Farm investment response to changing income tax laws

Sermin D. Hardesty  □  Hoy F. Carman

Income tax laws are an important determinant 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 row-crop farms by means of a dynamic optimization model. The model optimizes all decisions at once over the total planning 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, sugar beets, 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 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 pre-also 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 pre-ERTA to post-ERTA was 45 and 38 percent for large and medium farms, respectively, and 40 percent for the small farm. The change in machinery usage was due to differences in the production and income functions for the current and past years.

Considering all the tax law changes made in 1981 (table 2), farms of all three sizes sold their excess machinery 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 pre-ERTA to post-ERTA was 45 and 38 percent for large and medium farms, respectively, and 40 percent for the small farm. The change in machinery usage was due to differences in the production and income functions for the current and past years.
The present value of their after-tax net cash flows was also higher under the post-ERTA rules. These results indicate that, by lowering tax rates and changing tax rules, ERTA substantially reduced the present value of tax savings from interest and depreciation deductions and increased 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: no-tax, 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 very low. Medium and large farms had some savings in the post-ERTA situation but also had 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 increase 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 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 farm receives greater tax savings on its interest deductions, it can afford to pay more for an asset than can a low-income farm.

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 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 sell into a low-investment machinery capacity. Income tax simplification proposals now before Congress have provisions that would decrease the progressiveness of the tax rate structure, lessen 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.

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.

Sermin D. Hardesty, formerly Postgraduate Research Agricultural Economist, Department of Agricultural Economics, University of California, Davis, is now Assistant Professor, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, and Roy F. Carman is Professor, Department of Agricultural Economics, UC Davis.