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Author(s): Robert A. Blewett and Julia I. Lane

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Development Rights and the Differential Assessment of Agricultural Land:

Fractional Valuation of Farmland is Ineffective for Preserving Open Space and Subsidizes Speculation

By ROBERT A. BLEWETT and JULIA I. LANE*

ABSTRACT. The relative *fiscal* efficacy of using *differential assessment* as a means of preserving *agricultural land* is examined. A simple model of *land use* and *land rent* determination is developed and tested. An implication is that differential assessment merely delays or retards, but does not prevent, the *conversion of land* to *developed uses*. Differential assessment is viewed as a *tax expenditure*, or special *tax reduction*, that in essence leases *development rights*. *Landowners* are also shown to be overcompensated for the development rights implicitly acquired by the *public* sector. The *fee simple purchase of development rights* or *regulatory control* over the use of development rights can be employed to preserve *farm land* at a lower *fiscal cost*.

I

Introduction

ONE MILLION ACRES of prime U.S. agricultural farmland is urbanized each year. Between 1967 and 1977, the land removed from agricultural production was equal to an area the size of New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, and Delaware combined.¹ The availability of the open space provided by agricultural lands has also become a major concern in regions with growing urban areas. As a result, there has been political pressure for the preservation of such land not only by agricultural interest groups, but by urban and suburban residents as well. One method proposed to save farmland from urban encroachment is the differential tax assessment of land devoted to agricultural uses (Miner, 1977, p. 56).

Differential assessment usually implies that agricultural parcels are assessed at the value in their "current use" rather than at their fair market value. This may result in a tax savings to landowners and thus prevent or delay the conversion of parcels to urban uses. There are basically three types of differential assessment statutes:

* [Robert A. Blewett, Ph.D., is associate professor of economics, St. Lawrence University, Canton, NY 13617; Julia I. Lane, Ph.D., is assistant professor of economics, University of Louisville, Louisville, KY 40208.]

- (1) preferential assessment laws;
- (2) deferred taxation laws;
- (3) restrictive agreement laws.

In general, preferential assessment laws outline eligible land uses and parcels are taxed at assessments based on the discounted stream of future values (income) derived from the particular current use. For example, the assessment of a parcel of farmland may be based on the net income derived from agricultural uses.²

Deferred taxation laws have an additional feature in that if the landowner

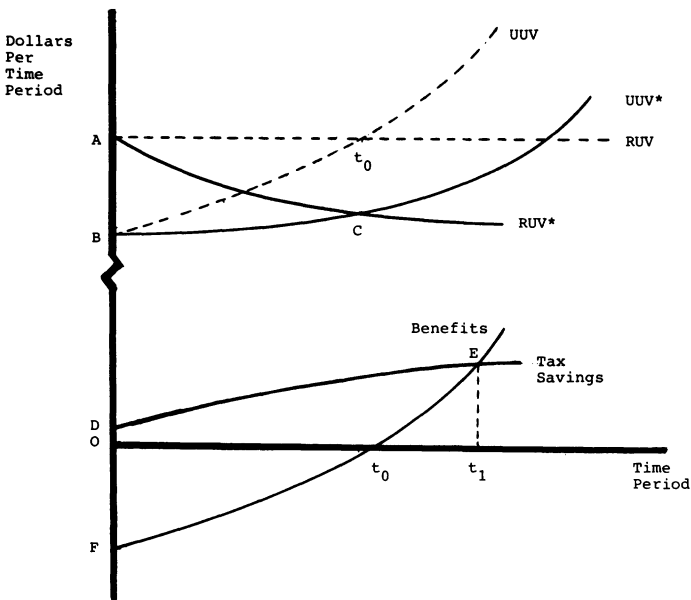


Figure 1. Preferential Assessment and Farmland Conversion

converts his parcel to an ineligible use, then some or all of the tax reductions for a specified number of years must be forfeited. Restrictive agreement laws require that an owner also sign a contract specifying the rights and agreements concerning allowed land uses. In the past 25 years, some 42 states have implemented some type of differential assessment statute (Council on Environmental Quality, 1976, p. 4).

One purpose of differential assessment of agricultural land is the use of taxation as an instrument of land-use control. Differential assessment is also an example of a tax expenditure. Reduced taxes can be viewed as compensation to owners for maintaining socially desirable land uses. The public sector is, in effect, *renting*

or *leasing* the development rights of agricultural land with a reduction in property taxes. This would essentially be the equivalent of giving qualified landowners a direct payment for the rental of development rights and assessing parcels at their fair market value.

A major potential cost of this kind of public policy may well be the irreversible loss of open space and prime farmland brought about by the failure to implement other, more effectual policies. The specific purpose of this study is to examine the relative fiscal efficacy of using differential assessment to preserve agricultural land.³ The economics literature in this area is extensive, as shown in twelve of the items in the bibliography below. However, this literature either discusses or examines empirically the impacts of differential assessment. There is no economic model of the land conversion decision nor of how differential assessment impacts this decision. This study develops such a model. The analysis here also departs from previous literature in that differential assessment is viewed in terms of the public sector renting development rights with tax reductions. This allows for easier, more direct fiscal comparisons with alternative land use controls. The next section develops a simple model of the conversion process. Section III provides an empirical test of some of the model's implications while in the fourth section differential assessment and other methods of controlling or acquiring development rights, namely land-use regulations and the public purchase of easements are compared.

II

The Conversion Decision

WE WILL ASSUME that current use assessment values and fair market assessment values are identical in a steady state world since land would tend to be put to its highest valued use. A difference between the two assessment values implies that future land rents must be different from current land rents.

To see this more clearly, we will develop a simple model of land rent determination. The model will abstract from the plethora of complexities that affect land use and rents in the real world, including differences in expectations, in order to examine some essential aspects of our problem. We will also abstract from any differences between fair market assessments and actual market values. Economic distortions caused by imperfect assessment practices are beyond the scope of this analysis.

Let us examine a single parcel of land. For simplicity, assume assessment procedures are unbiased and the land rent obtainable is independent of the land uses of surrounding parcels. Suppose the rural-use-value per time period

is constant, as is depicted in the upper portion of Figure 1 by curve RUV, and the urban use-value per time period (curve UUV) is increasing. Both RUV and UUV are net of the tax payments per time period. In this case, the parcel will be devoted to rural use until it is converted to urban use in time period t_0 .

The fair market value of the parcel, we will assume, is the sum of the discounted stream of land values. That is to say, all current and future values, net of property taxes, are capitalized into the market value. In this case the fair market value of the land would be equal to the area beneath the discounted rural-use-value curve (RUV* in Figure 1) from time period 0 to period t_0 plus the area under the discounted urban-use-value curve (UUV* in Figure 1) beyond t_0 . The current use assessment value, on the other hand, would just be the area under the discounted rural-use-value curve plus the capitalized value of the reduced property taxes, which is less than the difference between fair market and current use assessment value. Thus with differential assessment, property taxes are not imposed on the discounted stream of future values higher than those of a parcel's current use.⁴

An alternative method of graphically analyzing the conversion of rural land to urban uses is to examine the discounted net benefits of conversion. The discounted net benefit of urban use is the difference between a parcel's discounted urban-use value and discounted rural-use value in a particular time period. Graphically this is represented by the benefits curve (including the points F, t_0 , E) in the lower portion of Figure 1. The benefits curve is derived by taking the vertical difference between curves UUV* and RUV*. Note that area ABC is equal in size to area $O_t F$. In the absence of differential assessment, conversion again occurs when the net benefit of conversion becomes positive at t_0 .

Differential assessment increases the landowner's opportunity cost of converting his parcel to an urban use since the tax preference is lost. As before, the landowner converts the land to urban use when the capitalized value of future UUV's (*i.e.*, urban-use values net of property taxes, corporate income taxes, special assessments and fees) exceeds the capitalized future RUV's (*i.e.*, rural-use values net of property taxes, corporate income taxes, special assessments and fees). The only difference here is that property taxes are dependent upon land use.

With differential assessment, the marginal conditions are such that conversion occurs when the net benefits of conversion in a time period exceed the property tax savings of rural use in that time period. The tax savings in a given period are equal to the effective property tax rate times the difference between the fair market value and the current use value. As shown in the lower portion of Figure

1, the tax savings per period are positive as long as UUV is increasing through time and RUV is constant. Figure 1 also depicts the marginal conditions and indicates that differential assessment delays conversion until time period t_1 , when the tax savings curve intersects the benefits curve.⁵

An important implication of this analysis is that differential assessment does not stop the encroachment of urban development—it merely delays or retards it. Consequently, this method of tax expenditure, or subsidizing through tax reductions, does not purchase development rights, but merely leases the rights while the landowner unilaterally determines the length of the lease. The public sector's tax revenue loss with differential assessment in our example is equal to area DEt_1O . Note that this is much larger than the minimum-willingness-to-be-paid for these development rights which is equal to area t_0Et_1 . Much of this difference is due to the landowner receiving subsidies before t_0 when he does not want to convert anyway. Simple leasing of the development rights could result in the same amount of "preservation" at a lower fiscal cost to local governments.⁶ This additional subsidization of farmland by differential assessment redistributes income away from the general taxpayer to the farm owner and merely serves to subsidize speculation in farmland.

III

An Empirical Test

THE ANALYSIS ABOVE suggests that preferential assessment can at best slow but not prevent the conversion of farmland to urban uses. Thus, a theoretical explanation has been provided for the observed ineffectiveness of differential assessment statutes (Carman and Polson, 1971, p. 449; Conklin and Leshner, 1977, p. 759; Council on Environmental Quality, 1976, p.7; Schwartz, Hansen and Foin, 1975, p. 131). Some implications of the model can be tested empirically using data from Indiana. In 1963 legislation was passed in Indiana mandating statewide differential assessment of farmland based on current-use value. Since all farmland was subject to the same basic assessment practices, this allows for an empirical analysis of the effects of property taxation on farmland conversion before and after implementation of differential assessment using county-level data from the Census of Agriculture and Census of Governments.

The percentage declines in farmland for the periods 1954–59 and 1964–69 in 92 Indiana counties were regressed against the percentage change in population (PPOP), percentage change in property taxes per acre (PTAX) and the percentage change in the number of farmers over 65 years of age (P65).⁷ As was argued above, farmland should continue to convert, but the rate of change

in conversion may be slowed. Thus, during the 1964–1969 period (immediately following implementation) we should expect the rate of conversion to be lower and consequently the intercept should decrease.

The conversion of farmland should also be positively correlated with increased property taxes. In the absence of perfect capital markets, property taxes increase the carrying costs of holding land. Given the difficulty in starting new farms, higher property taxes increase the development pressures. Once a farmer sells

Table 1.**Seemingly Unrelated Regression Results**

Dependent Variable: Percentage Decline in Farmland	Percentage Decline in Farmland	
	1954-59	1964-69
Constant	-.0004* (-3.07)	-.00035 (-1.22)
PTAX	.0716* (4.35)	-.0101 (-.78)
P65	.0420* (3.06)	-.1088* (-3.79)
PPOP	.0622 (1.56)	.1817** (2.43)

n = 92 counties

weighted R² for system (approximate F-test) = .236

t-statistics are in parentheses

*significant at 1% level

**significant at 5% level

the farm due to higher taxes, it is less likely to be farmed until development occurs (Conklin and Leshner, 1977, p. 756). Higher property taxes may also represent increased local government services that may make the land relatively more attractive and hence valuable for developed uses (Hamilton, 1976, p. 743). Total property taxes should have a diminished impact on farmland conversion after implementation (1964–69 period) since farmland bears a smaller proportion of these taxes with differential assessment. Thus PTAX should have a negative coefficient.

Increases in population and the accompanying increases in development pressures should be associated with a decline in farmland. Thus PPOP should have a positive coefficient.

As more farmers reach retirement age, farmland sales should increase and some of this sold farmland would be more likely to be converted to urban uses, leading to a positive coefficient for P65.

There were technical problems involved with estimation. First there was heteroscedasticity—a lack of constant variances in random variables of a series—across counties, as the estimated variability was greater for large counties than for small. This is suspected to be due to larger counties having a greater change in property values in each period. Heteroscedasticity does not bias the parameter estimates but does tend to overstate the t-statistics. Another problem was the choice of estimation procedures. Since the regressions were similar in nature, although estimated for different time periods, it was decided to use Zellner's seemingly unrelated regression (SUR) technique. This not only has the advantage of improving the efficiency of the parameter estimates but also includes any heteroscedastic information in the variance-covariance matrix (Amemiya, 1985).

The results are presented in Table 1. The estimated coefficients all have the expected signs, with the exception of P65 in 1964–69. Note that in the 1964–69 period, after implementation of preferential assessment, the intercept term on the regression equation decreases as expected. Also note that in the 1954–59 period before implementation, the coefficient for property taxes was positive and extremely significant. As expected, the coefficient declined in the 1964–69 period and is insignificant. Similar results were achieved with the use of ordinary least squares, but for the sake of brevity they are not presented here.

IV

Policy Alternatives

A THEORETICAL AND EMPIRICAL EXPLANATION for the observed ineffectiveness of differential assessment statutes has now been developed. Differential assessment of agricultural land is, at least from a fiscal standpoint, a relatively expensive method of preserving agricultural land. This method can be viewed as a tax expenditure, or special tax reduction, which leases the development rights of farmland at an excessive rental rate. The term excessive is used since most of the tax reductions go to landowners during periods when they would not have converted anyway. The length of the lease is also unilaterally determined by the landowner. The conversion of agricultural land to urban use is not prevented but merely delayed or retarded with differential assessment.

It has also been shown that direct leasing of farmland development rights would be less expensive than using the special tax reductions resulting from differential assessment. The cost to the public sector in terms of these tax reductions also tends to be hidden with neither the public nor their representatives possibly even being aware of the real fiscal impact.⁸

Differential assessment statutes are more likely to be effective as tax breaks to farmers rather than as a method of preserving agricultural land. Farmer demands for differential assessment have been particularly intense in areas with relatively high development pressures. In such areas, property values increase rapidly as do property taxes. Farmers are not receiving higher incomes but must pay the increased taxes, and as a result, some may be caught in a cash-flow bind. The tax relief brought by differential assessment may merely help to finance the farmers' land speculation. When the timing is right, it will behoove farmers to sell out to developers.⁹

A major cost of differential assessment may very well be the failure to adopt other, more effectual, policies that could prevent the irreversible loss of open space. There are other methods of preserving agricultural land and one such method is the implementation of land-use regulations. Such regulations, including zoning, can control the use of development rights without compensation to landowners. This places the major burden of preserving farmland on the landowners and thus will be less burdensome to fiscally stressed localities.

The regulatory approach to preserving agricultural land and open space has been used in many communities. For example, exclusive agricultural zones are used in Sacramento County, California; Salem, Oregon; Bucks County, Pennsylvania; Howard County, Maryland; and Stow Creek Township, New Jersey. Numerous growth-conscious communities have used other regulatory methods to preserve agricultural land and open space (Burrows, 1977, p. 33).

The government purchase of development rights is a far more effective means of preserving prime agricultural land. With differential assessment, tax expenditures are generated during periods when landowners are not going to convert to urban uses. The purchase of easements compensates owners only for those rights actually given up. The purchase of easements also allows the permanent preservation of farmland rather than merely generating minor delays in conversions.¹⁰ The public sector can "land bank" the easements and then sell the easements if it deems the benefits of development great enough. However, urban development and the irreversible destruction of agricultural land will not be solely a private individual's decision.

The government purchase of development rights, or easements, has also been used in a few areas to preserve agricultural land. Some examples of such localities

are King County, Washington; Boulder, Colorado; Montgomery County, Maryland; and Ramapo, New York (Wolfram, 1981, p. 399; Correll, Lillydahl and Singell, 1978, p. 208; Burrows, 1977, p. 21). The acquisition of development rights has the distinct advantage of requiring land-use regulators to take account of the opportunity costs of the rights. The economic cost of preserving land would also be much more apparent to taxpayers and their elected representatives than the hidden tax expenditures resulting from differential assessment. City and suburban voters may find the purchase of development rights in their interest despite its higher fiscal costs relative to regulation. Zoning and other land-use regulations are more uncertain methods of agricultural preservation in that changes in these regulations are all too often quite responsive to political pressures from narrow interest groups (Wolfram, 1981, p. 411).

V

Conclusion

A SIMPLE THEORETICAL MODEL was developed and tested which indicates that differential assessment does not prevent farmland from being converted to urban uses, but merely delays or retards the conversion. The purchase of easements and/or land use regulations can be used to prevent urban encroachment.

Given these alternatives, a major cost of differential assessment may very well be the irreversible loss of open space and prime farmland brought about by the failure to implement other, more effective policies.

If the goal of public policy is to preserve farmland, then there are better methods to obtain this goal than the differential assessment of agricultural land. The minor delays in urbanization are brought about at a high—but often hidden—fiscal cost. However, if the objective is merely to subsidize speculation by agricultural landowners, then differential assessment is an efficacious public policy.

Notes

1. See Wolfram (1981, p. 398) and U.S. Congress (1981, p. 10). For a less alarmist view see Fischel (1982).

2. This is a gross oversimplification of how current use assessments are actually calculated. However, for the purpose of the present work this simplification can serve as an adequate generalization.

3. It is beyond the scope of this paper to examine the optimal amount of farmland. The welfare economics is quite involved (Ladd, 1980). This study is limited to comparing different land use controls once the decision to preserve farmland has been made.

4. Land value or site value assessments should not be confused with assessments based on the value of farmland as farmland. The model presented is so simple so that there is no essential

difference between site value and fair market value taxation. However, property taxation and site value taxation may have differing effects on the timing of land conversion (Douglas, 1980, p. 291; Skouras, 1974, p. 449; Smith 1978, p. 66). The differing effects of site value and property taxation with respect to the timing of development are not relevant to the issues addressed in this paper.

5. It should be obvious that in this model, property taxes are capitalized into land prices. This may increase market values but taxes are still decreased and there is still a tax preference for farmland (Pasour, 1975, p. 547; Bevins, 1975, p. 723). Differential assessment can only permanently preserve farmland in a very special case. Assume UUV is greater than RUV and the difference per time period is constant. Conversion will not occur if the net benefits of conversion, or $UUV - RUV$, are less than the tax savings, or $r(UUV/d - RUV/d)$, where r is the effective tax rate and d is the discount rate. This condition is met only in the unlikely case that the tax rate is greater than the discount rate.

6. Current use assessments may also yield tax breaks for owners with no development pressures. If future farmland values are expected to increase, these higher future values may not be captured in current use assessments.

7. The time periods correspond to Census of Agriculture years 1954, 1959, 1964 and 1969. Since the Census of Agriculture and the Census of Governments are taken in different years, property tax revenues for the years 1954, 1962, and 1967 were used. The percentage change in population was derived from census data for the years, 1950, 1960, and 1970.

8. Tax expenditures are only one of the costs of differential assessment. Differential assessment increases administrative costs since two sets of assessment records must be kept—one for current use assessments and the other for fair market assessments. There are also enforcement costs. The authorities must check to insure that actual land uses conform to eligible uses. Disagreements, which end up in court, may also occur over whether a particular parcel's use is eligible. Restrictive agreement laws, however, reduce the areas of potential misunderstanding by specifying in detail the rights and obligations of all parties.

9. The tax reduction brought about by differential assessment may be capitalized into the market value of farmland. Thus, a farmer selling his land before it is to be developed will realize an additional capital gain (See Tullock, 1975, p. 674).

10. It can be shown that unless effective property tax rates are extremely and unrealistically low, permanent preservation of farmland via fee simple purchase would be less expensive to local governments than granting the tax subsidies of differential assessment and thus temporarily saving the same amount of farmland.

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