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Economics of Qualified Individual Retirement Plans and Alternative Investments

by George F. Patrick, Associate Professor of Agricultural Economics and Extension Economist

The Economic Recovery Tax Act of 1981 allows individuals with earned income to set aside that income, up to an annual limit of $2,000, in an Individual Retirement Account (IRA). This $2,000 annual contribution to an IRA can be deducted from current taxable income—and the tax deferred. Taxes are also deferred on the earnings (interest, dividends and/or capital gains) of the IRA as they accrue. Both the original contributions and their earnings are fully taxable as ordinary income when withdrawn at retirement, although regular income averaging may apply. Redemption distributions, made to an individual who has not reached age 59 1/2 and who is not disabled, are also subject to a 10 percent penalty.

Deferral of taxes on income is one of the key elements of many tax shelters. In the case of an individual in the 35 percent tax bracket (a taxable income of $23,500 if you are single) $2,000 per year in an IRA earning 12 percent would have, before taxes, $161,398 in 20 years. Assuming the individual’s tax bracket decreased to 25 percent end of 20 years. Although an IRA may be a good retirement investment for many individuals, an IRA might not be the best investment alternative for farmers and other small businessmen.

This publication analyzes some of the economics of qualified individual retirement plans and alternative investments. Both tax and economic factors influence the after-tax value of these investments. An investment may be tax-deferred, have annual earnings in the form of ordinary income and/or long-term capital gains, and appreciate in value and qualify for investment tax credit. All of those factors, as well as marginal tax rates, influence the after-tax value of investments. Expected returns and riskiness also vary among investments.

This article is divided into three sections. The first briefly describes the types of investments considered and the formulas used to compute the after-tax liquidation values at retirement. Numerical results are presented in the second section. Emphasis is given to the effects of marginal tax rates, rates of return, ordinary income vs. long-term capital gains, investment tax credit, and asset appreciation. A brief analysis compares the effects of early withdrawal from an IRA with alternative investments. The final section summarizes the primary effects of the factors analyzed and provides some guidelines for evaluating alternatives.

Investments and Calculations

Farmers, businessmen and other individuals with earned income may invest in an IRA or, in some cases, a Keogh plan. In both cases, the annual contributions are tax-deferred, and earnings are not taxed as they accrue. If the amount invested and the rate of return were constant each year, the before-tax value of the tax-deferred retirement fund at the end of n years would be:

\[ F = A \left(1 + r\right) \left(1 + r\right)^n - 1 \]

where

- \( F \) = before-tax value after n years,
- \( A \) = annual contribution,
- \( r \) = annual rate of return, and
- \( n \) = years of investment.

Because contributions are generally made at the beginning of each year when the tax return is filed, the standard annuity formula with deposits made at the end of the year has been adjusted by \((1 + r)\), the earnings of the first year.

Funds in an IRA account can be invested in annuity contracts; savings accounts with a bank, savings and loan association, or credit union; mutual fund shares; or in any assets that are acceptable investments for a qualified plan. Earnings may be as interest, dividends and/or capital gain income. Assets may be invested in forms which may appreciate over time, e.g., mutual funds. However, both the annual contributions and accumulated earnings are taxed as ordinary income when distributed. Distribution can be in a lump sum or

Although IRAs and Keogh plans are similar in many economic and tax aspects, this analysis considers only IRAs.


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as an annuity. In the latter case, additional earnings and taxes will accrue as the investment is liquidated.

For simplicity, it is assumed that the investment is liquidated in a lump sum. When liquidated in year \( n \), the after-tax value of the investment is:

\[
(2) \quad V = (1 - T2)F
\]

where

\( V \) = after-tax value after \( n \) years, and

\( T2 \) = the composite federal and state income tax rate in the year of liquidation.

For individuals not itemizing deductions, the composite income tax rate is the sum of the federal and state tax rates. For individuals itemizing deductions, the composite rate equals the state tax rate plus \((1 - \text{state tax rate}) \times \text{federal tax rate}\).

Individuals also have the possibility of investing in a variety of nontax-deferred alternatives. These include financial investments with no possibilities of capital gains income or asset appreciation. Savings accounts, certificates of deposit, and money market funds are some examples of these types of investments which have an annual return of ordinary income. Other financial investments such as stocks, mutual funds and bonds involve the possibility of asset appreciation and/or annual capital gains income as well as an annual return of ordinary income.\(^2\)

Farmers and businessmen commonly have the alternative of taking the money which could be contributed to an IRA or invested in financial asset and investing in their business. For example, a farmer could invest in supplies, machinery, livestock, buildings and land. A businessman might invest in inventory, equipment, facilities and real estate. Such an investment in a farm or nonfarm business would be expected to yield a return of ordinary income to the investment after renumerating the owner’s labor and management. In addition, there may also be an annual return of long-term capital gain income such as from the sale of raised breeding stock. Some of the investment and reinvestment of earnings may qualify for investment tax credit. Finally, the value of the business assets may increase over time through appreciation and yield long-term capital gain income when the investment is liquidated. Increases in the value of farmland and other estate are examples of this type of return.\(^3\)

The total annual return on a nontax-deferred investment can be expressed as:

\[
(3) \quad p = [(1 - T1) (1 + .1c)r] + [(1 - .4T1) (1 - .1c)Z] + g
\]

where

\( p \) = rate of annual total return,

\( T1 \) = composite tax rate before retirement,

\( c \) = fraction of annual after-tax investment and reinvestment qualifying for 10 percent investment credit,

\( r \) = rate of annual ordinary income return,

\( Z \) = rate of annual long-term capital gain income, and

\( g \) = rate of annual asset appreciation.

Thus \( p \) consists of the after-tax annual ordinary income return adjusted for investment credit, the after-tax capital gain income also adjusted for investment credit and the rate of appreciation. If an investment does not have a specific type of return, that element in the equation is zero.

The ending value of the nontax-deferred investment is given by:

\[
(4) \quad F = [(1 - T1) (1 + .1c) A] [(1 + p) [(1 + p)^n - 1]/p]
\]

where

\( F \) = value after \( n \) years,

\( A \) = annual contribution,

\( n \) = number of years of investment, and

the other variables are defined as in equation 3. This differs from equation 1 in that only the after-tax value of the annual investment, increased by any investment credit, is considered.

When the nontax-deferred investment is liquidated, only the capital appreciation is subject to tax. Any recapture of depreciation, cost recovery or investment tax credit is ignored in this analysis. The amount of tax would be:

\[
(5) \quad T = .4T2 [F - n(1 - T1) (1 + .1c)A] (g/p)
\]

where

\( T \) = amount of tax, and

\( T2 \) = composite tax rate in year of liquidation.

The increase in value over the \( n \) original after-tax contributions is indicated by the terms within the brackets of equation 5. Only \( g/p \) fraction of that increase has not been previously taxed. This proportion is taxed as long-term capital gain income at the retirement tax rate.

The after-tax value of the nontax-deferred investment in year \( n \) is:

\[
(6) \quad V = F - T
\]

The Vs of equation 2 and equation 6 can be used to compare tax-deferred and nontax-deferred investment alternatives.

\(^2\)Tax exempt bonds would be a special case in which the annual return, interest, is not subject to tax. Tax exempt bonds are not considered in this analysis.

\(^3\)This analysis assumes that the farm or business is made in a pool of assets rather than a specific asset. Furthermore, the analysis assumes that the IRA vs. nondeferred investments is marginal in terms of the individual’s balance sheet and is treated as an equity investment.
Numerical Results

A FORTRAN language computer program was developed from equations 1 to 6 to allow analysis of various investment alternatives. The program allows variables to be changed over a selected range to permit an analysis of the sensitivity of the results obtained. A listing of the computer program is presented as Appendix A.

The after-tax value of a tax-deferred investment is influenced by the amount of the annual contribution, number of years invested, annual rate of return and post-retirement composite of state and federal tax rates. The after-tax value of a nontax-deferred investment may also be influenced by the additional factors of pre-retirement composite tax rate, annual rate of long-term capital gain income received, percentage of investment and reinvestment eligible for investment tax credit, and the rate of asset appreciation.

For this paper it is assumed that the annual contribution or investment is $1,000 (variable A) and the period of investment is 20 years (variable n). Contributions may be adjusted as a fraction or multiple of $1,000. The 20-year investment period was selected as reflecting a period during which many families would be more likely to have funds available for retirement investment. Longer periods of time would make differences among alternatives larger, but would not change relative rankings. Other variables are varied over ranges of values to reflect a variety of possible situations. It is assumed that the values specified for the composite tax rates, annual income flows and rate of appreciation would be constant over the 20-year period.

Tax-Deferred vs. Nontax-Deferred Investments

As indicated previously, the tax-deferred aspect of an IRA can make it an extremely attractive investment relative to a nontax-deferred investment of a similar type. This is illustrated by the curves in Figure 1 which compare tax-deferred and nontax-deferred investments with similar rates of return. For the tax-deferred investments, post-retirement composite tax rates of 20 and 40 percent are assumed. For the nontax-deferred investments, it is assumed that the tax rates are the same before and after retirement. As can be seen in Figure 1, the advantage to tax deferral increases at higher rates of return. At the 20 percent tax rate and 4 percent annual return, the after-tax value of the tax-deferred investment is $24,775, only 9.4 percent higher than the $22,461 value of the nontax-deferred investment. At the 16 percent rate of annual return the difference becomes $107,072 vs. $71,360, a difference of 50.0 percent. With a 40-percent tax bracket and a 16-percent rate of return the after-tax value of the tax-deferred investment is $80,204, 123.1 percent more than the $35,995 value of the nontax-deferred investment.

Many individuals considering retirement investments assume that they will be in a lower tax bracket after retirement than they are currently. This increases the value of a tax-deferred investment relative to the nontax-deferred investment even more. However, farmers and businessmen may find that taxable income is as high or higher than before retirement. Sale or rental of the business and loss of investment tax credit, cost recovery and other tax advantages from business operations are some reasons why tax rates could be higher for farmers and businessmen after retirement.

Table 1 illustrates the effect of changes in the post-retirement tax rate on the after-tax value of an IRA earning 12 percent annually. Although higher post-retirement tax rates reduce the value of the tax deferral feature, they do not offset the initial advantage of tax deferral for investments earning the same rate of return. Lower post-retirement tax rates increase the after-tax value of the IRA.

<table>
<thead>
<tr>
<th>Pre-retirement tax rate</th>
<th>Liquidation values with the relationship of post-retirement tax rates relative to pre-retirement rates:</th>
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<tbody>
<tr>
<td></td>
<td>Liquidation values with the relationship of post-retirement tax rates relative to pre-retirement rates:</td>
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<td>10 points lower</td>
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<td>10</td>
<td>$80,699</td>
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<td>20</td>
<td>72,629</td>
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<td>30</td>
<td>64,559</td>
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<td>40</td>
<td>56,489</td>
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<td>50</td>
<td>48,419</td>
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</tbody>
</table>

*a A tax-deferred IRA earning 12 percent with deposits of $1,000 annually over 20 years is assumed.
Rates of Return and Tax Rates

Typically IRAs and alternative investments do not have the same rates of return. Which investment provides the highest after-tax liquidation value depends upon both the rate of return and the composite tax rate of the individual.

Figures 2 and 3 illustrate the effect of composite tax rate changes on a number of alternative investments. Figure 2 assumes that an individual's pre- and post-retirement tax rates are the same, while Figure 3 assumes the post-retirement tax rate is 10 points lower than the pre-retirement rate. As before, tax rates are assumed constant throughout the 20-year period.

Six investment alternatives are indicated in these Figures. Two tax-deferred IRAs, one yielding a 12 percent return and the other with a 6 percent return, are included. Nontax-deferred investments with ordinary annual income at rates of 9 and 15 percent increase are included. Finally two business investments are also indicated. One yields a current return of 5.5 percent annually and an appreciation rate of 9 percent; the second assumes a current return of 8.5 percent annually and an appreciation rate of 3 percent. Other alternative investments will be considered later.

Among the investments considered: if the pre-retirement tax rate is below 5 percent, then the 15 percent nontax-deferred investment has the highest after-tax liquidations value. However, as the tax rate increases, the after-tax liquidation value of this (and other) investments drops sharply. Over much of the range of tax rates considered, a business investment with a 5.5 percent rate of return (0.5 percent as capital gains) and a 9 percent rate of appreciation has the highest after-tax liquidation value. At above the 35 percent tax rate, the 12 percent tax-deferred investment will provide the highest return. Business investment yielding a 8.5 percent rate of return (0.5 percent as capital gain) and a 3 percent appreciation rate is considerably inferior to the 12 percent tax-deferred investment.

A decrease in the post-retirement tax rate by 10 points (typically a decrease of $10,000 or more taxable income for a married couple filing jointly) has little effect on the relative rankings of the investments considered (Figure 3). The after-tax liquidation values of the tax-deferred investments are influenced because all of the taxes are paid at the lower post-retirement tax rate. The nontax-deferred investments which do not involve asset appreciation are unaffected by the lower post retirement tax rate because all of the taxes are paid as earnings accrue at the pre-retirement rate. On the business investments and financial investments, only the asset appreciation proportion which is taxed as long-term capital gains is affected by the tax rate reduction.

Annual Ordinary Income vs. Asset Appreciation

Stocks, mutual funds, business and farm investments generally provide an annual return of ordinary income and (hopefully) asset appreciation. Farm investments are of special interest. Since 1950, the rates earned on capital investment by farms in the Purdue Farm Account Project have averaged about 5 percent annually. Appreciation of Indiana land values was about 6 percent annually in the 1950s, 4 percent in the 1960s and 17 percent annually in the 1970s. So far in the 1980s, land values have declined. Looking at the overall period from 1950 to 1980, Indiana land values increased an average of about 9 percent annually.

Figure 4 illustrates some of the effects of three levels of annual rates of return: 2.5, 5.5 and 8.5 percent combined with asset appreciation rates of 6, 9 and 12 percent annually. Of the annual income return, 0.5 percent is assumed to be long-term capital gains income (as from the sale of raised breeding stock) while the rest is taxed as ordinary income. Although these values were selected to reflect a range of possible values for farm investments, they can also reflect stocks or mutual funds with reinvestment of dividends and capital gain distributions.

In comparison with the tax deferred investment (IRA) earning 12 percent only the two investments with the 5.5 and 8.5 percent annual rate of return and 12 percent asset appreciation have higher after-tax liquidation values at all tax rates. (The 8.5 percent annual return-12 percent appreciation line is not included in Figure 5, but would be higher than the 5.5 percent annual return-12 percent appreciation line at all points.) The two investments with 2.5 and 5.5 percent annual return and 6 percent asset appreciation are never better than the 12 percent IRA. (The 2.5 percent annual return-6 percent appreciation line would be lower at all points than the 5.5 percent line and is not included.)

The other three investments all have the same after-tax liquidation value at 0 percent tax rate because the combination of annual current return and asset appreciation equals a 14 percent total annual return in all cases. As the tax rate increases the investment with the higher proportion of asset appreciation (which is taxed as capital gains) have higher after-tax liquidation value than investments with less asset appreciation. However, at tax rates above about 40 percent the 12 percent IRA has the highest after-tax liquidation value.

The rate of asset appreciation has a larger impact on the after-tax liquidation value of an investment than the annual rate of return. However, there is a considerable range of annual return rates and asset appreciation rates for which the tax rate is a major factor in determining which investment has the largest after-tax liquidation value.

Annual Capital Gains vs. Ordinary Income

Farm investments have the possibility of producing capital gain income, such as from the sale of raised breeding stock, on an annual basis. In some farm operations, like a one-litter farrowing system, essentially all of the taxable income is capital gains income. Figure 5 compares the after-tax liquidation values of two farm
investments, both with an annual asset appreciation rate of 6 percent. It is assumed that one investment yields an annual capital gain income of 6 percent while the other produces a 6 percent return of ordinary income. At the 25 percent tax rate, the after-tax liquidation value of the capital gain investment is 12 percent higher than the ordinary income investment. This difference increases to 25 percent at the 50 percent tax rate. However, the difference in after-tax liquidation value due to whether annual income is received as capital gain or ordinary income is small relative to changes in the rate of annual return and/or asset appreciation.

**Investment Tax Credit**

The final factor in determining total annual return to a farm or business investment is the fraction of the after-tax investment and reinvestment which qualifies for investment tax credit. This could vary from 0 percent for investments in nonqualifying assets such as land or apartment buildings to 100 percent if the entire investment were in eligible machinery, equipment, breeding livestock and single purpose livestock or horticultural buildings.

Figure 6 illustrates the effect of no investment tax credit as compared with 50 percent of the investment and reinvestment qualifying for the 10 percent investment tax credit. Both investments are assumed to yield annual rates of 5 percent ordinary income, 5 percent capital gain income and 6 percent asset appreciation. In contrast to the capital gains analysis, the difference between the two cases decreases as the tax rate increases. This occurs because at lower tax rates, the investment tax credit permits an individual to make a larger after-tax investment which then appreciates in value. At higher tax rates, the relative effect is considerably smaller. However, as with the capital gain analysis, the difference in the after-tax liquidation value due to the amount of investment and reinvestment qualifying for investment tax credit is very small relative to the effect of the rate of return.

**Premature Distributions**

There is a penalty for withdrawing money from an IRA before reaching age 59 1/2, unless disabled. In the case of a premature distribution, the amount withdrawn is included in gross income in the year of distribution. Furthermore, there is a 10 percent "penalty tax" on the amount of distribution. This penalty tax has caused some people to feel that an IRA is not a good investment for them because it is not very liquid. If they needed cash before retirement, they would be worse off with an IRA than if they had invested in something else. This is not true for many people.

If an individual contributes to an IRA, the contribution and earnings are tax-deferred. Thus an individual could make a larger after-tax investment and larger earnings will occur. Over time, this will offset the regular and penalty tax due in a premature distribution. Table 2 indicates the breakeven periods of time that an IRA must be held to offset the penalty associated with a premature distribution. For example, an individual in the 20 percent tax bracket must hold an IRA yielding 8 percent for 9 years or more to be as well off as a nontax-deferred investment also yielding 8 percent. In contrast, the breakeven period for an individual in the 50 percent tax bracket only needs to hold an IRA yielding 16 percent for 3 years to be better off than having invested that money in a nontax-deferred investment yielding a 16 percent return.

| Table 2. Breakeven holding periods required for after-tax premature distributions of IRAs to equal values of nontax-deferred investments
<table>
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<tbody>
<tr>
<td>Tax bracket before penalty</td>
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<td>(percent)</td>
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<td>20</td>
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<td>30</td>
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<td>40</td>
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<td>50</td>
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* IRA and nontax-deferred investments are assumed to earn the same annual rate of return.

For farmers and businessmen with variable income, the penalties associated with premature distribution may be considerably less. There is a 10 percent penalty tax on the premature distribution regardless of the level of income. However, many individuals would probably not withdraw money from an IRA unless their income were substantially below average or they have a loss. This would considerably shorten or eliminate the breakeven holding period. For example, for an individual who is normally in the 40 percent tax bracket, a $1,000 before-tax investment in a nontax-deferred investment yielding 12 percent would have an after-tax value of $643.20 at the end of year 1, $689.51 after year 2 and $739.15 after year 3. However, if that money had been invested in an IRA yielding 12 percent and the individual dropped to the 20 percent tax bracket, the after-tax and penalty value of the premature distribution would be $983.45 at the end of 3 years, more than 30 percent more than the nontax-deferred investment. This indicates that investments in IRAs are more liquid, especially for individuals with variable income, than is commonly assumed.

*The after-tax value of the nontax-deferred investment would actually be $775.70 at the end of year 3 rather than $739.15 because of the lower rate in year 3.
CONCLUSIONS

The results of this analysis indicate that the annual rate of return, rate of appreciation of asset value and the composite tax rate are primary factors affecting the after-tax liquidation value of alternative investments. Differences between the pre- and post-retirement tax rates, whether returns are capital gains or ordinary income, and amount of investment qualifying for investment tax credit have limited effects on liquidation values relative to the previously mentioned force. In many instances uncertainty with respect to future returns and tax rates may more than offset any differences due to the last three factors.

Tax-deferred retirement plans outperform nontax-deferred investments unless that latter have sufficiently high returns as ordinary income or asset appreciation to offset the advantage of tax deferment. A high tax rate can make tax-deferred retirement plans more advantageous than nontax-deferred plans with substantially higher sales of return because earnings in the tax-deferred investment accrue with no tax reduction. Because asset appreciation is not taxed until liquidation and then receives preferential capital gains treatment, investments with substantial appreciation can compare favorably with tax-deferred retirement plans.

Figures 7 and 8 are an attempt to provide, in graphical form, some guidelines for evaluating alternative investments. The horizontal axes represent the annual rate of return (or rate of asset appreciation), and the vertical axes represent the after-tax liquidation value of an investment. Figures 7 and 8 reflect tax rates of 20 and 40 percent, respectively. The lowest curve in each figure is a nontax-deferred investment earning the annual rate of return indicated on the horizontal axis. The second curve is a tax deferred investment earning the indicated return. The two highest curves represent business investments with annual returns of 3 and 9 percent combined with asset appreciation rates of 4 to 18 percent annually.

These curves permit a rough comparison of the after-tax liquidation values of alternative investments. For example, for an individual with a composite tax rate of 40 percent, a tax-deferred investment yielding a 12 percent annual return has an after-tax liquidation value of about $49,000. Other investments yielding about a $49,000 after-tax liquidation value for an individual in the 40 percent tax bracket include a nontax-deferred investment yielding about 20 percent annually or business investments with a 3 percent current return and 11 percent asset appreciation or a 9 percent annual rate and 7 percent rate of appreciation. Based on the information in Figure 8, it can be inferred that an investment with a 6 percent annual return and about 8.5 percent asset appreciation would have an after-tax liquidation value of approximately $49,000 like the other investments. Inferences are also possible to other tax rates and combination of returns to provide guidelines in evaluating alternative investments.

Tax-Saving Opportunity

Commonly both a husband and wife may be involved in a farm or other family business. When both spouses work in a nonincorporated, family owned business, one spouse may pay the other a salary for services to the business. The salary earned allows the “employed” spouse to contribute to an IRA in his or her own name. This permits a couple to defer taxes on up to $4,000 per year instead of the $2,250 maximum permitted for a spousal IRA.

Although the wages received are reported as income on the couple’s tax return, wages paid to a spouse are not subject to social security taxes. The income of the wage-paying spouse is reduced for self-employment tax purposes and an additional tax savings arises. For example if a farm couple has taxable income of $30,000 in 1982, they would pay $5,607 in federal income tax and $2,131 in self-employment tax assuming there was no dependents or itemized deductions. Contribution of $2,250 to a spousal IRA would save $656.50 in income taxes. However if the farmer paid the spouse $3,000 in wages ($5.00 per hour for 600 hours), the spouse could contribute $2,000 to their IRA. Total tax savings would be $1,352 in 1982. Savings of $1,164 would result from the contributions to the IRAs and an additional savings of $188 from the reduction in the self-employment taxes.

Other Considerations

Individuals considering alternative investments will also want to consider factors excluded from this analysis. First, alternative investments may have different costs of investment and administration associated with them. Commissions, brokerage fees, annual management fees, front end loading, and administrative charges on distribution can vary and may influence the returns to an investment. Individuals should “shop” carefully even among a specific group of investments such as IRAs because differences in investment costs may have major impacts on returns and flexibility.

Second, the rates of return and tax rates were assumed constant for the period of analysis. Some investments, like farm businesses, have wide fluctuations in returns and the ending value of an investment may be quite different than expected. Other investments may have guaranteed returns, but typically at very low rates. The riskiness of investments may differ and generally higher levels of returns are associated with higher levels of risk.

Third, estate planning considerations may be important to an individual. Nontax-deferred investments included in an estate would receive a stepped-up basis which would reduce the taxable gain when sold. Farmland may be eligible for special use valuation reducing the size of the taxable estate. However, a tax-deferred

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Footnote:

1 Wages paid to a spouse or other family members should not exceed the wage rate which would be paid a nonfamily member for a similar number of hours worked.
retirement plan may be even more attractive because its value is not included in the taxable estate if paid to beneficiaries as a qualifying annuity. These payments to beneficiaries would be included in their taxable income. These factors should be considered when evaluating investments.

Fourth, prudent investment planning may lead farmers and other businessmen to diversify into nonbusiness investments or tax-deferred retirement plans even if expected returns are somewhat lower than investment in their own business. Diversification generally reduces risk.

Fifth is the personal preference of the individual. In some cases this may be the most important factor. However, consequences of alternative actions and investments should be understood by individual investors.

Finally, do not invest and forget. Farmers and others should review IRAs and other investments annually. What was a good investment, may no longer be the best use of funds. Tax laws generally permit IRAs to be "rolled over" in other types of IRAs, while other investments can be changed.

References
+++ DISPLAY
1.000= PROGRAM RETIRE (INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
2.000=C THIS PROGRAM IS DESIGNED TO EVALUATE AND HELP COMPARE
3.000=C ALTERNATIVE INVESTMENT OPPORTUNITIES FOR RETIREMENT.
4.000=C TAX DEFERRED PROGRAMS AS WELL REGULAR INVESTMENTS ARE
5.000=C ABLE TO BE CONSIDERED. VARIABLES WHICH ARE PRESET IN
6.000=C THIS ANALYSIS INCLUDE:
7.000=C A=10000 ANNUAL CONTRIBUTION
8.000=C M=20 YEAR PERIOD OF INVESTMENT
9.000=C VARIABLES WHICH ARE READ IN INCLUDE:
10.000=C B1=PRERETIREMENT STATE TAX RATE
11.000=C B2=POSTRETIREMENT STATE TAX RATE
12.000=C F1=PRERETIREMENT FEDERAL TAX RATE
13.000=C F2=POSTRETIREMENT FEDERAL TAX RATE
14.000=C TS=IS INVESTMENT TAX DEFERRED? 1=YES, 2=NO
15.000=C DIMENSION VAR(8)
16.000=C READ (5,100)
17.000=C 100 FORMAT (4OH)
18.000=C READ (5,101) TS,(VAR(I),I=1,4)
19.000=C 101 FORMAT (F5.0,F6.2)
20.000=C R=RATE OF ANNUAL NET RETURN (ORDINARY INCOME)
21.000=C Z=RATE OF ANNUAL NET LONG CAPITAL GAIN INCOME
22.000=C G=RATE OF ANNUAL APPRECIATION
23.000=C C=FRACTION OF AFTER-TAX INVESTMENT AND REINVESTMENT QUALIFIED FOR INVESTMENT CREDIT.
24.000=C READ (5,102) (VAR(I),I=5,B)
25.000=C 102 FORMAT (4F6.2)
26.000=C READ CHANGEABLE VARIABLE; CHANGE INCREMENT AND STOPPING POINT
27.000=C READ (5,103) II,CHANGE,STP
28.000=C 103 FORMAT (5,F5.2)
29.000=C WRITE (6,100)
30.000=C WRITE (6,280)
31.000=C WRITE (6,201)
32.000=C WRITE (6,202)
33.000=C WRITE (6,203)
34.000=C 200 FORMAT (* TAX RATES ANNUAL INCOME INVESTMENT VALUE*)
35.000=C 201 FORMAT (* BEFORE AFTER ORDINARY C.GAIN APPER BEFORE AFTER*)
36.000=C 202 FORMAT (* RETIREMENT (PRECENT/YEAR) TAX TAX*)
37.000=C 1 B1=VAR(1)
38.000=C B2=VAR(2)
39.000=C F1=VAR(3)
40.000=C F2=VAR(4)
41.000=C R=VAR(5)
42.000=C Z=VAR(6)
43.000=C G=VAR(7)
44.000=C C=VAR(8)
45.000=C A=10000.
46.000=C N=20
47.000=C T1=B1+(1.-B1)*F1
48.000=C T2=B2+(1.-B2)*F2
49.000=C IF (TS GT 0.) GO TO 50
50.000=C NONTAX DEFERRED INVESTMENTS
51.000=C CALCULATE F=ANNUAL RATE OF TOTAL RETURN
52.000=C F=(((1.-T1)*(1.+1*C))**R+((1.-4*T1)*(1.+1*C)**G+(((1.-T1)*(1.+1*C)**K)**A*(1.+P)**((1.+P)**-1)-1)/P)
53.000=C ENDING VALUE OF INVESTMENT
54.000=C T=4*T2*(F-N*(1.-T1)*(1.+1*C)**A)**(0/P)
55.000=C TAXES DUE
56.000=C V=F-T
57.000=C GO TO 60
58.000=C TAX DEFERRED INVESTMENTS
59.000=C F=A*(1.+R)**((1.+R)**N)-1./R
60.000=C V=(1.-T2)*F
61.000=C PRINT OUT BEFORE AND AFTER TAX VALUES
62.000=C WRITE (6,203) T1,T2,R,Z,G,F,V
63.000=C 203 FORMAT (F4.3,F4.3,F3.2,F10.2)
64.000=C VAR(II)=VAR(II)+CHANGE
65.000=C IF (VAR(II),LT,STP) GO TO 1
66.000=C STOP
67.000=C END
68.000=C IF (VAR(II),LT,STP) GO TO 1
69.000=C STOP
70.000=C END
71.000=C *EOR
72.000=C *EOR
+++
THOUSANDS

FIGURE 3. AFTER-TAX LIQUIDATION VALUES OF ALTERNATIVE INVESTMENTS WITH LOWER POST-RETIREMENT RATES

- 8.5% CURRENT, 3% APPREC.
- 5.5% CURRENT, 9% APPREC.
- 15% NONTAX-DEFERRED
- 12% IRA
- 6% IRA
- 9% NONTAX-DEFERRED

AFTER TAX VALUE

POST-RETIREMENT TAX RATE (PERCENT)

THOUSANDS

FIGURE 4. AFTER-TAX LIQUIDATION VALUES OF AN IRA AND ALTERNATIVE BUSINESS INVESTMENTS

- 6% APPRECIATION
- 9% APPRECIATION
- 12% APPRECIATION
- IRA - 12%
- 2.5% CURRENT, 12% APPREC.
- 8.5% CURRENT, 6% APPREC.

AFTER TAX VALUE

TAX RATE (PERCENT)