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AGRICULTURAL ECONOMICS
STAFF PAPER

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Staff Paper No. 93-19 November 1993

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THE EFFECT OF DEFERRED TAXES ON MARKET VALUE BALANCE SHEETS

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The Farm Financial Standards Task Force (FFSTF), which was developed to establish standards for financial statements for United States production agriculture, recommends that deferred taxes be included as liabilities on market value balance sheets. The rationale for this inclusion is that the market value of assets included on the balance sheet includes gain that would be taxed if the asset were sold. The amount of the tax that would be paid on that gain if the assets were sold, represents a contingent liability that should be reflected on the balance sheet to make the balance sheet equity accurately reflect the owner's net worth in the business.

The equity shown on balance sheets as they have historically been prepared (excluding deferred taxes) by most people in agriculture does not represent the amount of money the owners could take away from the business free and clear. Part of what has been called equity would have to be paid in taxes. Including an estimate of those taxes as a liability makes the equity calculation a true indicator of net worth.

According to GAAP accounting, deferred taxes arise when temporary differences between the tax basis of an asset and its reported amount in the financial statements occur. The effect of these differences on the tax liability are entered as deferred tax liabilities (Kieso and Weygandt).

The idea of inclusion of deferred taxes on market value balance sheets is not new. Frey and Klinefelter incorporated it in their suggested financial statements for agriculture in 1978. However, deferred taxes have not been included on most balance sheets prepared for agriculture. There appear to be two major obstacles causing this resistance, or delay, in adoption.

First, the importance of deferred taxes is not generally known. Some wonder if it is important enough to add the complexity to balance sheet construction. Earlier work by LaDue (1990) using assumed tax basis values, indicated that deferred taxes are indeed important and might represent about 20 percent of assets or 30 percent of equity on average dairy farm situations. Others are concerned that the lack of standards for interpretation of equity values and leverage ratios when deferred taxes are incorporated could lead farmers, lenders and regulators to incorrectly interpret the solvency position of farm businesses.

Second, the correct procedures for calculation of deferred taxes have not been established. A completely accurate calculation would require going through a complex set of tax calculations and forms. Clearly, the FFSTF did not intend to add that degree of complexity to the preparation of balance sheets. The appropriate degree of complexity depends on the importance of various characteristics in the tax law, but research on the importance of these characteristics has not been conducted.

The objective of the research reported in this paper is to provide a foundation for resolution of these obstacles. Actual tax basis and balance sheet data are used to determine the magnitude of deferred taxes and the effect of those taxes on leverage ratios for a sample of farm businesses. Then these data are used to assess the importance of various characteristics of the tax code on deferred taxes and determine the efficacy of various deferred tax estimation procedures.

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1 Professor of agricultural finance, Department of Agricultural Economics, Cornell University. Valerie McConnell conducted the personal interviews and assisted with the data analysis. Stuart Smith and George Casler provided interpretation of the tax code and checked the appropriateness of the tax calculations. Stuart Smith also helped design and field test the questionnaire and assisted in oversight and organization of the personal interviews.

The remainder of this publication presents the results of this research by providing (1) a discussion of the data set used in the analysis, (2) a review of the procedures used to calculate deferred taxes under current tax code, (3) the magnitude of deferred taxes for the sample farms, (4) the effect of various tax law characteristics on deferred tax values, and finally, (5) some conclusions.

The Data Set

The businesses used in this study are a sample of the farms participating in the Cornell Dairy Farm Business Summary (DFBS) project (Smith, Knoblauch and Putnam). As a part of this project the businesses prepare complete financial statements and provide physical operating data to allow a management analysis of the businesses. Cooperative extension specialists, agents and Department of Agricultural Economics personnel work with the participant to insure that the data are consistent, reasonable, complete and representative of the business. The financial statements prepared include market value balance sheets without inclusion of deferred taxes. A sample of participating farms was obtained by selecting a representative set of counties. Counties were used as a basis of farm selection to reduce travel time and cost of data collection.

Income and balance sheet data for 1991 were taken from the financial statements developed as part of the DFBS project. The tax basis data and other tax information were collected by a personal interview during the summer of 1992. A formal survey instrument was developed, pretested, and used for collection of the data. A high proportion of the data could be provided by making available a copy of the most recent depreciation schedule.

The farms selected are somewhat above the state average in both size and apparent managerial ability (Table 1). They are likely representative of the commercial full time farms for which complete farm business financial statements will be necessary for loan and management analysis.

Table 1. Characteristics of Study Farm
84 New York Dairy Farms, December 31, 1991

Farm Characteristic	Value
Total Farm Assets ($)	794,943
Total Farm Liabilities ($)	444,919
Farm Equity ($)	350,023
Total Assets ($)	830,763
Total Liabilities ($)	448,823
Farm and Nonfarm Equity ($)	381,940
Pounds of Milk sold	2,321,441
Worker Equivalent	3.71
Total Crop Acres	336
Nonfarm Income ($)	6,099
Milk Per Cow	18,065
Feed and Crop Expense Per Cwt.	4.62
Milk Per Worker (lbs)	570,961
Capital Per Cow	6,811
Asset Turnover Ratio	.40

Tax Calculation Procedures

A Lotus 123 spreadsheet was developed to calculate the taxes required for a farm business for 1991 under two conditions. First, the taxes were calculated based on the income of the business and tax rules and regulations for that year. Then taxes were calculated under the assumption that the farm was sold as the date of the balance sheet, December 31, 1991. The difference between these two calculations is the 1991 deferred tax. A similar spreadsheet was developed to calculate the deferred taxes under 1993 tax rates and regulations. The 1991 asset, liability and tax data were used with the 1993 spreadsheets to determine the deferred taxes with the changed rates and regulations, but with the same farm data.

The results of the deferred tax calculations, including a summary of the deferred taxes, the tax basis of assets, a without-deferred-taxes balance sheet and a with-deferred-taxes balance sheet, for each farm were sent to the farm manager for review. The manager was asked to review the data and inform the research team of any apparent inaccuracies in the data or results. Incomplete data were identified on one farm as the result of this process.

The tax calculation spreadsheet calculated Self Employment, Federal and New York State taxes. Interdependencies of the tax calculations were incorporated through the deductibility of one-half of the self employment tax for state and federal taxes and the deductibility of state taxes for federal taxes. The calculations simulated the calculations for federal tax form 1040, with schedules A, B, D, F and SE, form 4797 and New York forms IT-201 and IT-212.

Assumptions and procedures used in the calculations were:

1. All gains on the sale of machinery and equipment is ordinary gain (implicitly assumes that all was purchased after 1961 and will sell for less than the purchase price).

2. Itemizable deductions excluding state taxes were assumed to equal the federal standard deduction.

3. The recapture period for federal investment tax credit was past. However, state investment tax credit recapture was assumed at 90 percent of the total for assets purchased in 1991 and 70, 50, 30 and 10 percent for assets purchased in 1990, 1989, 1988 and 1987, respectively.

4. Farmers were asked to identify any purchased livestock that would be expected to sell for more than their original cost to determine any capital gain on purchased livestock.

5. All gains on residences of the owners of the business will either be rolled over into another residence or will be subject to the over 55 years of age exemption of up to $125,000, and thus, will not be taxed.

6. Gains from the sale of single purpose livestock structures and silos is all ordinary gain.

7. The gains from the sale of all buildings is divided between those subject to taxation as ordinary gain to the extent of depreciation taken (single purpose livestock structures and silos) and all other buildings, in proportion to the remaining tax basis.

8. The market values listed on the balance sheet are net of sales costs. This is consistent with DFBS directions for completion of balance sheets.

The Magnitude of Deferred Taxes

A major factor influencing the magnitude of deferred taxes on any farm is the tax basis (undepreciated balance for tax purposes) of the assets. Little published information on tax basis

values is available. Prior research (LaDue) assumed tax basis values. The average tax basis for the farm assets on the 84 farms in the study was 34 percent of market value (Table 2). The major asset causing this low value was livestock which is largely raised dairy breeding stock with a zero tax basis. The tax basis of machinery and equipment was 45 percent of market value. Crop farms and many other types of farms could be expected to have similar tax basis values for machinery. The farm real estate had a somewhat higher average value than machinery (59 percent). This higher value, and the existence of a number of farms with tax basis that exceed market value, result from recent construction of buildings. Livestock buildings frequently add only 40 to 60 percent of their cost to the market value of the farm.

Table 2. Distribution of Book Value (Tax Basis) as a Percent of Market Value 84 New York Dairy Farms, December 31, 1991

Book as % of Market	Breeding Livestock	Machinery	All Real Estate Except House	All Farm Assets Except House
	Percent of Farms			
Under 20	85	17	6	15
20 to 39	12	27	29	55
40 to 59	1	32	24	26
60 to 79	1	15	23	4
80 to 100	1	5	7	0
Over 100	0	4	12	0
	Average Book Value as Percent of Market Value			
All Farms	9	45	59	34

Note: Totals may not add due to rounding.

These tax basis values have significance for the farm vs. nonfarm rates of return discussions frequently seen in the literature. For these farms rates of return based on book values, where tax basis is accepted as the book value, would be three times greater than rates of return based on market values. Based on the values found for machinery and real estate, it is likely that book value rates of return for most of agriculture would be at least two times those reported based on market values.

Inclusion of deferred taxes will clearly significantly influence farm balance sheets (Table 3). The average deferred tax for 1991 for the group of farms was $158,474. This represented 19 percent of the value of assets and 29 percent of total equity calculated without consideration of deferred taxes. Even small farms with less than $400,000 of assets have average deferred taxes of over $45,000. Farms with over one million dollars in assets would have had to pay an average of nearly $340,000 in taxes if the farm were sold.

The imposition of 1993 rates had a relatively modest effect on average deferred tax liability. Total deferred tax for small farms declined slightly as a result of increases in exemption and deductions and an inflation induced upward shift in tax brackets. Taxes for those farms with over one million dollars in assets increased about $11,000 or three percent. The 36 and 39.6 percent rates that were added by the 1993 tax law had a modest effect because the maximum capital gain rate remained at 28 percent. Thus, the effective tax rate on much of the income resulting from sale of the farm was not changed.

The direct effect of deferred taxes is to reduce the net worth of the business. The average percentage reduction at 1991 tax rates was 31 percent for farm and nonfarm assets and 33 percent for farm assets (Table 4). However, the range in equity loss was from eight percent to 81 percent. Deferred taxes would consume 21 to 40 percent of farm equity on about half of the farms. Most farms would lose between 10 and 60 percent of their equity by incorporation of deferred taxes.

Table 3. Deferred Taxes by Farm Size
84 New York Dairy Farms, December 31, 1991 Asset Values

Total Farm Assets	No. of Farms	Self Employment Tax	State Tax	Federal Tax	Total Deferred Tax
1991 Tax Rates					
Less than 400,000	18	2,602	10,105	32,734	45,442
400,000 to 599,999	22	4,405	21,544	72,301	98,250
600,000 to 799,999	16	5,667	28,192	100,508	134,367
800,000 to 999,999	9	8,852	42,254	141,220	192,326
1,000,000 or More	19	9,130	77,289	253,139	339,558
All Farms	84	5,804	35,187	117,483	158,474
1993 Tax Rates					
Less than 400,000	18	2,602	10,105	31,963	44,671
400,000 to 599,999	22	4,405	21,544	71,816	97,765
600,000 to 799,999	16	5,667	28,192	101,397	135,256
800,000 to 999,999	9	8,852	42,254	142,594	193,700
1,000,000 or More	19	9,130	77,289	264,116	350,535
All Farms	84	5,804	35,187	119,990	160,982

Since the 1993 rates had little effect on total deferred taxes, the effect on the net worth position was little changed from results with 1991 rates. Average deferred tax as a percent of net worth remained at 33 percent of farm equity and 31 percent of farm and nonfarm equity.

The average equity reduction did not vary by farm size (results not shown). Average reduction for the farm size groups shown in Table 3 varied only slightly around the average values shown in Table 4 with no trend.

The major problem with relating deferred taxes to net worth is that the primary determinant of net worth is the level of debt on the farm. Thus, the interfarm stability of the effect of deferred taxes is low. Somewhat greater stability is achievable by relating deferred taxes to total assets. Deferred taxes averaged 18 percent of total assets and 19 percent of total farm assets (Table 5). For most farms deferred taxes were 11 to 25 percent of the market value of total assets. Use of 1993 tax conditions had little impact on the relationship between deferred taxes and total assets.

Table 4. Distribution of Deferred Taxes as a Percent of Net Worth Without Deferred Taxes
84 New York Dairy Farms, December 31, 1991 Asset Values

Deferred Taxes as % or NW	1991 Tax Rates		1993 Tax Rates	
	Farm Only	Farm & Nonfarm	Farm Only	Farm & Nonfarm
	Percent of Farms			
20 or less	11	12	10	13
21 to 40	50	53	51	52
41 to 60	14	11	14	11
61 to 80	3	2	3	3
81 and Over	1	1	1	0
	Average Deferred Tax as Percent of Net Worth			
All Farms	33	31	33	31

Table 5. Distribution of Deferred Taxes as a Percent of Assets Without Deferred Taxes 84 New York Dairy Farms, December 31, 1991 Asset Values				
Deferred Taxes	1991 Tax Rates		1993 Tax Rates	
as % or Assets	Farm Only	Farm & Nonfarm	Farm Only	Farm & Nonfarm
	Percent of Farms			
10 or less	5	8	6	8
11 to 15	21	17	20	17
16 to 20	26	32	24	31
21 to 25	37	38	37	36
26 and Over	11	5	13	8
	Average Deferred Tax as Percent of Net Worth			
All Farms	19	18	19	18

The data in Tables 3 through 5 indicate that inclusion of deferred taxes will materially influence market value balance sheets. In particular the level of net worth and solvency ratios will be influenced. Although the dollars of net worth is of primary concern to the farm owner or owners, percent equity, the debt/asset ratio and the debt/equity (leverage) ratio are solvency ratios that are widely used by farmers, lenders and regulators in evaluating loans.

The Effect of Tax Law Characteristics

The basic issue in incorporating deferred taxes into market value balance sheets is the appropriate calculation procedure to use in estimating the tax liability. Completely accurate calculations would require completion of numerous federal and state tax forms. The FFSTF was clear that this level of sophistication was not required nor expected. However, the accuracy of the estimation procedure does influence the accuracy of the resultant deferred tax entries.

The tax law includes a number of characteristics that combine to determine tax liability. Some of those characteristics are undoubtedly more important than others. In an effort to determine which characteristics should be considered in estimating deferred taxes, the tax liability was calculated for each of the 84 farms with selected parts of the tax code omitted. In each case the tax calculations were identical to those used for Tables 3 through 5 except for omission of specific parts of the tax code. The specific tax situations evaluated were (the numbers in the list below are referred to as analysis numbers in the text that follows):

1. No recapture of state investment tax credit.
2. No state investment tax credit (and no recapture of state investment tax credit).
3. No federal investment tax credit (carryover).
4. No investment tax credit (federal or state, and no recapture) (ITC).
5. No self employment tax (social security or medicare) (SET).
6. No base year income (no calculation of base year taxes without sale) (i.e., taxes without sale of the farm are assumed to be zero) (BY).
7. No residence exemption (gain on sale of residence is taxed like other assets, no rollover of gain on residence into another house and no use of the exclusion of the first $125,000 from taxation for those over 55 years of age) (RE).
8. No maximum capital gains rate (all income taxes at normal rates) (CG).
9. No state taxes (state taxes are zero).
10. No self employment tax and no base year income.
11. No maximum capital gains rate, no investment tax credit, and no residence exemption.
12. No investment tax credit, self employment tax, maximum capital gains rate, base year income or residence exemption.
13. No federal or state investment tax credit and no maximum capital gains rate.

14. No federal or state investment tax credit, no self employment tax and no base year income.
15. No federal or state investment tax credit, no maximum capital gains rate and no self employment tax.
16. No federal or state investment tax credit, no maximum capital gains rate, no self employment tax and no base year income.
17. No federal or state investment tax credit, no self employment tax, no base year income and no residence exemption.
18. No state taxes, no self employment taxes, no federal investment tax credit and no maximum capital gains rate.

Using 1991 tax rates taxes, omitting any one of the tax characteristics, except for state taxes, by itself (analyses 1 through 9) misestimated deferred taxes on the average farm by no more than five percent. Omitting state taxes underestimated taxes by 15 percent.[2] Omitting the residence exemption had a greater effect on small farms. Deferred taxes would be overestimated by 10 percent for the average small farm (under $400,000 in assets) but by only two percent for large farms (over $1 million in assets).

The combined effect of omitting all of these tax characteristics except state taxes (analysis 12) are somewhat offsetting and result in average overestimation of only three percent. However, if only the factors that tend to increase taxes by their omission are excluded (analysis 11) average taxes of the smaller farms are overestimated by an average of 18 percent. This appears to be the result of interaction of the residence exemption and the maximum capital gains rate. Including the residence exemption in the calculations (analysis 16) reduces the error to one percent for average situations and six percent for the small farms.

Using 1993 tax rates with the 1991 farm data produced similar results except that the maximum tax rate on capital gains became much more important. With 1993 tax rates the maximum capital gain rate protects farmers from 36 and 39.6 rates instead of 31 percent rates. When only the maximum capital gains tax rate was excluded (analysis 8) taxes were overestimated by an average of 16 percent. The problem was particularly severe on large farms where overestimation averaged 18 percent. The combined effect of excluding investment tax credit, maximum capital gains rate and residence exemption resulted in 60 percent of the farms being overestimated by 20 percent or more.

Conclusions

Inclusion of deferred taxes has a significant effect on market value balance sheets. For a sample of dairy farms, the average book value (tax basis) of the farm assets was only 34 percent of the market value. The prevalence of raised animals made the average book value of breeding livestock only nine percent of market value. Similar values for machinery and real estate were 45 and 59 percent, respectively. The farm net worth of these businesses declined by 33 percent by inclusion of deferred taxes. Deferred taxes amounted to 19 percent of the market value of all farm assets.

For the average farm, investment tax credit, investment tax credit recapture, the maximum rate on capital gains, self employment tax, base year income and carryover of operating losses each have only a modest effect on the deferred tax liability with 1991 tax rates. On an individual farm basis each of these tax characteristics amount to less than 12 percent of the total deferred tax liability for most farms. The only exception was the residence exemption which significantly influenced taxes for many small farms.

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[2] Contact the author for more detail on the exact results of the analyses.

When combined, the effects of these tax characteristics are somewhat offsetting and result in a total effect of only about three percent. Incorporating the residence exemption in the analysis improves the results for small farms.

Use of 1993 tax rates instead of 1991 (or 1992) rates has only a modest affect on total deferred taxes. Deferred taxes were slightly lower for small farms due to larger exemptions and deductions. The higher marginal rates increased taxes on large farms, but the increase was modest because much of the income was subject to the maximum capital gains rate which did not change in 1993.

The importance of various tax characteristics with 1993 tax rates were similar to the results obtained with 1991 tax rates except that the maximum capital gains rate becomes important on large farms. Capital gain treatment is protecting income from being taxed at 36 and 39.6 percent instead of 31 percent. Under these conditions deferred taxes could be reasonably estimated using federal and state tax rates with consideration for the residence exemption and capital gains taxation.

References

Frey, T.L. and D.A. Klinefelter. "Coordinated Financial Statements of Agriculture." *Agri Finance*, 1987.

Kieso, D. and J. Weygandt. Intermediate Accounting, John Wiley and Sons, New York, Fifth Edition 1986.

LaDue, E.L. "Deferred Taxes on Market Value Balance Sheets." *Journal of Agricultural Lending* 4:2, Fall 1990.

Recommendations of the Farm Financial Standards Task Force, Financial Guidelines for Agricultural Producers, Farm Financial Standards Task Force, 1991.

Smith, S.F., W.A. Knoblauch, and L.D. Putnam. "Dairy Farm Management Business Summary, New York State, 1991." Department of Agricultural Economics Research Bulletin 92-6, Cornell University, August 1992.

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