Farm investment response to changing income tax laws

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ncome tax laws are an important deter-

calculating optimum investments for each farm size for each tax situation during the eight-year planning period (table 1). Real net worth increased between the initial and terminal periods in only two cases: the medium and large farms in the no-tax situation. Terminal values for the other cases decreased because of family living expenses and crop prices that gave low farm returns. Comparison of the hypothetical no-tax with the two tax situations indicates that taxes decreased net worths.

The changes between pre- and post-ERTA net worths for each farm size were small, ranging from 1.76 to 1.90 percent. ERTA did, however, have pronounced effects on farm production, investment, and financing decisions - decisions with important implications for the agricultural sector. The most important effects are on land and machinery purchases, debt, and taxes paid.

None of the three hypothetical farms purchased land in the no-tax situation: all growth was through leasing, although less land was leased than the respective constraints allowed. Each farm grew the maximum allowed in the two tax situations, but methods differed by situation

and farm size. A larger proportion of the expansion was by land purchase in prethan post-ERTA. Lower tax rates, effective with ERTA, decreased incentives to purchase farmland with debt financing.

A high-income farm's relative advantage in bidding for land was also reduced. Land purchases accounted for 75 percent of large and medium farm acreage expansion before ERTA and 63 percent after ERTA. The small farm purchased 68 percent of land used for expansion before ERTA but only 41 percent after ERTA.

Each model farm initially had excess machinery capacity that could be maintained or sold. In the no-tax situation, farms of all three sizes sold their excess capacity at the end of the first year and, by the end of the third year, sold all machinery that needed replacement. In the two tax situations, sales were staggered to reduce tax liabilities, but the original machinery stock was sold by the end of the fourth and fifth years.

Present values of machinery purchases in each farm size were highest for the pre-ERTA and lowest for the no-tax situation (table 2). The decrease in machinery purchases when moving from

Farm size and stock type	Initial period	Terminal period value*		
		No-tax	Pre-ERTA	Post-ERTA
Small		dollars		
Land value	1,344,000	1,100,523	1,853,699	1,556,623
Machinery value	121,601	25,803	38,850	43,379
Savings	9,500	278,976	0	0
Total debt	141,663	28,560	664,826	382,929
Net worth	1,333,438	1,310,711	1,116,501	1,136,194
Medium				
Land value	2,688,000	2,201,039	3,851,763	3,605,399
Machinery value	162,034	51,605	99,183	90,247
Savings	19,000	672,342	0	10,983
Total debt	260,098	57,112	1,429,159	1,156,216
Net worth	2,608,936	2,735,812	2,290,681	2,334,089
Large				
Land value	5,376,000	4,402,078	7,703,520	7,153,307
Machinery value	216,505	101,108	300,602	262,580
Savings	38,000	1,413,066	0	50,738
Total debt	493,127	112,639	2,924,677	2,332,207
Net worth	5,137,378	5,539,488	4.617.234	4.705.220

TABLE 2. The present value of machinery purchases by farm size and income tax situation.

Farm size	Present value of machinery purchases by tax rule			
	No-tax	Pre-ERTA	Post-ERTA	
	dollars			
Small	54,123	101,932	81,864	
Medium	108,738	254,999	199,742	
Large	209,785	744,513	575,471	

minant of agricultural investments and have long-run effects on the structure of agriculture. While agricultural tax shelters receive considerable publicity, other tax laws and tax law changes may affect farming operations just as dramatically over the long term. A recently completed study of the Economic Recovery Tax Act of 1981 (ERTA) on California farms demonstrates that interactions of such tax law changes can produce striking and unexpected results.

ERTA decreased the depreciation period for capital assets, liberalized the investment tax credit, reduced individual income tax rates, and indexed tax rates for inflation. We analyzed the effects of these tax law changes on representative small, medium, and large California rowcrop farms by means of a dynamic optimization model. The model optimizes all decisions at once over the total eight-year period to maximize the firm's net worth. This is done, for example, in such a way that the effect of a decision made in year one on the results in year eight, as well as all other years, is optimum.

On each of these three hypothetical farms, decisions were made each year on investment in land and machinery, savings, debt, land leasing, total acreage planted, and crop mix over an eight-year period with the objective of maximizing the firm's net worth. In the study, we considered three income tax alternatives: no income taxes, pre-ERTA rules, and post-ERTA rules. The farms had the same beginning position for each set of tax rules; each faced the same input and output prices and was subject to the same constraints in each tax situation. Only the income tax rules differed.

In the study, the model farms are representative of Yolo County irrigated row crop operations producing processing tomatoes, field corn, sugarbeets, and winter wheat. Each farm can expand by leasing or buying land, but annual growth is limited to 40, 80, and 160 acres for the small, medium, and large farms, respectively. All land farmed at the beginning of the planning period was owned (table 1). Land ownership by farm size was: small, 320 acres; medium, 640 acres; and large, 1,280 acres.

Results

We estimated the effects of income taxes and changing income tax rules by

Total package has to be considered

pre- to post-ERTA tax rules was unexpected. Changes in investment tax credit and depreciation rules in ERTA were designed to encourage increased machinery investment, but this positive effect is apparently offset by reduced tax rates. Lower tax rates decrease the present value of tax savings from interest and depreciation deductions and increase the desirability of repairing machinery instead of replacing it.

Even though ERTA reduced machinery purchases, the farms still held excess machinery capacity. For example, the number of crawler tractors owned by the large farm in the terminal period was: notax, 2.31; pre-ERTA, 6.73; and, post-ERTA 4.99. (The analytical model could not be restricted to whole numbers; if the solution could be restricted, it would probably result in a slight increase in machinery investment.) Because cropping patterns were identical under pre- and post-ERTA rules and differed only slightly in the no-tax situation, differences in machinery purchases could be attributed almost entirely to tax rules.

Each model farm financed land and machinery purchases and made decisions regarding savings and equity refinancing. There are significant differences in optimum levels of saving and debt by situation (table 1). None of the farms had any savings in the pre-ERTA tax situation, and debt levels were high. Medium and large farms had some savings in the post-ERTA situation but also had relatively large debts. Without taxes, the model farms added significant amounts to savings and reduced their debt to very low levels.

Equity refinancing practices differed by farm size and tax situation. There was no refinancing in the no-tax situation. Equity refinancing was substantially greater in the pre-ERTA than in the post-ERTA situation (fig. 1). The higher pre-ERTA rate of refinancing results from lower net cash flows and higher tax savings for pre-ERTA interest deductions.

Even though ERTA decreased tax rates, the present value of the firms' total tax liabilities was higher under post- than pre-ERTA rules. After ERTA, it was advantageous for the farms to reduce investment, increase taxable income, and have higher total income tax liabilities. The present value of their after-tax net cash flows was also higher under the post-ERTA rules. These results indicate that, with ERTA, government tax revenues would increase as would net worths and net cash flows of the farms.

Conclusions

The results of our analysis of optimum adjustments to changing income tax laws by three hypothetical California row crop



Fig. 1. Equity refinancing by three hypothetical farms was substantially greater before the Economic Recovery Tax Act of 1981 than after because of lower net cash flows and higher tax savings on interest deductions.

farms help explain past adjustments in the agricultural sector and provide hypotheses concerning future developments. We conclude that income taxes and changing tax rules can significantly affect farm investment patterns, financing decisions, and growth. Investment in land and machinery increases as progressive tax rates increase, and the degree of distortion increases with the income level of the farm firm. By increasing the demand for land and machinery, income tax rules can raise the prices of these assets. Because the high-income firm receives greater tax savings on its interest deductions, it can afford to pay more for an asset than can a low-income firm.

The progressive income tax rate structure is intended to redistribute income and improve equity among firms of different sizes. In reality, interactions between the rate structure and the deductibility of interest expenses and depreciation cause the investment opportunities of high-income farms to expand relative to those of lower income farms. By reducing the degree of progressivity, ERTA diminishes the relative bidding advantage of high-income over low-income farms. Progressive income tax rates combined with deductible interest and depreciation, however, will always provide a differential advantage to larger farms.

Our results suggest that income tax rules that promote debt financing are partially to blame for the financial crisis now faced by many farms. As shown by the pre-ERTA results, when crop prices and taxable incomes were high in the mid-1970s, the deductibility of depreciation and interest payments, combined with investment tax credits and progressive tax rates, promoted land and machinery purchases and encouraged debt financing. Now with lower crop prices, high real interest rates, and declining land values, many farms do not have the cash flow necessary to service their debt and are unable to improve their position by selling land.

Many participants in the farm machinery industry blame low sales on the current depressed state of the farm economy. Low farm returns are an important factor in low machinery sales but, because of ERTA, sales will not rebound to the extent expected when crop returns improve. The decrease in tax rates and bracket indexing provided by ERTA diminish the incentive for farms to shelter income by investing in excess machinery capacity.

Income tax simplification proposals now before Congress have provisions that would decrease the progressiveness of the tax rate structure, lengthen the time over which depreciation deductions may be taken, and eliminate the investment tax credit. Preliminary analysis indicates that the rules being discussed will probably provide results somewhere between the no-tax and post-ERTA results in table 1. Proposed changes would certainly decrease the demand for farm machinery, other factors being equal, but the effect on incentives to purchase land is unclear. Land could become a preferred investment, given changes affecting other assets and the possible indexing of capital gains.

This research reveals the importance of considering the total package of tax law changes rather than singling out one provision and determining its isolated effect. Interactions between factors such as investment incentives and rate changes may have unexpected consequences and unintended effects.

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