AN AGRICULTURAL VALUE TAX AS AN ALTERNATIVE TO LAND USE TAX OR MARKET VALUE TAX ON LAND

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INTRODUCTION

A use-value assessment tax requires a system by which agricultural land values may be established. Land value in agricultural use can in principle be determined from the land's income-generating ability. The value of agricultural land can be based upon the capitalized income stream, which implies that net income attributable to land resource, or more theoretically, its value of the marginal product, can be capitalized into economic value [1, p. 2]. A major weakness in the process of determining net returns to land is the requirement that returns to other production inputs can be determined accurately. To be exact, the marginal productivity of every input must be known.

Since management inputs and owned capital inputs are difficult to quantify, their value of marginal products are seldom estimated except in intensive studies. Furthermore, since a market price for these inputs is practically non-existent, they are frequently measured by economists using residual methods. In other words, in estimating return to management, one usually assumes some highly arbitrary land rent and opportunity cost of capital, ascribing net of total return over total cost as return to management. In a similar manner, residual methods could be used to ascribe a residual return to either land or capital. Unfortunately, a residual return to land, management or capital usually involves an educated guess about the other two. Thus, it is at best difficult to accurately estimate net returns to land. Furthermore, for a taxing jurisdiction it may be administratively infeasible to estimate these returns for each land parcel, even by residual methods. However, a detailed study of production costs and farm sales must be maintained by each farmer for income tax purposes. We explore in this study whether or not tax information provides a useful and administratively feasible estimate of the land's ability to generate taxable income. Implications of taxing land's ability to produce are explored in detail by comparing an agricultural value tax with a market value tax on land. Our definition of agricultural value differs significantly from prior definitions of land use value.

DATA

In this study, a stratified random sample of farmers was used to capture wide differences in income and tax situations for Georgia's farmers. Information was collected from a random sample of 1,213 farmers, sample size in each county proportionate to its farm income. After each sample farmer was identified, information on annual cash farm sales, annual cash operating expenses, and net taxable farm income was obtained. In addition, assessed property values and property taxes paid were obtained for each individual.

PROCEDURE

Using the capitalization formula, income can be converted into land values. In a form applicable to a resource such as land the formula is: $V = \frac{R}{I}$, where V is calculated value of farmland, R is annual net income and I is a selected capitalization rate. The value of land, based upon its income-earning capacity in agricultural production, can be calculated after R, net income, and I, a capitalization rate, are determined.

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The income (R) figure used in this analysis is net taxable farm income measured by gross farm income minus cash expenses and depreciation. Residual net farm income was assumed representative of the land's income generating ability, but no attempts were made to derive a net return to land. Thus, we define the value V to be agricultural value rather than land use value.

Aggregation of farmer observations would tend to cancel out results of a typical years for individual farmers, although it would not account for an unusual year in the entire farming sector. Taxable net farm income in 1972 was selected as a representative year for net farm income in Georgia. Since it was impossible for the present analysis to accurately determine whether income was generated from owned or rented property, agricultural use value was estimated only for 580 nonrenters, which represented 47.8 percent of the sample.

The capitalization rate used is the expected rate of return from land which should be comparable to returns from other forms of wealth, properly adjusted for variations in risk and uncertainty. In this analysis a 7 percent capitalization rate was used; however, the effect of any other discount rate could be simply analyzed by making an appropriate adjustment in agricultural value.

Another adjustment might be to recognize net income (R) as a function of inputs other than land. Since these other inputs may have a finite life, the capitalization method should take this into account. Choice of interest rate and capitalization method represent areas for further study if current analysis is accepted as an operational alternative.

INCOME AND TAX SITUATION

An examination of farms by economic class reveals that farm income is closely related to size of operation. Average number of owned and rented acres increased from Class VI farms to Class I farms (Table 1). Farm sales are heavily concentrated on larger farms, especially in Class I, accounting for 70.6 percent of sales but only 22.9 percent of all farmers. Class V and VI farms represent 26.1 percent of the farmers but only 2.2 percent of farm output. Average net farm income for these smallest economic classes is negative, compared to $10,052 per farm for the largest farms.

Table 1. DISTRIBUTION OF FARM INCOME AND EXPENSES BY GROSS FARM INCOME IN GEORGIA, 1972

	Class VI	Class V	Class IV	Class III	Class II	Class I
	Gross Farm Income					
	$0-$2,500	$2,500-$5,000	$5,000-$10,000	$10,000-$20,000	$20,000-$40,000	Over $40,000
	(Dollars)					
Gross Farm Income	1,380	3,768	7,228	14,142	28,448	93,279
Labor Hired	114	265	405	945	2,212	8,772
Interest	163	188	291	494	1,266	3,622
Rent of Farm, Pasture	16	76	105	440	1,289	4,914
Taxes	240	318	410	619	760	1,739
Depreciation	509	683	1,227	2,224	4,009	10,455
Other Expenses	1,440	2,758	4,496	7,972	15,384	53,726
Net Farm Income	-1,166	-520	295	1,447	3,527	10,052
	(Acres)					
Acres (owned)	120	159	196	253	325	525
	(Percent)					
Percentage of Observations	13.0	13.1	17.0	18.6	15.4	22.9

Property taxes increased with higher gross farm incomes of each economic class. Taxes increased from a low of $240 per farm for Class VI farms to a high of $1,739 for economic Class I (Table 1). However, property tax rates are disproportionately high in the low-income farms. Taxes as a per-

centage of gross farm income decreased from 17.4 percent for Class VI farms to 1.9 percent for Class I. The regressive impact of the property tax is even more evident by comparing taxes to net farm income, reflecting a tax burden relative to farmers' ability to pay. Since Class V and VI farms had negative average net farm incomes, average taxes of $318 and $240, respectively, represented a real burden for them. Property taxes represented a significant expense even for large commercial farms; 21.5 percent of net income before taxes for Class II farms and 17.3 percent for Class I farms.

MARKET VALUE VERSUS AGRICULTURAL VALUE

Economic Class

Since net income was closely related to a farm's economic class, agricultural value would also be related to economic class. The average agricultural value would also be related to economic class. The average agricultural value increased from a low of $25 per acre for Class VI farms to a high of $416 per acre for Class II (Table 2). In contrast, market value of land was found to be unrelated to net income or economic class (Table 2). Average market value ranged from a low of $285 for Class V farms to a high of $404 for Class III. Average agricultural value exceeded average market value for highest income (Class I and II) farms. Class VI farms, with an agricultural value of $25 per acre and an average market value of $341 per acre, had the largest difference ($316) between these two values.

Within an economic class there is a great deal of variability between agricultural values and market values. The largest number of observations for each economic class has an agricultural value which is less than 20 percent of market value (Table 2). For 75 percent of the Class VI farms, agricultural value was less than 20 percent of market value. Consequently, few low-income farms had agricultural value greater than market value. Class I had the smallest porportion of its observations in the less than 20 percent category.

Table 2. THE RELATIONSHIP BETWEEN AGRICULTURAL VALUE AND MARKET VALUE OF FARMLAND BY ECONOMIC CLASS OF FARM IN GEORGIA, 1972

Agricultural Value As a Percentage of Market Value	Class VI	Class V	Class IV	Class III	Class II	Class I
			Gross Farm Income			
	$0- $2,500	$2,500- $5,000	$5,000- $10,000	$10,000- $20,000	$20,000- $40,000	Over $40,000
	(percentage of observations)					
Less than 20%	75.0	48.3	45.5	31.7	36.0	26.5
20% - 40%	13.4	20.2	11.7	4.9	2.7	12.3
40% - 60%	3.6	8.8	8.3	13.4	6.7	10.2
60% - 80%	2.7	6.1	9.7	6.3	2.7	6.1
80% - 100%	0.9	5.3	2.8	7.0	5.3	12.2
100% - 120%	0.0	2.6	4.8	4.9	8.0	4.1
120% - 140%	0.0	1.8	3.5	2.8	6.7	2.0
140% - 160%	0.9	0.9	2.1	4.2	8.0	6.1
160% - 180%	0.0	0.0	2.1	2.8	4.0	0.0
180% - 200%	0.0	0.0	0.7	2.1	4.0	2.0
Greater than 200%	3.6	6.2	9.0	19.7	16.0	18.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
	(dollars per acre)					
Value in Agriculture	25	95	265	315	416	405
Market Value	341	285	396	404	370	379

County Population

Increasing population expands demand for land, thus increasing land values, especially near urban areas. Consequently, there may be a significant divergence between agricultural value and market value of farmland near urbanizing areas. Urbanization did appear to increase market values, as agricultural value was less than market value for

88.1 percent of farms in the urban counties with more than 50,000 population (Table 3). In fact, agricultural value was less than 20 percent of market value for a majority of farms in urban counties. No other county grouping had such a large proportion of its farms in this category (less than 20 percent of market value).

Table 3. THE RELATIONSHIP BETWEEN AGRICULTURAL VALUE AND MARKET VALUE OF FARMLAND BY COUNTY POPULATION IN GEORGIA, 1972

Agricultural Value As a Percentage of Market Value	County Population				
	0-7,500	7,500-15,000	15,000-25,000	25,000-50,000	Greater Than 50,000
	(percentage of observations)				
Less than 20%	53.4	38.5	44.6	44.8	61.9
20% - 40%	6.8	13.6	12.4	11.5	14.3
40% - 60%	11.7	8.6	6.4	8.3	7.1
60% - 80%	4.9	5.4	7.4	6.3	0.0
80% - 100%	2.9	4.1	5.5	6.3	4.8
100% - 120%	4.9	3.6	2.5	6.3	2.4
120% - 140%	3.9	3.6	1.5	2.1	0.0
140% - 160%	1.9	3.6	2.5	4.2	2.4
160% - 180%	1.0	1.8	2.0	1.0	0.0
180% - 200%	0.0	1.4	2.0	0.0	2.4
Greater than 200%	8.7	15.8	13.4	9.4	4.8
Total	100.0	100.0	100.0	100.0	100.0
	(dollars per acre)				
Value in Agriculture	165	253	256	228	228
Market Value	282	314	392	408	649

Rural counties had a large percentage of farmland with agricultural value greater than market value. The 7,500-15,000 population group had 29.9 percent of its observations with value in agricultural use greater than market value. Market value increased with each larger population group, from a low of $282 per acre in counties with less than 7,500 population to a high of $649 per acre in counties with greater than 50,000 population. In contrast, highest agricultural values occurred in the 7,500-25,000 population groups. With the highest market value, urban counties had the greatest difference between market value and agricultural value; the average agricultural value accounted for only 35.2 percent of average market value in these counties.

AGRICULTURAL VALUE TAX

When farmers were arrayed by level of net taxable farm income, property tax liabilities generally increased with farm income (Table 4). An important exception is in the lowest income group with an average net farm income of -$6,319 and an average property tax of $931. Taxes per farm in the highest two income categories are 2-5 times as large as in the lowest five.

Implementing an agricultural value tax would eliminate tax liabilities for farmers with negative net farm income. Taxes is the three lowest income categories with positive net farm income would be reduced $200-$300. There would be very little decrease in taxes for farmers with higher net farm incomes.

In addition to the absolute level of property tax liability, tax burdens may be analyzed by calculating ratio of tax to net farm income. Tax burden is clearly heaviest for low-income farmers, because their taxes are high relative to their incomes. Any tax liability would be a burden for farmers with negative net farm income. Furthermore, farmers earning $0-$2,500 pay 40.8 percent of their net income in taxes. Beyond these lowest three income categories, taxes represent 20 percent or less of net farm income. With an agricul-

tural value tax, the tax rate would be reduced to 11.8 percent of net farm income for the $0-$2,500 category and also significantly reduced in the next higher income categories.

Even though level and burden of taxes would be reduced, the tax structure might still be regressive for taxpayers at some income levels and progressive for others at a different level. An overall

Table 4. PROPERTY TAXES AS A PERCENTAGE OF NET FARM INCOME UNDER A MARKET VALUE TAX AND AN AGRICULTURAL VALUE TAX IN GEORGIA, 1972

Net Farm Income Category	Percentage of Farmers	Average Net Farm Income[a]	Average Tax		Taxes as a Percentage of Net Farm Income	
			Market Value Tax	Agricultural Value Tax	Market Value Tax	Agricultural Value Tax
	(percent)	(dollars)	(dollars)	(dollars)	(percent)	(percent)
Less than (-$2,500)	10.3	-6,319	931	0	b/	0.0
(-$2,500) - $0	21.9	-1,086	470	0	b/	0.0
$0 - $2,500	35.2	1,100	449	129	40.8	11.8
$2,500 - $5,000	14.8	3,642	730	387	20.0	10.6
$5,000 - $7,500	8.3	5,982	771	573	12.9	9.6
$7,500 - $10,000	4.1	8,500	749	725	8.8	8.6
$10,000 - $15,000	2.2	12,547	1,312	906	10.5	7.2
$15,000 - $20,000	2.1	16,712	1,593	1,361	9.5	8.2
Greater than $20,000	1.0	24,868	2,232	2,092	9.0	8.4

[a] Net farm income before deducting property taxes.

[b] Average net farm income is negative.

measure of regressiveness or progressiveness can be calculated as the weighted average of changing tax liabilities over all income levels.[1] Thus, we define tax liability change (C) as change in tax liability divided by change in income or:

$$C_i = \frac{TL_{i+1} - TL_i}{I_{i+1} - I_i}$$

where C is tax liability change;
i specifies the income class;
TL is average tax liability per thousand dollars of income; and
I is average net farm income before deducting property taxes in thousand dollars.

Tax liability changes are then weighted by estimated percentage of taxpayers within the specified income classes. Thus, the weighted average index is given by:

$$\text{Index of Tax Equity} = \sum_{i=1}^{n} w_i C_i$$

where w_i is the weight of the ith tax liability change based on the number of taxpayers in income classes i and i+1,
n is the number of income classes, and

$$\sum_{i=1}^{n} w_i = 1$$

If the index value for a particular tax structure is negative, then the tax structure is regressive. If the value is positive the tax structure is progressive.

Applying the index to data in the last two columns of Table 4 would indicate the market value property tax is infinitely regressive, since two income classes have property tax liabilities but negative net farm incomes. Restricting application of the index to those income classes with positive and measurable tax burdens yields an estimated Tax Equity Index of -49.3 for the property tax based on market value, and yields an Index of 14.3 for an agricultural value tax. As a basis for comparison, the Index of Tax Equity was 1.3 for the income tax relative to adjusted gross income for the same group of farmers. Thus, agricultural value tax reduces regressiveness of property tax, as well as reducing the overall level of farm taxes.

SUMMARY AND IMPLICATIONS

Rising income level and extensive use of technology have shifted part of the tax burden from

[1] Such an average implies constant utility of money. The consequences of declining utility of money merely imply that the index is a conservative estimate of change in regressiveness.

land to incomes [3, p. 6]. In order to limit the income subject to taxation, many states have implemented land-use taxes which relate property taxes to the potential income earning ability of the land in its current use. As a logical extension of the land-use tax, this research proposed an agricultural value tax that would relate taxes to the actual level of income generated from the land.

Implementation of an agricultural value tax would change the basis for valuing farmland, but would not alter overall authority or responsibility of the local government. Each parcel of farmland would still be assessed according to market value. Then, if a farmer had documentation that agricultural value (net taxable income times capitalization multiplier [1/I]) was less than market value, his tax bill would be reduced accordingly. Thus, market value could be an upper limit for tax purposes, the same concept that now applies to any other property. In addition, the local government would maintain its authority to establish tax rates.

Substitution of agricultural value tax for property tax would reduce the regressiveness of the tax structure by reducing the relative tax burden of low income farmers. From the administrator's point of view the calculations are simple and based on existing tax procedures and data.

Finally, an agricultural value tax could be viewed as an upper limit of some theoretical land-use tax as this tax is defined in the literature. It is the upper limit depending on the functional relationship between agricultural value and the VMP of land. We believe that agricultural value overstates land VMP since, in particular, our residual method does not account for returns to operator labor and management. If agricultural value is highly correlated with land VMP, then our data indicates it is appropriate to question some of the long-run welfare implications of land use taxes versus market value taxes. Since the agricultural value tax reduces regressiveness, it favors low-income farmers who may have the lowest VMP. To the extent this is true, land may be taxed at less than its VMP to more efficient farmers. Clearly, such a tax policy would favor the less efficient farmer at a real cost measurable in less efficiency for agriculture in general. However, in a more global welfare sense many of us might prefer such an allocation of resources.

Since the agricultural value tax would decrease the tax burden to farmers as a group, there is a long-run implication that financing current government services must fall more on non-farmers. But, as we have shown in another study, non-farmers also face a regressive property tax structure [4]. Shifting a further property tax burden to non-farmers is, therefore, politically infeasible. Both sales and income taxes appear to be the public choices for increased use with little doubt that income tax is least regressive [4]. To the extent that the agricultural value tax is a tax on land's income-generating ability, it is closely allied with current proposals for increased income taxation.

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