in land use that was underway and recommended "that the federal government make the protection of good agricultural land a national policy" (pp. 6 and 15).[2]

Published claims about the rate of land development need to be taken with one or more grains of salt, however. As Bills (2007: 167) has observed, federal data sources on land use and land conversion frequently "conflict with each other." Even more pointedly, Fischel (1982) has concluded that the 1981 USDA-CEQ study seriously *exaggerated* the rate of farmland development that had occurred for a number of technical reasons. One is that the method used by the Soil Conservation Service to measure urban land area changed from its 1958 study to the one it conducted in 1977. Hence, one cannot simply take the difference between the two reported urban area measures to measure the increase in urbanized area over those two decades.

Whatever the precise extent of land use change in the U.S. since 1945, however, the number of acres converted from rural uses has been substantial. This expansion of metropolitan regions into the countryside helped to launch a political movement favoring preferential assessment of rural land. In his major study of use-value farmland assessment for the International Association of Assessing Officers, Gloudemans (1974: 10) argues that this movement was motivated by "two major concerns: (1) concern

---

[2] Decisions about land use in the U.S. were then and still are primarily private ones regulated by state and local policies. However, purchases of U.S. farmland by foreign citizens were a federal policy concern at that time. That concern contributed to enactment of the Foreign Investment in Real Property Tax Act of 1980.

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 because of higher municipal service levels demanded by newly arriving households and businesses and because of rising farmland prices (and hence rising land value assessments) associated with the development potential of rural parcels. A study by Blase and Staub (1974) supports Gloudeman's general point about the escalating property tax bills faced by some farmers during the post-WWII era. In their study of seven counties in the metro Kansas City region during the early 1960s, these authors 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" (p. 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.[3]

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 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." This second argument for preferential assessment of rural lands seems to presuppose that private land ownership and a competitive land market will fail to produce the socially efficient amount of rural land preservation (Gardner 1977).

Although I cannot provide evidence that the state legislators and conservationists who supported enactment of preferential assessment of rural land actually used "market failure" arguments to make their case, it is clear that some academic writers of that era were ready to follow this line of argument. Veseth (1979: 98), for example, reasoned that "[a]gricultural and open lands are particularly susceptible to development pressures … because they generate positive externalities … The landowners' benefits are largely financial. They receive the profits from the crops, timber and livestock that are raised on their land. The public's benefits are largely non-financial … [and include] the aesthetic, recreational and ecological services which open lands provide." Since the annual benefits to society from a parcel of undeveloped land arguably exceed those captured by the parcel's private owner, some form of state intervention to preserve rural land seems justified.[4] Whether the appropriate form of public intervention is preferential assessment for purposes of property taxation is a question that I will pursue later in this paper.

---

[3] Writing during the period when UVA programs were being launched, Conklin and Lesher (1977) argued that financial pressure on farmers near the fringe of metropolitan regions also results in "premature and excessive" disinvestment in soil fertility and land improvements. Their argument is unconvincing, however, since it is hard to understand why a farmer should make a substantial gross investment in the agricultural potential of a land parcel if he anticipates selling to a developer within a few years.

[4] Lopez, Shah and Altobello (1994) make a similar argument.

Enactment of Use-Value Assessment Programs

During the sixties and seventies, dozens of state governments enacted use-value assessment programs for specific categories of rural land.[5] 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). 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 were intended to provide property tax relief to "deserving citizens" but resulted in dramatic differences in assessment ratios among taxable properties within the same jurisdiction.[6]

The expansion of state aid programs after World War II required the use of numerical formulas to allocate state grants among 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 via state statute or constitutional amendment. Hence, efforts to launch use-value assessment programs were often a political reaction to recent trends in both real estate markets and also state & local intergovernmental relations.

---

[5] For a brief summary of UVA legislation up to the early seventies, see Barlowe, Ahl and Bachman (1973). For another legislative summary that focuses on Southern states up to the early eighties, see Rodgers and Williams (1983).

[6] A property's assessment ratio is its assessed value for tax purposes divided by its market value during the same period of observation.

<u>Use-value assessment in California</u>[7]

California was one of the early adopters of current-use assessment of rural land. In 1965, its legislature passed the California Land Conservation Act (CLCA), commonly known as the Williamson Act. The stated goals of this statute were to preserve agricultural lands in order to ensure adequate food supply, to discourage premature conversion of land to urban uses and to preserve agricultural land for their open-space amenity values. The Williamson Act enables counties and cities to designate agricultural preserves and then offer preferential property taxation based on agricultural use-value in return for a contract barring land development for a minimum of ten years. After the first decade of the contract, there is an automatic extension every year unless the owner or the county files a notice of contract nonrenewal. If such a notice is filed, then the property's assessment ratio rises incrementally until it reaches unity when the contract finally terminates after nine years. An immediate termination of a Williamson contract is also possible but only if permitted by the city or county government and if the owner pays a penalty equal to 12.5 percent of market value.

As of 2010, all but four of California's counties have chosen to participate in the Williamson Act program. At the beginning of 2009, half of the state's farmland and almost 30 percent of its privately owned acreage had been enrolled in the program. One suspects that a program of this magnitude must have significant effects on both rural land markets and local government budgets in the Golden State.

The 1972 Open Space Subvention Act modifies the impact of the Williamson Act on local government budgets by providing state grants to partially replace foregone local property tax revenues. From 1972 through 2008, those subvention payments from Sacramento to the cities and counties totaled $839 million. Subvention payments were suspended during 2009, however, because of the state's mammoth budget deficit.[8]

<u>Use-value assessment in Hawaii</u>[9]

In 1961, the newly admitted state of Hawaii passed its comprehensive Land Use Law. This act created a nine-member Land Use Commission (LUC) that was empowered to assign all land in the state to four categories: urban, rural, agricultural and conservation. The LUC was also made responsible for establishing and adjusting the boundaries of those four districts. County governments, the LUC and the State Board of Land and Natural Resources share jurisdiction over land uses across the islands. According to Mark, Yamauchi and Okimoto (1982: 95), this "represents the most comprehensive statewide land use control system in the United States."

---

[7] The sources for this section are Schwartz, Hansen and Foin (1975) and
http://www.consrv.ca.gov/dlrp/lca/Pages/Index.aspx.

[8] The passage of the Proposition 13 property tax limitation in 1978 was another major change to the tax system in California. Research is needed on how the Williamson Act and Proposition 13 have interacted and what their joint impact on land use patterns has been.

[9] The sources for this section are Mark, Yamauchi and Okimoto (1982) and http://luc.state.hi.us/about.htm.

The motivating force behind passage of the Hawaii Land Use Law was a desire to retain prime farmlands in agricultural use in the face of rapid urbanization and growth of tourism. Hence, the act required the state's Department of Taxation to assess farmland according to its current use value (even if the acreage fell outside the boundary of an agricultural district). For historical reasons, ownership of agricultural land is highly concentrated in Hawaii and sales of working agricultural properties are rare. Hence, assessment of rural lands has had to rely on income-capitalization methods and on lease-rental data as proxies for farm income.

Use-value assessment in Nevada[10]

At the beginning of the seventies, *de facto* preferential assessment of farms and ranches was common in Nevada. Some Nevadans feared a taxpayer suit demanding market-value assessment of rural lands based on the uniform and equal taxation clause of the state constitution. Several farm associations actively supported adoption of an amendment to make current-use assessment of farm and ranch lands constitutional. Support among ranchers was mixed, however, because of the rollback provision of the proposed amendment: This clause provided that the owner of rural land who had enjoyed lower property taxes because of use-value assessment would have to pay a penalty equal to several years of tax savings if and when the parcel was developed for urban use.

There was also urban support for an amendment allowing use-value assessment of farm and ranch land. Conservationists in Las Vegas and Reno feared that assessing rural land according to its "highest and best use" would accelerate urban development. The nearly *six-fold* increase in the population of Clark County from 1950 to 1970 helped to fuel this anxiety about urban sprawl (even though much of Nevada remained uninhabited then and remains so today). In the November 1974 referendum that endorsed use-value assessment, there was majority support in the two urban counties but in only three of the fifteen rural counties of the state.

Use-value assessment in Texas[11]

Implementation of current-use assessment has been a protracted legal process in Texas. The constitutional amendment of 1966 was restrictive in several respects. For example, it provided that only farm and ranch land owned by a "natural person" qualified for a property tax preference. That is, farms and ranches owned by corporations or partnerships and all timberland regardless of ownership did not qualify for lower property taxes. A dozen years later, a second amendment to the Texas constitution enlarged the potential for use-value assessment in the state. Implementation, however, awaited passage of HB1060 during May of 1979.

---

[10] The sources for this section are Atkinson (1977) and http://www.census.gov/population/www/censusdata/cencounts/files/nv190090.txt.

[11] The source for this section is Hickman and Crowther (1991).

At the end of the seventies, forested and "ecological laboratory" lands became qualifying uses. The 1978 amendment increased eligibility to include qualifying land owned by corporations, partnership and other legal entities except when nonresident aliens or foreign governments held a majority interest. The later amendment increased the rollback tax period from three to five years but cut the interest rate applied to back taxes from twelve to seven percent when a land parcel no longer qualified for use-value assessment. The second amendment also required that the income-capitalization method be used to estimate use-values of qualifying properties.

Use-value assessment in Wisconsin[12]

From 1848 until 1974, the state constitution in Wisconsin required uniform taxation of all property. That situation changed with the 1974 amendment to the uniformity clause that allowed non-uniform taxation of agricultural and undeveloped land. Not until 1993, however, did the legislature direct the Department of Revenue (DOR) to study the implementation of use-value assessment of farmland.

In 1995, Wisconsin Act 27 provided for use-value assessment, to be implemented over a phase-in period of ten years. The assessed value of agricultural land was to be frozen at its 1995 levels during 1996 and 1997. Then the assessed value of farmland was to be reduced by ten percent annually from its 1995 levels through 2007. This act also created a Farmland Advisory Council to advise DOR on use-value assessment methods and to recommend a penalty for conversion of agricultural land to other uses.

The pace of property tax reform in Wisconsin accelerated in 1999. Act 9 established a conversion penalty equal to the difference between taxes owed under market valuation and taxes paid under agricultural-use valuation for the two years prior to land conversion. An emergency rule issued by DOR suspended the phase-in process and implemented complete use-value assessment effective January 1, 2000.

In 2001, Act 109 changed the land conversion penalty to an amount per acre specific to each county. This amount was 5.0 – 10.0 percent of the difference between a county's average market price of farmland and the average use-value of an agricultural acre in that county). In 2002 the Wisconsin Supreme Court upheld early implementation of use-value assessment. During the following year, Act 33 redefined classes of taxable property to include agricultural forestland, a class to be assessed at 50 percent of market value.

---

[12] The sources for this section are Boldt (2002) and Youngman (2005). See also Wisconsin Department of Revenue, *Agricultural Assessment Guide For Wisconsin Property Owners 2010.*

Specific Features of State Programs

These historical sketches of state adoption of use-value assessment provide some insight into how *diverse* tax reform plans can be within a federal political system. Let us now look more systematically at the outcomes of this nationwide process of property tax reform that began during the 1950s. In an excellent summary of the process, Malme (1993) observes that state programs vary in which categories of rural land are eligible for current-use assessment, in whether enrollment requires filing an application or not, in the minimum size of a parcel that can be enrolled, in how long a parcel must have been devoted to its current use before it is eligible for enrollment, in how the use-value of an eligible parcel is estimated, and in what penalties are levied (if any) when enrolled acres lose their eligibility.[13]

Arizona is an example of a state that implemented a UVA program highly beneficial to private landowners. As of 1977, enrollment of agricultural, forest, open space and recreational parcels was automatic and statewide. Neither a history of eligible use nor a minimum cash income from rural use was required for enrollment. If a private owner chose to develop his or her land or sell to a developer, no development penalty applied.[14] As metropolitan Phoenix exploded in population during the final decades of the 20th century, private landowners must have enjoyed huge tax savings as they prepared to develop their properties.

By 1977, eleven states had implemented UVA programs in which eligible parcels enjoyed automatic enrollment. In another 38 states, enrollment was voluntary and required owners to file applications for preferential assessment. Forty-seven states offered assessments below market value to agricultural land but only 21 extended preferential assessment to timberlands and forests. Still fewer included open space (15 states) and recreation lands (8 states) as eligible rural land uses (Coughlin, Berry and Plaut 1978).

Hibbard, Kilgore and Ellefson (2003: Table 1) document some regional differences in the method used to assess the use-value of private forest properties. As of 2000, all nine Southern states employed some version of an income-capitalization technique.[15] Some of the 14 Northern and 13 Western states that granted preferential assessment to private forests used administrative or productivity-based approaches instead.

If the purpose of use-value assessment is to discourage expansion of metropolitan regions and not simply to cut the property taxes of rural landowners, then these owners need to face development penalties when they withdraw their land parcels from eligible uses. As of 2002, fifteen states permit preferential assessment of rural land but do not collect a penalty when a landowner converts her property to an ineligible use. With the exceptions

---

[13] Gloudemans (1974: Appendix B) offers a nice summary of eligibility requirements, as of early 1974.

[14] See Coughlin, Berry and Plaut (1978: Table 1).

[15] Wear and Newman (2004) point out, however, that current-use assessment is not available to *corporate* owners of timberland in Georgia.

of Arizona and Florida, these are relatively rural states without rapidly growing metropolitan regions. Perhaps enactment of current-use assessment in these states was originally motivated more by a desire to grant tax relief to farmers and ranchers than by a desire to restrain metropolitan sprawl (England 2002: Table 2).

Another seven states fall into the percent payback category; that is, they collect a penalty based upon the market value of a parcel during the year it no longer qualifies for preferential assessment. California, Maryland, New Hampshire and Vermont simply collect a fixed percentage of market value during the year of property reclassification. This percentage ranges from 5 percent in Maryland to 20 percent in Vermont. Connecticut, Maine and Rhode Island employ a sliding scale version of this type of penalty: The percent of market value collected as a penalty declines with the number of years that a parcel has been enrolled in the current-use program, sometimes to zero percent (England 2002: Table 3).

Far more common is the rollback penalty, a development deterrent utilized by 26 states. In these cases, a landowner must pay the difference between taxes actually paid during several recent years of use-value assessment and the taxes that would have been paid with market-value assessment (plus accrued interest on the difference in some cases). As of 2002, the number of years of tax savings recaptured ranged from ten in Delaware and Indiana to only two or three in New Jersey, Georgia and Illinois (England 2002: Table 4). Looking to the future, researchers should use this variation of development penalties across the states to discern whether use-value assessment can actually deter rural land development or not.

Theoretical Analyses of Use-Value Assessment

Over and over again in the history of economic thought, economists have found theoretical puzzles to solve in the hurly burly of real-world events. The emergence of use-value assessment of rural land is no exception. An early example is the paper on California's Williamson Act written by Schwartz, Hansen and Foin (1975). These authors aim to discover what circumstances would induce a landowner to sign a ten-year conservation contract under the CLCA program. They use a pair of formulas to compare the present value of the net benefits to an owner from enrolling or not enrolling their agricultural land. The authors also use particular numerical assumptions about the annual discount rate (6 percent) and the federal and state income and capital gains tax rates faced by the property owner. Eight scenarios about the trajectory of agricultural land prices are then used to calculate the present values of enrolling or not enrolling. They conclude that, "as long as development expectations remain high, a substantial increase in enrollment may not be attainable … The attractiveness of such a policy [i.e., the Williamson Act] is further diminished by the bluntness of the instrument, since large benefits would also accrue to contractees far from the urban fringe" (p. 131). Although the authors' particular numerical assumptions limit the persuasiveness of their conclusions, they are probably correct that landowners on the metropolitan fringe would hesitate to forego development for a decade or more if land prices are expected to appreciate rapidly in the near future.

In their formal model of the individual decision to enroll a parcel in a current-use program or withdraw an enrolled parcel for development, England and Mohr (2003) point to the tension between getting owners to voluntarily *enroll* their rural land in a preferential assessment program and getting enrolled owners to *defer* development until a later date. If there is no development penalty when a parcel leaves the program, then owners are very willing to enroll and enjoy lower property taxes until they choose to develop their land. At the same time, the absence of a development penalty means that use-value assessment is unlikely to push land development to a later date. If, however, there is a rollback penalty that collects all property tax savings since the parcel was enrolled (plus a commercial interest rate on those deferred savings), then parcels are less likely to be enrolled at all but, if enrolled, will be developed at a later date.[16]

Blewett and Lane (1988) offered an early analysis of the impact of preferential assessment on the individual owner's decision to convert a land parcel from rural to urban uses. These authors comment that use-value assessment is a form of tax expenditure that allows the state or locality to *lease* the development rights to a parcel while leaving the length of the lease in the hands of the landowner (with the exception of California). They employ a graphical analysis of the land conversion decision in which the annual rural and urban use-values of a parcel are functions of time. By assumption, the rural use-value is constant over time whereas the urban use-value grows exponentially.[17] In the absence of preferential assessment, there is a moment (t_0) when the urban use-value rises to equal the rural use-value and the parcel undergoes development. If current-use assessment is introduced, development occurs at a later moment (t_1) when the annual net benefits from urban use rise to equal the annual tax savings from rural use and preferential assessment. Hence, in this simple graphical model, preferential assessment induces later development of rural land. According to Blewett and Lane (1988: 199), however, the "public sector's tax revenue loss … is much larger than the minimum-willingness-to-be-paid for these development rights … Much of this difference is due to the landowner receiving subsidies … when he does not [yet] want to convert anyway."

More recently, several papers have reported formal optimization models of a landowner's decision to develop a rural parcel in the presence of preferential assessment. Anderson (1993) theorizes that the landowner will maximize the sum of the present values of the net income stream from rural use and urban use by choosing the optimal development date. Introducing tax assessment of rural land as though its use will remain rural in perpetuity while keeping the property tax rate constant implies that development will occur at a later date. The model assumes no development penalty when land use change finally takes place. According to the author, the length of this development delay

---

[16] In 1977, New Jersey imposed a development penalty equal to two years of tax savings without interest (Coughlin, Berry and Plaut 1978: 168). Not surprisingly, nearly 95 percent of all farmland in the state had been enrolled in the preferential assessment program by that year.

[17] More specifically, this graphical analysis hinges on the restrictive assumptions that there is full capitalization of tax savings into land prices and that the growth rate of urban use-values is indefinitely greater than the discount rate.

depends crucially on two factors: "(a) farming use-value of the land relative to potential developed use, … and (b) the rate of property taxation τ. The greater the divergence between use-value and developed value the more use-value will delay development. Further, the greater the level of property taxation, the more use-value assessment will delay development" (Anderson 1993: 266).[18]

Building upon Anderson's 1993 paper, England and Mohr (2003) propose a similar model of the landowner's wealth-maximizing decision to convert her land to an urban use. Their analysis introduces two new factors affecting the timing of the land conversion decision: (a) the non-pecuniary benefits enjoyed by rural landowners, and (b) the structure of the development penalty imposed at the time of development. Not surprisingly, if farmers and ranchers feel attached to their properties because of family histories and community ties to friends and relatives, these non-cash benefits push development deeper into the future. However, if the annual benefits of rural residency are positive but constant, then exponentially increasing urban rents will eventually induce the owner to sell to a developer – even if great-great grandfather is buried on the property.

The introduction of development penalties into a model of the land conversion decision complicates the theoretical story a bit. If the penalty is constant over time, then one can show that a higher penalty favors later development of rural land presently enrolled in a current-use assessment program. However, if the magnitude of the penalty varies with the choice of development date, then the incentive effects of the *level* and *change* in the penalty could work at cross purposes. A high penalty level favors later development of an already enrolled parcel but, if that penalty is also increasing over time, there is an opposing incentive to develop sooner.[19] If, however, the landowner faces a high penalty today but knows that the penalty will be lower in years to come, she is more likely to defer development into the future (England and Mohr 2003: 48-49).

A major limitation of the optimization models of Anderson (1993) and England and Mohr (2003) is that they assume an omniscient optimizing landowner with an infinite time horizon. This type of economic agent is rare in the real world, to say the least. Several avenues of research therefore await the economic theorist who is interested in land development. One path would be to model the development decision over the *finite* life cycle of a rural landowner. If the owner is elderly and has no heirs, for example, one suspects that he is more likely to sell to a developer before his death. If the elderly owner has heirs who wish to remain on the land and if there is a generous exemption under the federal estate tax, then he presumably is less willing to sell. Coughlin, Berry and Plaut (1978: Figure 2) offered a graphical sketch of such a model, but their proposal has apparently not yet been formalized.

---

[18] In a more recent paper, McFarlane (1999) builds a model of the growth of an urban region with investment in durable housing and agricultural production beyond the urban fringe. The developer of rural land chooses the optimal development date and also the optimal capital-intensity of developed land. Although the author does not discuss preferential assessment explicitly, he finds that a lower property *tax rate* on the market value of rural land tends to delay development.

[19] This describes the situation in Vermont: When land prices are rising, then a penalty equal to 20 percent of market value at the time of development implies a large penalty that is also escalating with time.

Another path of theoretical analysis that has received more attention addresses the *irreversible* and *uncertain* nature of the land development decision. Anderson (1993: 267-268) raised this issue when he observed that the value of agricultural land today reflects not only current rents from agricultural use but also the option value of delaying development given that land conversion is irreversible and that future returns to rural and urban uses cannot be known with certainty.

Tavernier and Li (1995) explore this question of uncertainty with their analysis of the owner's need to acquire information in the land market prior to consummation of a land sale and the resulting *search process* involving a sequence of offer prices from potential buyers. The authors model a dynamic process in which the owner receives offers randomly drawn from a probability distribution of offer prices. He has a reservation price that depends on his after-tax farm income and sells only if he receives an offer at least as great as his reservation price. Because current-use assessment lowers the owner's property tax bill, it raises his after-tax farm income and thus his reservation price. This, in turn, lengthens the search process and delays the sale to a developer. According to the authors, the effectiveness of a UVA program in preserving farmland varies positively with the property tax rate and the difference between the market value and use value of farmland but "only within some range" of parameter values.[20]

More recently, Johnston (2003) discusses the interesting possibility that not only private landowners but also state legislators and tax officials have to make decisions in the face of uncertainty. State officials, for example, lack detailed knowledge about the ultimate causes of farmland conversion. The author constructs an optimal control model for a parcel of land subject to uncertain and irreversible development. The taxing authority is assumed to maximize net community benefits from collecting a property tax and from environmental amenities generated by the parcel before its development. The optimal tax policy is then calculated under three scenarios: (1) development triggered solely by an exogenous offer by a developer at some uncertain future date, (2) development triggered solely by taxation which reduces the owner's wealth below some uncertain threshold, and (3) some combination of these two scenarios. As with many other theoretical analyses, Johnston (2003: 207) reaches the agnostic conclusion that his model "does not generate unambiguous guidance regarding increases or decreases in initial tax levies…."

A very important issue that has received little attention by theorists so far is the impact of the introduction of use-value assessment on rural land prices. Gloudemans (1974: Appendix E) demonstrates algebraically that the rate at which the tax savings resulting from preferential assessment are capitalized will affect land prices. Anderson (2005: 418) remarks, "Reductions in property taxes, *ceteris paribus*, should be at least partially capitalized into higher land values. Consequently, preferential assessment will confer a windfall gain in wealth to the agricultural land owner." A corollary of this point is that

---

[20] In an empirical analysis of land conversion from agriculture to forests in Georgia, 1982 – 1992, Schatzki (2003) finds that increased uncertainty about the relative returns to farming and forestry does indeed increase the real option value of delaying land conversion. He estimates that option value could be as much as 81 percent of the present value of expected returns to agricultural use.

proposals to scale back or repeal use-value assessment are certain to face political opposition from rural landowners who fear capital losses. It would be useful to know whether theory suggests that the capitalization rates for changes in property tax rates and changes in assessed valuations are the same or not.

Empirical Analyses of Use-Value Assessment

Because economic theory alone provides limited understanding of real-world phenomena, I turn now to studies of use-value assessment that concentrate on empirical measurement of its effects. Let us begin with several studies that discuss what influences seem to affect the landowner's decision to enroll in a voluntary UVA program or not.

Enrollment in a Use-Value Assessment Program

One of the earliest studies of the decision to voluntarily enroll in a use-value assessment program is Hansen and Schwartz (1975). The authors collected assessment and CLCA enrollment data for three study areas near Sacramento, California, as well as attitudinal survey data for landowners in those areas. They report "that, with few exceptions, CLCA parcels in all three areas are located away from development activity … Much smaller average parcel size and acreage per owner for non-enrolled parcels were observed in each study area … This result could be attributed to the greater development potential of these parcels, since parcel sizes were smaller closer to developing areas" (pp. 345 – 346). The authors also report that landowners who were farmers were more likely to enroll in the Williamson Act program than professionals, retirees and corporations owning rural parcels in the same study areas. Because of the limited geographic scope of this study (Sacramento County) and the long-term contractual commitment of the CLCA program, one should not generalize these findings to UVA programs in other states.

In a related simulation exercise, Schwartz, Hansen and Foin (1976) find that changes in the provisions of the CLCA are unlikely to affect the rate of enrollment in California's UVA program in a substantial way. The main exception is that shortening the minimum term of the CLCA contract would encourage more landowners to enroll.

Carman (1977) offers a more comprehensive view of landowner participation in California's Williamson Act program. He collects county-level acreage data on CLCA enrollment from 1967 through 1975 and estimates time-trend equations for forty participating counties. For most counties, the acreage time trend can be described by a logistic function.[21] The author then regresses two parameters of the county logistic functions (upper asymptote and rate of growth of total acreage) on several variables that might explain inter-county differences in enrollment. He concludes that "the rate and level of acceptance of the [Williamson] Act is inversely related to the expected opportunity to convert agricultural land to urban uses at a profit … [Surprisingly,] counties with the largest per acre tax reductions tended, other things being equal, to have

---

[21] Marin and Napa Counties are two exceptions. The author speculates that strict agricultural zoning substitutes for CLCA enrollment in that pair of counties (p. 286).

lower rates and levels of acceptance of use-value assessment. It is likely that landowners in those counties view nonagricultural development as offering significant opportunities for realizing capital gains" (pp. 285 – 286).

<u>Preservation of Small Family Farmers</u>

According to a survey of farmers reported by the Council on Environmental Quality (1976: 49 – 51), a host of considerations enter into the decision of a farm owner to sell his property and leave the land. The after-tax returns from agricultural production certainly play a role and hence preferential assessment could affect the decisions of some farmers. However, the age of the owner and whether he plans to bequeath the farm to a relative or sell the property to fund his retirement is another consideration. Finally, a farmer on the metropolitan fringe might sell, not because of rising property taxes, but because of worsening traffic on rural roads, growing air pollution from urban sources, and neighbors' complaints about farm odors. One implication of this early survey is that detecting the impact of preferential assessment on survival of small farmers requires a degree of econometric sophistication.

Chicoine (1981) documented some of these pressures on farmers to sell with his hedonic model of agricultural land prices on the fringe of metropolitan Chicago. Using data for 1400 sales of unimproved farmland in Will County, Illinois, during 1970 – 1974, he found that sale price per acre correlated positively and significantly with proximity to downtown Chicago and to the nearest freeway exchange, with suitability of the parcel's soil for a septic system, with residential or industrial/commercial zoning of the parcel, and with the fraction of adjoining acres already developed as commercial or industrial properties. Interestingly, the sales price of an acre of land did not correlate with its soil productivity index for agricultural purposes. Hence, by the early seventies, the price of rural land dozens of miles from Chicago's Loop reflected its potential urban uses. The author concludes (p. 360), "This fact supports urban fringe preferential farmland property tax assessments to discourage the premature removal of land from agriculture …."

Chicoine, Sonka and Doty (1982) employ a simulation methodology to examine the effects of circuit breakers and current-use assessment on the financial position of a typical Illinois farmer over a ten-year period. They assume a corn/soybean operation on 600 acres with the operator owning half the acreage and share cropping the remaining half. They also assume that the only labor input comes from the operator and her family. Employing actual data on crop yields and crop prices to calibrate their model, the authors simulate the annual after-tax income and property tax payments of the operator with either market-value or use-value assessment of the farm property or with a circuit breaker provision. What is their conclusion? "With both property tax relief programs, the reduction in average annual property taxes is reflected in … [higher] after-tax average annual incomes. But the cash situation remains dismal, suggesting that even with property tax relief the operator and landlord would … likely have to liquidate part of their land base to continue operations" (p. 520). This simulation exercise suggests that the capacity of UVA programs to preserve family farmers is quite limited.

<u>Preservation of Rural Lands</u>

A question closely related to the preservation of small family *farmers* is whether use-value assessment has actually helped to preserve *rural land* that generates environmental amenities and ecosystem services or not. In an early study of the empirical relationship between property taxation and land use change, the Council on Environmental Quality (1976) regressed percent change in agricultural land, 1969-1973, in a sample of Ohio counties on absolute change in population density, gross cash receipts per farm acre, percent of farmers over 65 years of age and property tax paid per acre. This OLS study found that a higher property tax per acre was associated with a greater percentage loss of farmland during the period studied. Although this study tried to control for some influences on land use change other than the property tax, its simple methodology did not correct for potential endogeneity problems.

Blewett and Lane (1988) used the 1963 introduction of use-value assessment in Indiana to conduct a before- and after-study of the rate of agricultural farmland loss in that state. Using data for 92 counties, they regressed percent decline in farmland acres on the percentage changes in population, property taxes per acre and number of elderly farmers during two periods, 1954-1959 and 1964-1969. The SUR results indicate an increase in the negative intercept term after the introduction of preferential assessment of farmland and a change in the coefficient on the property tax variable from a positive and significant one to an insignificant one. These results suggest that the implementation of current-use assessment slowed the conversion of Indiana farmland to urban uses.

In a cross-sectional study of counties in eleven Northeastern states during 1987, Lopez, Shah and Altobello (1994) estimate a supply-demand model for agricultural land using the three-stage least squares technique. This relatively sophisticated empirical model of the agricultural land market implies that the elasticity of acres in agricultural use with respect to the property tax paid per agricultural acre is -1.065 and highly significant. The comparable elasticity with respect to the property tax paid per residential acre is +0.300 and highly significant. The authors conclude that "these findings lend support to the potential effectiveness of differential assessment programs …" (pp. 57-58).

Parks and Quimio (1996) focus their empirical study on changes in farmland acreage in New Jersey between 1949 and 1990. This historical period includes the 1964 constitutional amendment that permitted current-use assessment of agricultural land in the Garden State. Using annual state-level data in logs, the authors regress agricultural land area on net farm revenue per acre (excluding the property tax), annual percentage changes in the market value of farmland, the interest rate on farm credit, and the effective property tax rate. Although the adjusted R square of their GLS equation is quite high (0.86) and the authors have corrected for autocorrelation, their use of proxies to measure several explanatory variables suggests that their statistical results should be viewed with caution. That said, they find that the elasticity of agricultural land area with respect to the effective property tax rate equals -0.066. This implies that the cut in the effective property tax rate on agricultural land that followed implementation of current-use assessment had a very modest impact on the conversion rate of farmland after 1964. The authors conclude that New Jersey needs to rely more heavily on its purchase of

development rights program in order to protect its remaining farmland from urban development.

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.[22] 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.

The author regressed the percentage of farmland in a county during a particular year on a series of dummies for 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) remarks that these results "suggest policy endogeneity if states that adopted deferred tax policies were the ones more prone to lose farmland."

In an effort to correct for this 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 suggests 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 also … suggest that the policy may be more effective when property tax burdens are higher" (p. 156).

Williams, Brockett, Gottfried and Evans (2004) ask whether the 1976 enactment of Tennessee's Greenbelt Law was necessary to protect forested land from development. They study 337 parcels in Franklin County that enjoyed use-value assessment in early 1999. The authors estimate the reservation prices of parcel owners given assessors' valuations, tax savings from enrollment in the Greenbelt program, prospective development penalties *and* alternative assumptions about the reservation premium of owners, i.e., the intangible benefits from ownership of forested parcels. They conclude that, if the reservation premium of owners was zero, then the Greenbelt Law afforded some degree of protection to all parcels. If, on the other hand, the reservation premium was $500 per acre, then 57 percent of the parcels required no protection. This result implies that the ratio of tax expenditure to acres saved from development could be quite high in situations where all owners of rural land are eligible to enroll their properties in a use-value assessment program.

---

[22] 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).

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 between agricultural, forestry and developed uses with a random parameters logit model. 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 "absolute values of elasticities are small. This means 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 elasticities 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. Interestingly, however, most of that farmland would have transitioned to forestland and the additional land devoted to urban uses would have been fewer than six thousand acres.

In his study of California's Williamson Act (CLCA) Program, Kovacs (2009) analyzes county-level data on contract non-renewals from 2000 through 2007. He is particularly interested in discovering what variables help to explain a transition from a slow to rapid rate of farmland conversion and *vice versa*. Using a proportional hazards model with fixed effects and random effects, the author finds more rapid population and income growth hasten the transition to a high rate of removal of farmland from the Williamson Act Program. Proximity to cities, the Pacific Ocean and major highways also increase the hazard of transition to a rapid rate of land conversion. Of greater relevance to this paper, a one-percent increase in the property tax rate reduces the hazard of a transition to a high rate of land conversion by nearly a quarter. The author concludes that "differential assessment programs help to reduce urban sprawl and thus provide benefits to taxpayers" (p. 24).

Tax Shifts, Tax Expenditures and Equity

Although empirical research has shown that use-value assessment of rural land has slowed the rate of development of rural land in various states, one needs to ask how expensive this land conservation policy has been for taxpayers and who has borne this program cost. Those questions are addressed in the following section.

In an early study of California's CLCA program, Hansen and Schwartz (1975) gather assessment and enrollment data for roughly 800 agricultural parcels in three rural areas of Sacramento County. Those public data are augmented by a survey of parcel owners. Although the authors do not report statistical significance tests, they report that the average parcel size owned by owners participating in the program was more than three times the average acres owned by nonparticipating owners. This provides some evidence that the tax savings in Sacramento County during the early years of the Williamson Act Program accrued largely to those with large landholdings. This paper also reports that those owners who had enrolled their agricultural land in the CLCA program enjoyed property tax reductions ranging from 37.9 percent for producers of row crops to 80.2 percent for ranchers with dry pasture.

Of course, the number of acres held by an owner says nothing about her total net worth or annual income. In a follow-up study, Hansen and Schwartz (1977) report on the distribution of tax savings enjoyed by individual and subchapter S owners of CLCA agricultural land in Sacramento County. They report that those owners with net taxable family income in the lowest categories received 12.5 percent of net income but 45.2 percent of net CLCA benefits. Hence, it appears in this very specific case that use-value assessment resulted in a progressive distribution of program benefits.

In its 1976 report on preferential assessment of farms and open space, the President's Council on Environmental Quality stated clearly that these state programs result in tax expenditures of significant magnitude that redistribute income among taxpayers:

"All differential assessment laws … [entail] 'tax expenditures,' by means of which the tax bills of some taxpayers are reduced … In most cases, the cost of this reduction is spread over all the other taxpayers … The effect of a tax expenditure is precisely the same as if the taxpayers who receive the benefit were to pay taxes at the same rate as other, non-preferred taxpayers, and then were to receive a simultaneous grant … in the amount of the tax benefit … Tax expenditures for the federal government must be estimated in the annual budget … [R]eal property tax systems are riddled with tax expenditures of significant [but hidden] magnitude …" (pp. 6-8).

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 current-use assessment on aggregate tax base and on the property tax rate hike required to hold total revenue constant.[23] 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 thousand acres in Spokane County had been enrolled, forty percent of the county's total land area. The

---

[23] 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.

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 1 – 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 an interesting study of state & local fiscal interactions, Chicoine and Hendricks (1985) point out that implementation of a UVA program (1) results in little tax shifting within a locality if it merely formalizes earlier *de facto* preferential assessment of eligible properties and (2) can shift a substantial tax burden from local taxpayers to state taxpayers. The authors study the impact of the 1980 implementation of mandatory use-value assessment of agricultural land in Illinois. Their study area consists of the three school districts in Coles County, a grain-producing area of the state. They find that informal and formal use-value assessment of farmland lowered assessed value per pupil and qualified these districts for more generous state educational grants distributed by Illinois' district-power-equalizing aid formula. Prior to implementation of use-value assessment, *de facto* preferential assessment had already garnered an additional $2.8 million of state aid for the county's school districts. Implementation of formal current-use assessment qualified the county for an additional $115,000 of state educational funding. As a result, the interaction between preferential assessment and state aid lowered the local property tax bills of farm and nonfarm owners alike in Coles County.

Hickman and Crowther (1991) report on a study of the property tax shift that occurred in the 43 easternmost counties of Texas because of its use-value assessment program. These counties contain most of the state's commercial timberland, properties that became eligible for preferential assessment in May 1979. As of 1987, the authors' study year, roughly 9.3 million acres not in timber use and 7.5 million acres in timber use in eastern Texas had been enrolled in the state's UVA program. Of these acres that were forested, the average assessment cut per acre ranged from $5825 in Harris County (metro Houston) to $277 in Red River County.

Assuming constant property tax rates across the region and no capitalization effects of preferential assessment on aggregate assessments, the authors calculate that UVA would have cost Harris County $301 million in property tax revenue during 1987. Under these assumptions, the average revenue loss for all 43 counties would have exceeded 6.9 percent.

Of course, local governments frequently do not freeze their property tax rates when assessed valuations fall. Rather, they raise their tax rates in an effort to mitigate or even prevent cuts in local public spending. The authors calculate that a tax shift of $133 million to ineligible and nonparticipating properties in eastern Texas would have been required in 1987 to fully offset the impact of UVA. This sum amounts to 5.1 percent of actual property tax revenue in that year across the 43 counties.

19

Anderson and Griffing (2000) report estimates of the tax expenditures in two Nebraska counties associated with the state's green belt UVA program.[24] They gather county assessor parcel-level data on market value and use value and then regress the ratio of use value to market value on distance of the parcel from the nearest urban center, parcel size and dummies for school districts contained in the county. Confirming the results of various studies in the urban and public economics literatures, they find that this parcel value ratio does indeed correlate as expected with distance, size and school district.

According to the authors, "Since the ratio of use value to market value is equivalent to the ratio of property taxes under the two assessment regimes, we know that the tax expenditure is large near the [central business district] … and declines with distance … One minus that ratio gives the proportion of property tax foregone due to use-value assessment … The average ratio is 0.639 for properties in Lancaster County and 0.2477 in Sarpy County. Hence, the average tax expenditure [associated with UVA] is approximately 36 percent of revenue in Lancaster County and 75 percent of revenue in Sarpy County" (p. 46).

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 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.

After having surveyed various studies of the tax shifting and tax expenditures associated with UVA programs, what can we conclude about the equity of those programs? The answer to that question depends upon the normative principle of taxation that one accepts. If one believes that the total net worth of a taxpayer should be the object of taxation, then one might object to sharp cuts in taxation on valuable holdings of rural land.[25] If, on the other hand, one accepts the benefit principle of taxation, then preferential assessment of rural land could be justified since "rural landowners may consume fewer [local] services per dollar value of land owned than residential or commercial landowners in the same taxing area" (Morris 1998: 145).

---

[24] This article also provides a very accessible summary of several microeconomic models of land price determinants within a metropolitan region (pp. 35 – 40).

Other Impacts of Use-Value Assessment

As Hickman and Crowther (1991: 3) have observed, the present and future tax savings enjoyed by the owner of a property enrolled in a UVA program are "usually capitalized into higher land values and thus [are] … irrelevant to all but the initial property owners." Do empirical data support this prediction? Unfortunately, this question has not yet received a great deal of attention by researchers. Yamauchi (1979) raises the issue of capitalization of UVA benefits in Hawaii but does not furnish any estimates of the capitalization rate.

Using county-level data from Michigan during the early eighties, Anderson and Bunch (1989) estimate a three-equation model in which land values, property tax rates, and circuit-breaker tax credits are jointly determined. The authors find that the combination of a general homestead credit on the state income tax plus an additional agricultural circuit breaker raised land values by more than eight percent.[26] Whether a comparable result would be found for states with UVA programs remains to be seen. Vitaliano and Hill (1994) estimate a land price equation using farmland sales data to see whether the New York State Agricultural District program affects land prices or not. This program offers UVA of eligible farmland to the owner in return for a five-year rollback penalty and an agreement by the landowner to keep his property in agricultural production for three to eight years. Although the regression analysis finds that the property tax rate is negatively associated with sales price, enrollment in the Agricultural District program does not correlate with sale price.

Bowman and Mikesell (1988) propose that greater assessment uniformity would be a social benefit of moving from a regime of *de facto* preferential assessment to a formal UVA regime. Using sales data for agricultural parcels in 90 Virginia counties during the early eighties, the authors calculate the coefficient of dispersion (COD) for agricultural properties within a county.[27] The authors find that the counties participating in the state's UVA program have lower COD values. That is, there is greater assessment uniformity in the presence of a formalized program of preferential assessment.

In the final empirical study included in this survey, Ervin, Chicoine and Nolte (1986) consider the possibility that adoption of a UVA program could affect the stability of the property tax revenue stream over time. The use of capitalized net farm income to measure the use value of agricultural land and multiple-year lags in updating the use-value estimates used for tax assessment purposes could result in the countercyclical movement of farmland assessments. That is, property taxes owed by farmers could be rising because of higher land value assessments just as their cash net incomes are falling. A simulation based on assessment data for Lafayette County, Missouri, during the late seventies and early eighties suggests that this countercyclical behavior actually exists.

---

[26] It should be noted that Michigan and Wisconsin were the only states without UVA programs at that time.

[27] The coefficient of dispersion is the average absolute difference of parcel assessment ratios from the median assessment ratio in the county expressed as a percentage of the median ratio.

Criticisms of UVA Programs and Reform Proposals

Although use-value assessment programs have been widely adopted across the United States, they nonetheless have their critics. A repeated criticism is that UVA programs entail a large loss of property tax revenue in order to buy land protection of limited quantity and duration. Ladd (1980) comments that "use-value assessment … is a blunt policy instrument that benefits all eligible landowners in return for a small supply response at the margin." That is, a large tax expenditure is required to protect a limited number of acres from development during any particular fiscal year. Ladd argues purchase of development rights and outright purchase of rural parcels are superior tools of public policy with which to influence land use patterns.[28]

Heimlich and Anderson (2001) estimate that the total tax expenditure attributable to UVA programs in 48 states totaled $1.07 billion in 1995. Taking the present value of this annual tax subsidy at a 4 percent discount rate, they find that its long-term value exceeds $26.7 billion. In the long run, however, this massive subsidy cannot guarantee the permanent protection of a single acre of rural land. The authors compare this result with purchase of development rights to all croplands at high risk of urban development in 1995. They estimate that permanent protection of those agricultural parcels would have cost $87.8 billion.

In their study of Tennessee's Greenbelt Program, Williams, Gottfried, Brockett and Evans (2004) conclude that "the program fails a basic test of cost-effectiveness. By failing to target only those landowners who most likely will convert [their parcels to urban uses], the program forces counties to forgo property tax revenue in return for a negligible impact on land use" (p. 296). They conclude that UVA programs need to focus on protecting rural land in the direct path of urban development, especially parcels that provide "biodiversity benefits."

Another strain of criticism of UVA programs is that the formulas used by state boards and revenue departments to estimate the use-values of eligible rural parcels are often fundamentally flawed. Giertz and Chicoine (1984) argue that many states use the residual income capitalization method inappropriately when they estimate agricultural use values. The economic surplus from agricultural use of a land parcel is typically estimated using an average of *past* farm price and productivity data. The formula employed often assumes (implicitly) that this surplus will not grow in future years. This constant stream of future economic rents is then discounted using a market interest rate that incorporate expectations about *future* inflation rates. The authors calculate that, if the expected inflation rate is ten percent, the assessed use value of a rural parcel could be only a quarter of its actual use value.

Using sales data on agricultural land sales in Wyoming, 1989 – 1995, Spahr and Sunderman (1998) estimate a hedonic model of the market value and productive use-value of farms and ranches in the state. Their conclusion is that the method to estimate use-values "results in farms and ranches in Wyoming being under-assessed by approximately 50 percent. Not only are Wyoming farmers and ranchers receiving a tax

---

[28] Blewett and Lane (1988) make a similar argument and, to their credit, cite Ladd (1980) as a source.

subsidy based on being taxed on productive value rather than market value, assuming they are different, it is [also] found that they are under-assessed based on productive value" (p.387). This pair of studies leads one to the conclusion that some states offer tax savings to rural landowners that are far greater than could be justified by use of a theoretically-consistent technique to measure the use-values of rural properties.

Having surveyed the academic literature on UVA programs, I would offer the following set of reform proposals to state legislatures and tax departments:

- Those states that do not yet levy a penalty when land is removed from their UVA programs should do so. Unless the owner of rural land faces a penalty at the moment of development, he or she will simply collect the property tax saving offered by the UVA program until the market price of developed land is attractive enough. A high penalty per acre that declines with years of enrollment in the program, on the other hand, could induce the owner of rural land to defer development for years. In an era when few owners of rural land are poor farmers, UVA programs should help to conserve rural landscapes, not subsidize wealthy landowners.

- States should also reconsider the categories of rural land that are eligible for use-value assessment: (1) Enrollment of farm and ranch land should not be automatic as is the practice in some states. Rather, owners should be required to document substantial net income from sale of agricultural commodities during the previous tax year. This would prevent the owner of idle land that is about to be developed from receiving a property tax break. (2) Agricultural parcels should not be eligible for use-value assessment if subdivision plans have already been filed or if they have been rezoned for residential, commercial or industrial use. If there is substantial evidence that a landowner will soon develop a parcel, there is no reason to continue the UVA tax preference. (3) Forest, wetland and other non-agricultural parcels should be eligible for use-value assessment if they generate public goods such as flood protection, wildlife habitats and scenic views. On the other hand, barren land with great development potential on the fringe of a metropolitan region should be assessed at market value if it does not produce ecosystem services that benefit society.

- States should carefully review the income capitalization methods that they employ to estimate the agricultural use-value of rural properties. The guidelines for estimating the net income of agricultural land and for selecting the discount rate that capitalizes that income stream should be based on sound economic principles and should be presented to taxpayers in a transparent fashion. Because income capitalization calculations are so sensitive to choice of discount rate, that choice needs to be justified and not *ad hoc*. In principle, the risk-free rate of discount needs to be adjusted for inflation, default risk, maturity risk and liquidity constraints.

Conclusions

In this paper, I have offered a critical survey of the half-century experience with use-value assessment of rural land in the United States. At least two conclusions flow from this survey. One is that economists who study public, agricultural, environmental and land economics should devote more research to this important feature of property taxation in the United States. The other conclusion is that state legislators and tax officials should pause and reflect upon their UVA experience and then decide whether or not some form of tax reform should be pursued in order to better serve the public interest.

Citations

Alig, Ralph J., Andrew J. Pantinga, SoEun Ahn, and Jeffrey D. Kline. 2003. *Land Use Changes Involving Forestry in the United States: 1952 to 1997, with Projections to 2050.* Gen. Tech. Report PNW-GTR-587. Portland, OR: U.S. Forest Service, Pacific Northwest Research Station.

Anderson, John E. 1993. "Use-Value Property Tax Assessment: Effects on Land Development," *Land Economics* 69, no. 3 (August): 263-269.

_____. 2005. "Taxes and Fees as Forms of Land Use Regulation," *Journal of Real Estate Finance and Economics* 31, no. 4: 413-427.

Anderson, John E., and Howard C. Bunch. 1989. "Agricultural Property Tax Relief: Tax Credits, Tax Rates, and Land Values," *Land Economics* 65, no. 1 (February):   13-22.

Anderson, John E., and Marlon F. Griffing. 2000. "Measuring Use-Value Assessment Tax Expenditures," *Assessment Journal* (January/February): 35-47.

Atkinson, Glen W. 1977. "The Effectiveness of Differential Assessment of Agricultural and Open Space Land," *American Journal of Economics and Sociology* 36, no. 2 (April): 197-204.

Barlowe, Raleigh, James G. Ahl, and Gordon Bachman. 1973. "Use-Value Legislation in the United States," *Land Economics* 49, no. 2 (May): 206-212.

Bengston, David N., Jennifer O. Fletcher, and Kristen C. Nelson. 2004. "Public Policies for Managing Urban Growth and Protecting Open Space: Policy Instruments and Lessons Learned in the United States," *Landscape and Urban Planning* 69, no. 2-3 (August): 271-286.

Berry, David, and Thomas Plaut. 1978. "Retaining Agricultural Activities under Urban Pressure: A Review of Land Use Conflicts and Policies," *Policy Sciences* 9, no. 2 (April): 153-178.

Bills, Nelson. 2007. "Fifty Years of Farmland Protection Legislation in the Northeast: Persistent Issues and Emergent Research Opportunities," *Agricultural and Resource Economics Review* 36, no. 2 (October): 165-173.

Blase, Melvin G., and William J. Staub. 1971. "Real Property Taxes in the Rural-Urban Fringe," *Land Economics* 47, no. 2 (May): 168-174.

Blewett, Robert A., and Julia I. Lane. 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, no. 2 (April): 195-205.

Boldt, Rebecca. 2002. *Impact of Use Valuation on Agricultural Land Values and Property Taxes*. Madison, WI: Wisconsin Department of Revenue, Division of Research and Policy (October).

Bowman, John H., and John L. Mikesell. 1988. "Uniform Assessment of Agricultural Property for Taxation: Improvements from System Reform," *Land Economics* 64, no. 1 (February): 28-36.

Brigham, John. 1980. "The Politics of Tax Preference," chapter 5 in *Property Tax Preferences for Agricultural Land*, edited by Neal A. Roberts and H. James Brown. Montclair, NJ: Allanheld, Osmun, and Company.

Carman, Hoy F. 1977. "California Landowners' Adoption of a Use-Value Assessment Program," *Land Economics* 53, no. 3 (August): 275-287.

Chicoine, David L. 1981. "Farmland Values at the Urban Fringe: An Analysis of Sales Prices," *Land Economics* 57, no. 3 (August): 353-362.

Chicoine, David L., Steven T. Sonka, and Robert D. Doty. 1982. "The Effects of Farm Property Tax Relief Programs on Farm Financial Condition," *Land Economics* 58, no. 4 (November): 516-523.

Chicoine, David L., and A. Donald Hendricks. 1985. "Evidence on Farm Use Value Assessment, Tax Shifts, and State School Aid," *American Journal of Agricultural Economics* 67, no. 2 (May): 266-270.

Ching, C.T.K., and G.E. Frick. 1970. "Effect of Use Value Assessment on Property Tax Rates," *American Journal of Agricultural Economics* 52, no. 4 (November): 603-606.

Conklin, Howard E., and William G. Lesher. 1977. "Farm-Value Assessment as a Means for Reducing Premature and Excessive Agricultural Disinvestment in Urban Fringes," *American Journal of Agricultural Economics* 59, no. 4 (November): 755-759.

Coughlin, Robert E., David Berry, and Thomas Plaut. 1978. "Differential Assessment of Real Property as an Incentive to Open Space Preservation and Farmland Retention," *National Tax Journal* 31, no. 2 (June): 165-179.

Coughlin, Robert E. 1980. "The Economic Impact: Differential Assessment and the Conversion of Land to Urban Uses," chapter 3 in *Property Tax Preferences for Agricultural Land*, edited by Neal A. Roberts and H. James Brown. Montclair, NJ: Allanheld, Osmun, and Company.

Council on Environmental Quality. 1976. *Untaxing Open Space: An Evaluation of the Effectiveness of Differential Assessment of Farms and Open Space.* Washington, DC: U.S. Government Printing Office.

Dunford, Richard W., and Douglas C. Marousek. 1981. "Sub-County Property Tax Shifts Attributable to Use-Value Assessments on Farmland," *Land Economics* 57, no. 2 (May): 221-229.

England, Richard W. 2002. "Current-Use Property Assessment and Land Development: A Theoretical and Empirical Review of Development Penalties." Lincoln Institute of Land Policy working paper WP02RE1.

England, Richard W., and Robert D. Mohr. 2003. "Land Development and Current Use Assessment: A Theoretical Note," *Agricultural and Resource Economics Review* 32, no. 1 (April): 46-52.

_____. 2006. "Land Development and Current Use Assessment." Chapter 8 in *Economics and Contemporary Land Use Policy: Development and Conservation at the Rural-Urban Fringe*, edited by S.K. Swallow and R.J. Johnston. Resources for the Future.

Ervin, David E., David L. Chicoine, and Paul D. Nolte. 1986. "Use Value Assessment of Farmland: Implications for Fiscal Stability," *North Central Journal of Agricultural Economics* 8, no. 1 (January): 17-28.

Ferguson, Jerry T., and Michael A. Spinelli. 1998. "Measuring the Effectiveness of Use-Value Taxation," *Assessment Journal* 5, no. 5 (September/October): 56-63.

Fischel, William A. 1982. "The Urbanization of Agricultural Lands: A Review of the National Agricultural Lands Study," *Land Economics* 58, no. 2 (May): 236-259.

Gardner, B. Delworth. 1977. "The Economics of Agricultural Land Preservation," *American Journal of Agricultural Economics* 59, no. 5 (December): 1027-1036.

Giertz, J. Fred, and David L. Chicoine. 1984. "Tax Valuation of Farm Land: Non-Neutrality With Respect to Inflation," *National Tax Journal* 37, no. 2 (June): 253-258.

Gloudemans, Robert J. 1974. *Use-Value Farmland Assessments: Theory, Practice, and Impact.* Chicago: International Association of Assessing Officers.

Hady, Thomas F. 1970. "Differential Assessment of Farmland on the Rural-Urban Fringe," *American Journal of Agricultural Economics* 52, no. 1 (February): 25-32.

Hansen, David E., and S.I. Schwartz. 1975. "Landowner Behavior at the Rural-Urban Fringe in Response to Preferential Property Taxation," *Land Economics* 51, no. 4 (November): 341-354.

_____. 1977. "Income Distributional Effects of the California Land Conservation Act," *American Journal of Agricultural Economics* 59, no. 2 (May): 294-301.

Heimlich, Ralph E., and William D. Anderson. 2001. *Development at the Urban Fringe and Beyond: Impacts on Agriculture and Rural Land.* USDA Economic Research Service. Agricultural Economic Report No. 803.

Hibbard, Calder M., Michael A. Kilgore, and Paul V. Ellefson. 2003. "Property Taxation of Private Forests in the United States: A National Review," *Journal of Forestry* 101, no. 3 (April/May): 44-49.

Hickman, Clifford A., and Kevin D. Crowther. 1991. *Economic Impacts of Current-Use Assessment of Rural Land in the East Texas Pineywoods Region.* U.S. Forest Servie, Southern Forest Experimental Station. Research Report SO-261.

Johnston, Robert J. 2003. "Farmland Preservation and Differential Taxation: Evaluating Optimal Policy Under Conditions of Uncertainty," *Agricultural and Resource Economics Review* 32, no. 2 (October): 198-208.

Kashian, Russell, and Mark Skidmore. 2002. "Preserving Agricultural Land via Property Assessment Policy and the Willingness to Pay for Land Preservation," *Economic Development Quarterly* 16, no. 1 (February): 75-87.

Kashian, Russell. 2004. "State Farmland Preferential Assessment: A Comparative Study," *Journal of Regional Analysis & Policy* 34, no. 1: 1-12.

Kovacs, Kent F. 2009. "The Timing of Rapid Farmland Conversion Events: Evidence from California's Differential Assessment Program." Paper presented at Agricultural and Applied Economics Associations 2009 Joint Annual Meeting, Milwaukee, July 26-28.

Ladd, Helen F. 1980. "The Considerations Underlying Preferential Tax Treatment of Open Space and Agricultural Land," chapter 2 in *Property Tax Preferences for Agricultural Land*, edited by Neal A. Roberts and H. James Brown. Montclair, NJ: Allanheld, Osmun & Co.

Liu, Xiangping, and Lori Lynch. 2008. "Do Agricultural Preservation Programs Affect Farmland Conversion? Evidence from a Propensity Score Matching Estimator." Department of Agricultural and Resource Economics, University of Maryland at College Park, working paper 06-08.

Lopez, Rigoberto A., Farhed A. Shah, and Marilyn A. Altobello. 1994. "Amenity Benefits and the Optimal Allocation of Land," *Land Economics* 70, no. 1 (February): 53-62.

Lynch, Lori, and Wesley N. Musser. 2001. "A Relative Efficiency Analysis of Farmland Preservation Programs," *Land Economics* 77, no. 4 (November): 577-594.

Malme, Jane. 1993. "Preferential Property Tax Treatment of Land." Lincoln Institute of Land Policy WP93JM1.

Mark, Shelley M., and Hiroshi Yamauchi. 1982. "Agricultural Use Value Taxation and Farmlands Preservation: A Basic Inconsistency," *Annals of Regional Science* 16, no. 2 (July): 73-77.

Mark, Shelley M., Hiroshi Yamauchi, and Glenn M. Okimoto. 1982. "Differential Assessment and State Land Use Controls in Hawaii," *Annals of Regional Science* 16, no. 3 (November): 95-100.

McFarlane, Alastair. 1999. "Taxes, Fees, and Urban Development.," *Journal of Urban Economics* 46, no. 3 (November): 416-436.

Morris, Adele C. 1998. "Property Tax Treatment of Farmland: Does Tax Relief Delay Land Development?" In Helen F. Ladd, ed., *Local Government Tax and Land Use Policies in the United States*, 144-167. Cheltenham, UK: Edward Elgar.

Nelson, Arthur C. 1990. "Guest Editorial: Economic Critique of U.S. Prime Farmland Preservation Policies," *Journal of Rural Studies* 6, no. 2: 119-142.

Norris, Patricia E., Lynn R. Harvey, B. James Deaton, and Melissa A. Savard. 2002. *Can Use Value Assessment for Property Taxation of Agricultural Land Protect Environmental Amenities?* Final Report to Michigan Department of Environmental Quality, Great Lakes Protection Fund.

Parks, Peter J., and Wilma Rose H. Quimio. 1996. "Preserving Agricultural Land with Farmland Assessment: New Jersey as a Case Study," *Agricultural and Resource Economics Review* 25, no. 1 (April): 22-27.

Plaut, Thomas R. 1980. "Urban Expansion and the Loss of Farmland in the United States: Implications for the Future," *American Journal of Agricultural Economics* 62, no. 3 (August): 537-542.

Polyakov, Maksym, and Daowei Zhang. 2008. "Property Tax Policy and Land-Use Change," *Land Economics* 84, no. 3: 396-408.

Richardson, Jr., Jesse J. 2007. "Beyond Fairness: What Really Works to Protect Farmland," *Drake Journal of Agricultural Law* 12 (Spring): 163-183.

Rodgers, Pamela H., and Gerry H. Williams. 1983. "A Survey of Use-Value Assessment Laws in the South." Southern Rural Development Center, Mississippi State University. SRDC Series No. 53.

Schatzki, Todd. 2003. "Options, Uncertainty and Sunk Costs: An Empirical Analysis of Land Use Change," *Journal of Environmental Economics and Management* 46 (…): 86-105.

Schwartz, S.I., D.E. Hansen, and T.C. Foin. 1975. "Preferential Taxation and the Control of Urban Sprawl: An Analysis of the California Land Conservation Act," *Journal of Environmental Economics and Management* 2, no. 2 (December): 120-134.

Shi, Yue Jin, Timothy T. Phipps, and Dale Colyer. 1997. "Agricultural Land Values under Urbanizing Influences," *Land Economics* 73, no. 1 (February): 90-100.

Simpson, R. David. 2002. *Tax Rules, Land Development, and Open Space*. Discussion Paper 02-61. Washington, DC: Resources for the Future.

Sohngen, Brent, Diane Hite, and Josh Templeton. 2001. "Land Use Change and Property Taxes: An Empirical Study of the Effect of Property Taxes on the Timing of Land Conversion from Agriculture to Residential Development." Paper presented to Annual Meetings of the American Economic Association in Chicago, August 5-8, 2001.

Spahr, Ronald W., and Mark A. Sunderman. 1998. "Property Tax Inequities on Ranch and Farm Properties," *Land Economics* 74, no. 3 (August): 374-389.

Tavernier, Edmund M., and Farong Li. 1995. "Effectiveness of Use-value Assessment in Preserving Farmland: A Search-theoretic Approach," *Journal of Agricultural and Applied Economics* 27, no. 2 (December): 626-635.

U.S. Department of Agriculture and President's Council on Environmental Quality. 1981. *Executive Summary of Final Report / National Agricultural Lands Study.* Washington, DC: U.S. Government Printing Office.

Veseth, Michael. 1979. "Alternative Policies for Preserving Farm and Open Areas: Analysis and Evaluation of Available Options," *American Journal of Economics and Sociology* 38, no. 1 (January): 97-109.

Vitaliano, Donald F., and Constance Hill. 1994. "Agricultural Districts and Farmland Prices," *Journal of Real Estate Finance and Economics* 8, no. 3 (May): 213-223.

Wear, David N., and David H. Newman. 2004. "The Speculative Shadow over Timberland Values in the U.S. South," *Journal of Forestry* 102, no. 8 (December): 25-31.

Williams, E. Douglass, Robert R. Gottfried, Charles D. Brockett, and Jonathan P. Evans. 2004. "An Integrated Analysis of the Effectiveness of Tennessee's Forest Greenbelt Program," *Landscape and Urban Planning* 69, nos. 2-3 (August): 287-297.

Wunderlich, Gene. 1997. "Land Taxes in Agriculture: Preferential Rate and Assessment Effects," *American Journal of Economics and Sociology* 56, no. 2 (April): 215-228.

Yamauchi, Hiroshi. 1979. "Differential Impacts of Use Value Taxation on Local Property Tax Bases over Time," *Annals of Regional Science* 13, no. 1 (March): 11-22.

Youngman, Joan M. 2005. "Taxing and Untaxing Land," *State Tax Notes* (September 5 issue): 727-738.