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RETURN TO CASH RENTED FARMLAND AND STOCKS
A SOCIAL PERSPECTIVE

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Karl Gertel

September 1982

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Natural Resource Economics Division
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RETURNS TO CASH RENTED FARMLAND AND STOCKS: A SOCIAL PERSPECTIVE.

By Karl Gertel, Natural Resource Economics Division; Economic Research Service;

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ABSTRACT

For the period 1940 to 1982, the internal rate of return for cash-rented farmland (adjusted for inflation) exceeded the return to common stocks by 1.3 percent. Given prospects for greater mobility of investment funds between the farm and nonfarm sectors, future returns to cash rented farmland should more closely match returns to common stocks. However, consistent with past relationships, a greater proportion of the total returns to farmland is likely to come from increases in asset value, and a smaller proportion from current income, relative to common stocks. These historical and prospective relationships are interpreted in light of concerns the U.S. farmland is "underpriced" relative to other less durable assets in international markets. The extent and significance of such underpricing depends on the ability of the U.S. economy to maintain an adequate level of national investment.

KEY WORDS: Cash Rent, Dividends, Farmland Prices, Foreign Investment,
Stock Prices

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* This paper was prepared for limited *
* distribution to the research community *
* outside the U.S. Department of Agriculture *
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SUMMARY AND CONCLUSIONS

Returns to cash rented farmland exceeded returns to common stocks from 1940 to 1982. However, the 1.3 percent margin in real (inflation adjusted) internal rate of return in favor of farmland is unlikely to be sustained. To the extent that investment funds will flow more freely between the farm and non-farm sectors, future returns to cash rented farmland will more closely match those for common stocks.

From 1940 to 1982, the rate of appreciation in real (inflation adjusted) stock prices was nearly twice the rate of growth of dividends. Rates of appreciation of any asset can not indefinitely exceed the rate of growth of earnings from that asset. Therefore the recent decline in real stock prices appears to be an adjustment to past and prospective growth in dividends. Analysis of trends in future farmland appreciation must consider returns to all farmland, not just the fraction that is cash rented. Rates of growth in returns to farm production assets, which are principally farmland, have since 1960, been matched by increases in returns.

While total returns from cash rented farmland and common stocks are expected to converge towards long run equality, the proportions of the returns coming from current income versus increased market value of the two kinds of assets are expected to differ. Compared to stocks, cash rented farmland is expected to have a lower return from current income but a higher return from appreciation in asset value because future returns to farmland are expected to increase at a faster rate than returns to stocks. Because farmland prices reflect greater increases in future returns than stocks, the ratio of current income to asset value is likely to be lower from farmland.

Although foreign investment in U.S. farmland is small, the issue of foreign

ownership has aroused considerable concern. The limited research completed to date suggests that the effects of foreign ownership of farmland are similar to the effects of absentee ownership of U.S. farmland by domestic owners. The particular question examined here is if farmland is underpriced relative to other assets from a social perspective, because farmland "lasts forever".

Because of lower risk from variability of asset prices there is some support of the claim that foreign investment in farmland is likely to be held longer than other types of foreign investments. Moreover, future income from farmland and farmland prices are likely to rise relative to income and prices of stocks. However even if future income is worth more to society than to private investors, the extent and significance of underpricing of farmland depends on the ability of the U.S. economy to maintain an adequate level of national investment.

INTRODUCTION

The first part of this paper contains an update of an earlier study which compared returns to cash rented farmland in four areas to returns to common stocks. The comparison is extended to U.S. average returns to cash rented farmland. On the basis of the historical record and underlying trends, the likely direction of future returns to cash rented farmland and stock is discussed. With the aid of conclusions reached in the first part of the paper, we examine the hypothesis that, from a social perspective, farmland is underpriced to the foreign investor compared to non-farm assets because farmland "lasts forever".

HISTORIC AND PROSPECTIVE RETURNS

Over the long term, cash rented farmland has outperformed common stocks. The difference in the real (inflation adjusted) internal rate of returns from 1940 to 1982 is 1.3 percent in favor of farmland (table 1). Table 1 also shows the marked divergence in returns to farmland among different regions. Relative profitability of investment in cash rented farmland and stocks has also varied over time, consistent with contemporary economic trends.^{1/}

While future returns can not be predicted, some clues to the basic trends that will determine future returns are obtained from the year by year record of past return from income and asset appreciation (Table 2).

Common stocks. Apart from the high volatility of stock prices, the most striking feature of table 2 is the long term decline in the rate of return from dividends. The decline of the rate of return from dividends began in the mid-1950's and therefore is not explainable by recent accelerated inflation (figure 1). Rates of return, which averaged 5.4 percent from 1940-1955, stabilized at about 3 percent during the 1960 decade, and rose again in the latter part of the 1970's. However, the increase in rate of return from dividends in the 1970's resulted not from growth of dividends but a sharp fall in real stock prices.^{2/} From 1940 through 1982 the average real rate of growth in dividends for common stocks included in the S&P index was 1.2 percent per year, compared to a rate of stock appreciation of 2.2 percent. Rates of appreciation of any asset can not indefinitely exceed the rate of growth of income from the asset. Therefore the recent decline in real stock prices appears to be an adjustment to low growth rates in dividends. Barring increases in demand or productivity which would lead to faster growth in dividends, future long run real returns from stocks are likely to be lower than the 9.6 percent annual average from 1940, to 1972, prior to the recent decline in real stock prices.^{3/}

Table 1 Internal rates of return to farmland rented out for cash and common stocks 1940-1982

Asset	<u>Internal rates of returns^{1/}</u> 1940-1982	
	Nominal	Real ^{6/}
	<u>percent</u>	<u>percent</u>
Central Illinois cash grain ^{2/}	10.2	5.6
Central Kansas wheat ^{2/}	9.4	4.9
Upper Mississippi soybeans cotton ^{3/}	18.4	13.0
Montana ranching ^{4/}	13.5	8.8
U.S. cash rented farmland ^{5/}	12.5	7.7
S&P 500 common stocks	10.9	6.4

1/ The interest rate at which the discounted present value of future net annual income plus proceeds from sale of asset net of transaction costs equals the initial cost of the investment including transaction costs.

2/ Crop Reporting District 5.

3/ Crop Reporting District 1.

4/ Montana grazing land excluding CRD-1 where land prices are affected by recreational demand and not typical of rest of state.

5/ Weighted mean of cash rented acres for 25 states accounting for approximately 70 percent of all cash rented farmland with adjustment for excluded states, see appendix.

6/ Adjusted for inflation by consumer price index.

Table 2-Real returns as percent of asset value - farmland
rented out for cash and common stock 1940-1982

Year	<u>S&P 500 Common Stocks</u> ^{1/}			<u>U.S. Cash Rented Farmland</u> ^{1/2/}		
	Appre- ciation	Dividends	Total	Appre- ciation	Net rent	Total
	<u>percent</u>	<u>percent</u>	<u>percent</u>	<u>percent</u>	<u>percent</u>	<u>percent</u>
1940	-19.7	5.1	-14.6	-1.2	5.9	4.7
41	-28.8	6.8	-22.0	-2.2	6.0	3.8
42	34.3	8.6	42.9	1.9	6.4	8.3
43	3.0	5.1	8.1	12.0	6.3	18.3
44	10.9	5.2	16.1	9.0	5.9	14.9
45	28.9	4.8	33.7	7.3	5.9	13.2
46	-30.1	3.8	-26.3	-6.3	5.7	-0.6
47	-0.7	4.8	4.1	1.4	5.9	7.3
48	-1.8	5.6	3.8	3.3	5.7	9.0
49	16.1	6.5	22.6	-1.3	5.6	4.3
1950	13.0	6.8	19.8	5.0	5.4	10.4
51	11.7	7.1	18.8	8.8	5.5	14.3
52	2.7	5.8	8.5	0.9	5.3	6.2
53	5.4	5.6	11.0	-3.0	5.6	2.6
54	36.5	5.4	41.9	4.5	5.4	9.9
55	32.0	4.3	36.3	3.4	6.0	9.4
56	-12.2	3.6	-8.6	1.8	5.5	7.3
57	-8.0	3.9	-4.1	1.4	5.7	7.1
58	31.2	4.2	35.4	7.8	5.1	12.9
59	-1.6	3.2	1.6	1.5	5.2	6.7
1960	15.9	3.5	19.4	0.0	5.1	5.1

Table 2-Real returns as percent of asset value - farmland
rented out for cash and common stock 1940-1981--Continued

Year	<u>S&P 500 Common stocks</u>			<u>U.S. Cash Rented Farmland</u>		
	Appre- ciation	Dividends	Total	Appre- ciation	Net rent	Total
	<u>percent</u>	<u>percent</u>	<u>percent</u>	<u>percent</u>	<u>percent</u>	<u>percent</u>
61	5.7	3.0	8.7	4.6	5.2	9.8
62	-5.3	2.9	-2.4	4.3	5.0	9.3
63	17.0	3.2	20.2	5.0	5.1	10.1
64	7.8	3.0	10.8	3.6	4.9	8.5
65	0.8	3.0	3.8	5.2	5.0	10.2
66	-1.6	3.1	1.5	4.7	4.9	9.6
67	-3.8	3.2	-0.6	2.9	4.0	6.9
68	7.1	3.3	10.4	0.5	4.1	4.6
69	-16.7	3.1	-13.6	-2.3	4.0	1.7
70	7.0	3.5	10.5	-0.3	3.7	3.4
71	3.2	3.1	6.3	4.5	3.9	8.4
72	-0.6	3.9	3.3	8.6	3.8	12.4
73	-23.6	2.8	-20.8	13.1	3.5	16.6
74	-19.6	3.7	-15.9	3.3	3.3	6.6
75	16.1	4.4	20.5	7.0	3.5	10.5
76	-10.0	3.6	-6.4	9.9	3.4	13.3
77	-14.9	5.0	-9.9	2.2	3.3	5.5
78	3.3	5.4	8.7	3.3	3.1	6.4
79	-12.3	5.1	-7.2	0.4	3.8	4.2
80	14.7	5.7	20.4	-1.3	2.7	1.4
81	-20.0	4.6	-15.4	-6.8	2.6	-4.2
Mean	2.2	4.5	6.7	3.1	4.8	7.9

1/ Adjusted for inflation by the consumer price index.

2/ Weighted mean of cash rented acres 25 states, accounting for approximately 70 percent of all cash rented farmland with adjustment for excluded states; see appendix for procedures for estimating appreciation and net rent.

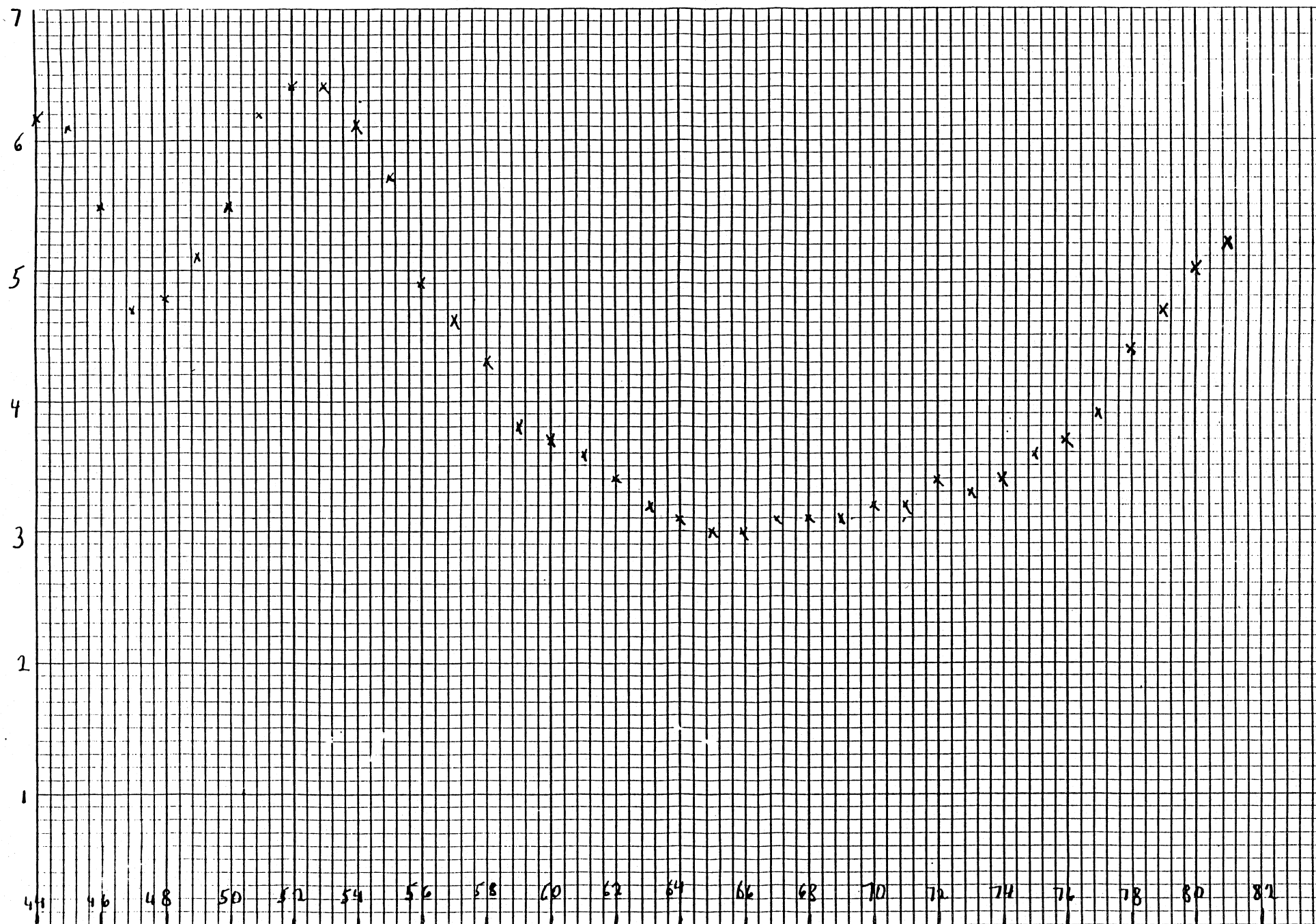


Figure 1 Rates of return from dividends, Standard and Poor, 500 Common Stocks 1944-1981, 5 year moving average.

Cash rented farmland. The higher rates of return to cash rented farmland over common stocks are evidence of imperfect mobility of investment funds. Given the greater stability of asset value, higher leverage possibilities, and some tax advantage, perfect mobility of investment funds would result in lower long run returns to farmland compared to common stocks.^{4/} The declining rates of return to cash rented farmland throughout the past 4 decades (figure 2) represent a long term adjustment; primarily in the southern regions, due to increasing mobility of both capital and tenant labor.^{5/} With continuing increase in mobility of labor as well as capital it is likely that long run future returns to cash rented farmland will move towards equality with returns to common stocks and possibly somewhat below stock returns.

Farmland appreciation. Analysis of likely trends in future farmland appreciation should consider returns to all farmland rather than the fraction that is cash-rented (Appendix p. 26). The closest we can come to returns to farmland are returns to farm production assets. Farm real estate ranged from 68 percent of the value of all farm production assets in 1940 to 77 percent in 1980 (13, p. 120). Returns to farm production assets have shown a downward trend from 1940 through most of the 1950's, (figure 2). Since 1960 there has been no clear upward or downward trend in returns to farm production assets. This means that rates of return to farm production assets have grown at approximately the same rate as appreciation as asset value. The past 20 years have been characterized by rapid substitution of capital for labor in agriculture, and by increased crop yields and rising exports of U.S. farm products. The extent to which historic rates of land appreciation can be sustained or exceeded depends primarily on future gains in farm production efficiency and export demand.

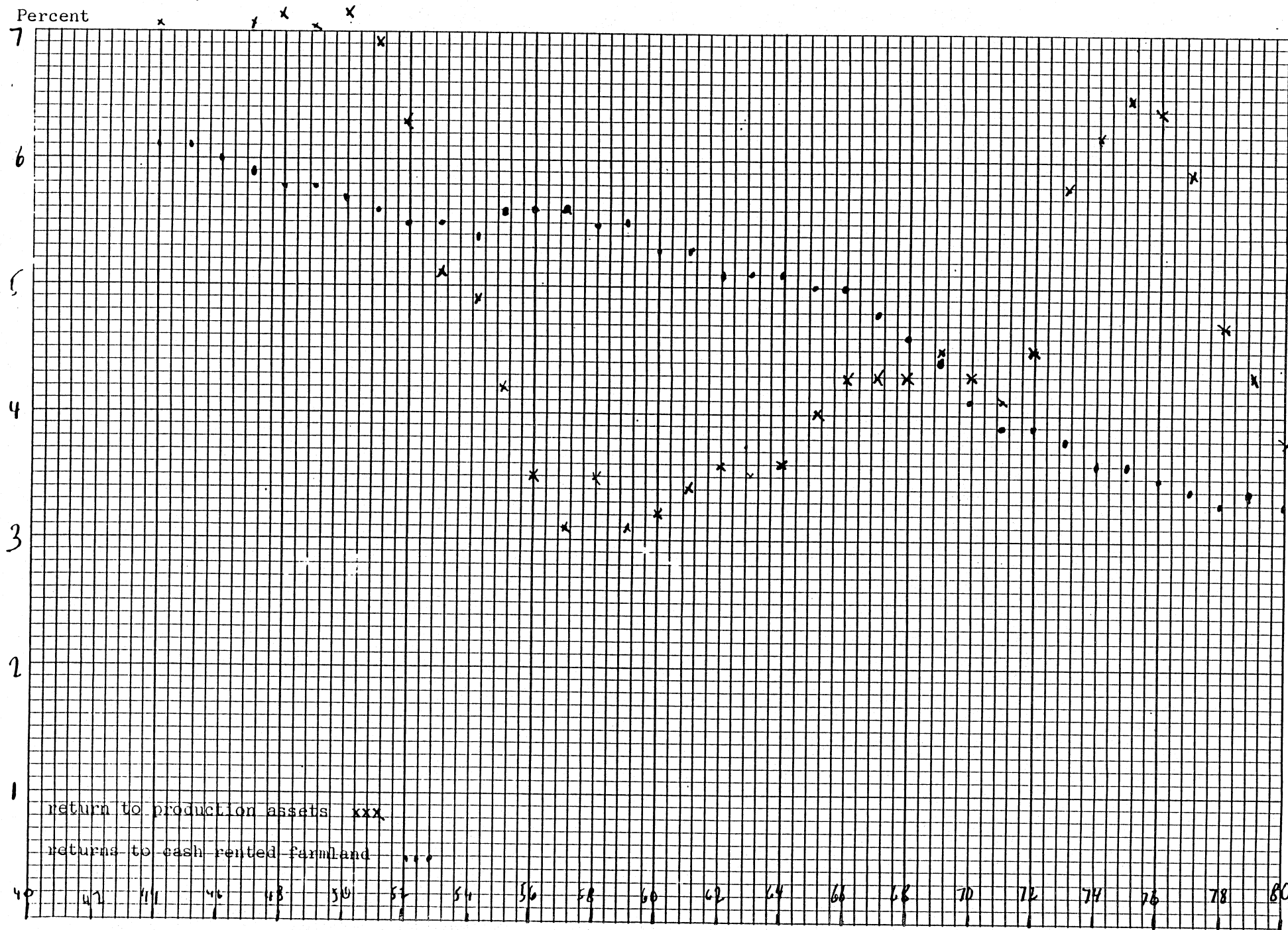


Figure 2 Rates of return to farm production assets and cash rented farmland 1944-1980, 5 year moving average

Appraisal of Future Growth of Returns of Cash Rented Farmland

Total current returns in any one year consist of the sum of income plus appreciation in asset value with both quantities expressed as a percent of asset value at the beginning of the year (see Table 2). We concluded that total returns to cash rented farmland and stocks are likely to move towards equality. However the proportion of total returns coming from current income and asset appreciation are likely to be different.

Melichar has stressed that if income from an asset is expected to rise, total current returns will be made up of a low return from current income compared to assets with constant expected income (10). However, assuming mobility of capital between investment opportunities, current total returns will be the same for both assets because lower returns from income of the asset with expected rising income will be offset by higher rates of asset appreciation ^{6/}. In our judgement, future returns to cash rented farmland will have higher rates of assets appreciation than stocks but lower returns from income. Let us review the evidence.

Figure 3 shows average real growth of prices of farmland and stocks from 1940 to 1982. Prices are plotted on a logarithmic scale, which is equivalent to plotting percentage increases rather than absolute increases. Compared to stocks appreciation in farmland prices has been fairly uniform over the past 4 decades. Judging from the above appraisal of returns to farm production assets, the growth in farmland prices was matched by returns to farmland.

By contrast, the annual average real growth of dividends of 1.2 percent was only 55 percent of the 2.2 percent growth rate in stock prices for the 1940-1982 period. While average annual growth in real earnings per share has been 2.7 percent, annual growth in earnings has averaged close to zero since 1965 and has been negative for dividends. Real rates of appreciation of stocks exceeded those of farmland from 1949 to 1965.

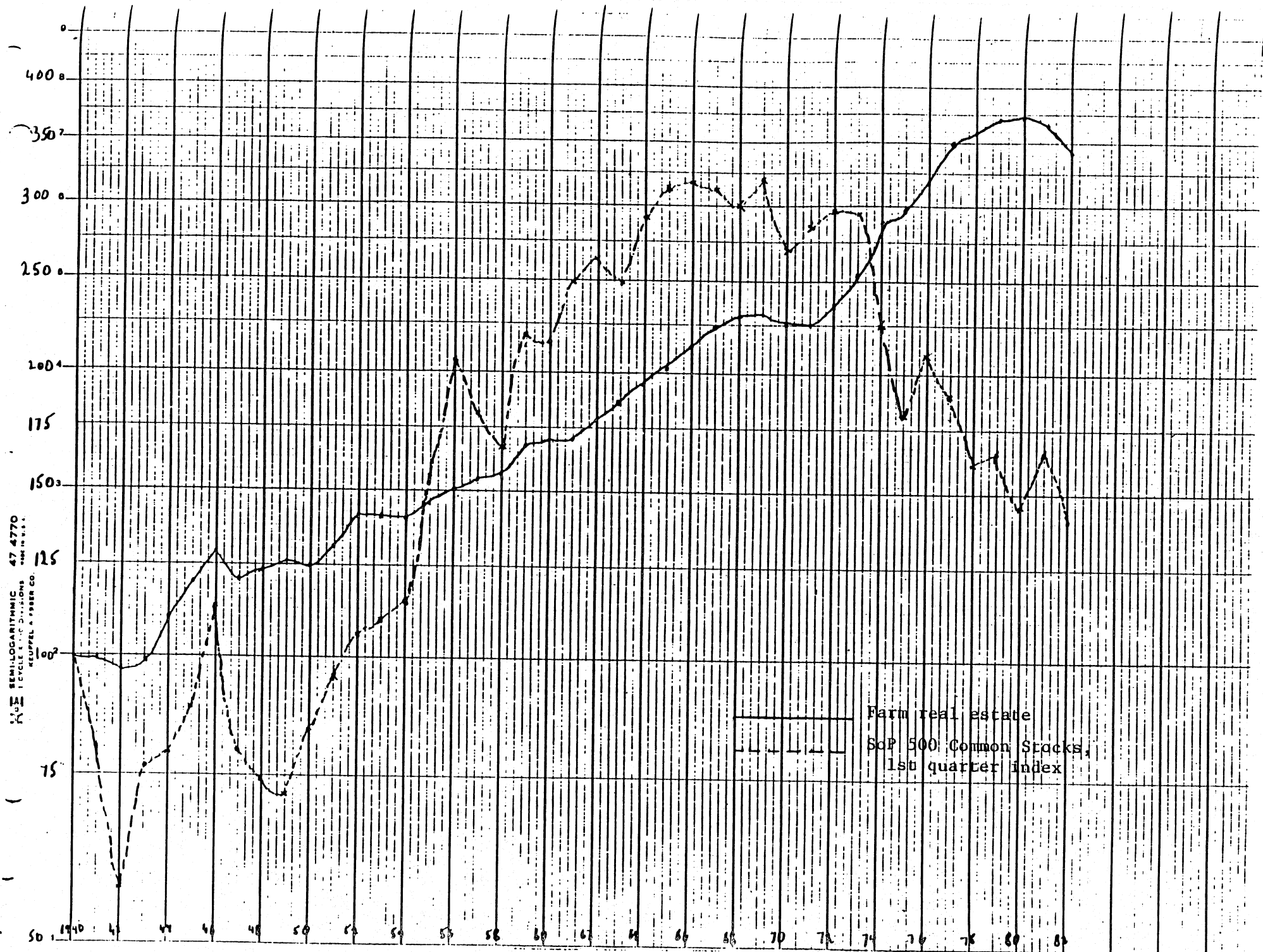


Figure 3 Index of Prices of Farm Real Estate and Common Stocks, Inflation adjusted by CPI, 1940=100.

However the rapid growth of stock prices could not be sustained by growth of dividends (or earnings) during this period (figure 1), resulting in a sharp downward adjustment in stock prices beginning in 1969.

While we can not predict the future, given the historic record of greater rates of growth of returns to farm production assets and recent declines in rates of growth of the non-farm sector, it appears likely that future growth of returns and asset value of farmland will exceed those of stocks. However, as described above, total current returns in any one year are likely to move towards equality, with farmland experiencing lower returns from income but higher returns from asset appreciation. If this conclusion is correct, then compared to stocks, investment in cash rented farmland will become attractive to persons of large wealth and high income (10 p. 1091).

IS FARMLAND UNDERPRICED TO THE FOREIGN INVESTOR FROM A SOCIAL PERSPECTIVE BECAUSE IT "LASTS FOREVER"?

Foreign investment in U.S. farmland is small, slightly less than 1 percent of all U.S. agricultural and forest land as of December 31, 1981, (3), but the issue of foreign ownership has aroused considerable concern. The concerns include the effect on farmland prices, on farm ownership, and on land use. These issues are discussed elsewhere (3,4,5,8). The limited research completed to date suggests that the effects of foreign ownership of farmland are similar to the effects of absentee ownership of U.S. farmland by domestic owners: a tendency to larger sized, corporate owned units, towards cash rather than share leasing, and possibly acceleration of trends of separation of crop production from livestock production.

As additional bidders in the farmland market, foreign investors increase the demand and hence the price of farmland but there is no credible evidence that foreign buyers pay more for comparable farmland than U.S. purchasers.^{7/} It should be stressed that due to the small acreage of foreign owned farmland, the above effects,

at present, are small and overwhelmed by domestic influences in the same direction. However the effects could be important locally.

The particular aspect of foreign investment in farmland we examine here is the hypothesis that purchase of farmland by investors from other nations is not in the national interest because farmland "lasts forever". While this argument has intuitive appeal, it is difficult to analyze because the underlying economics is not explicitly stated. To our knowledge, the argument has been most fully developed by Folke Dovring (4). We first review the hypothesis that farmland is undervalued. Here we rely on quotations from Dovring. We next examine the basic assumptions underlying the hypothesis with the aid of conclusions reached in the first part of this paper.

The Hypothesis of Undervaluation

"Land differs from most other forms of productive capital in that it does not depreciate. At least, and in most cases, land does not depreciate unless it is treated abusively. This retention of value is most striking in land used for farming and forestry.... If managed tolerably well, it can continue producing food and income for untold generations. The question must be raised whether a nation would not short change itself by selling its land to recover money paid for imports which are less durable...."

"The point about farmland lasting forever while other capital depreciates may need some elaboration. Any accumulation of wealth can, of course, be made permanent if the proceeds which represent value of depreciation are skillfully re-invested. But this requires careful management--an additional production input which includes unceasing attention to new opportunities to offset losses through obsolescence, both technological and economic. Thus, foreign investment in industry and in commerce are vulnerable to the vagaries of future change. Investment in farmland (and in well protected city sites) needs no input except routine managerial services which are available for hire at standard rates. The permanence of such investment need not be questioned. There is no reason why they should not last forever, especially if the investor is a large or para-public entity in a foreign country, and the foreign country enjoys continuing economic clout." (4 p. 134).

"....Corporate entities holding land for rental income rather than productive investment may well hold their land indefinitely. Private shareholders will pay inheritance and estate taxes on share inherited, but this might never come due if the corporation is owned by some public entity such as the government of an OPEC country." (4 p. 138).

In the above quoted paragraphs Dovring states that foreign investment in farmland will be held longer than non-farm investments because farmland a) does not depreciate, b) requires less management and c) has less investment risk.

The second part of the argument rests on the undervaluation by the market of future income streams. In discussing discount rates to convert future income to present value Dovring states:

"....society can afford to accept a lower discount rate than individuals because society may take a longer view than individuals can afford to do. This does not preclude the fact that society as well as individuals, will always prefer to earn a higher rate of return on investments, whenever such a higher rate is available. But in a competitive situation, where bidding a higher purchase price means offering to accept future income at a lower discount rate, society will be more at liberty to bid for resources in a way that implies a lower rate of return. This is because, in social planning, the fact of securing income for future generations may carry a higher value preference than individuals can afford under modern conditions." (4, p. 136).

Thus the first point, that foreign investment in farmland will be held longer than other assets, is combined with the second point to complete the argument: the private market undervalues future income streams. The longer the future income stream the greater the undervaluation. Thus farmland is underpriced in relation to other assets.

Evaluation of the Hypothesis

The longer investment period. We first examine the reasons given for the part of the hypothesis which states that foreign investment in farmland will be held for longer period than foreign investment in non-farm assets. That land is more durable than most non-farm assets is self evident. However, it does not immediately follow that because land is more durable it will be held for a longer period than less durable investments. As recognized by Dovring, depreciation can be offset by investing a portion of the proceeds from the investment. Consequently the argument that foreign investment in farmland will on the average be held longer must rest on claims that investment in farmland requires less management and has less risk. In the following discussion of management requirements and risk, the comparison is between cash rented farmland which accounts for nearly half of the foreign owned cropland and pasture, and common stocks, which serve as a proxy for passive non-farm investments.^{8/}

Concerning management requirements, there is no evidence that the management required by investor in stocks or other passive non-farm investments are greater than for cash rented farmland. Risk has two inter-related components: Risk of variations from the expected income and risk of change in asset value. Both sources of risk can lead to liquidation of the investment. The individual investor often guards against risk through diversification, a well established principal of portfolio management. In the context of the present discussion it should be noted that for the total of any group of foreign (or domestic) investments the effect of diversification is at work. If non-farm investments are indeed riskier, on the average, than investment in farmland, low or negative income from some of these riskier non-farm investments will be offset by higher returns for others.

The reduction of risk from pooling a large number of investments will reduce variation in annual income and in asset values for the total group of foreign investment in both farmland and non-farm assets. However, the reduction of risk from decline in asset values will not be equally effective for farmland and non-farm investments in periods of general decline in asset values. As shown in figure 3, the market value for farmland has historically been more stable than the market value for stocks even in periods declining returns to land, (figure 2). If variation in value of stocks can be taken as an indicator of variability in value of non-farm assets, the risks in periods of falling asset values is greater for non-farm assets than for cash rented farmland. Consequently risk due to variability in asset value does appear to be greater for non-farm assets than for cash-rented farmland.

In summary our reasoning lends some support to the assertion that foreign investment in cash rented farmland will, on the average, be held for a longer period than investment in stocks, which are used here as a proxy for passive non-farm investment. This conclusion is not based on the greater durability of land, nor on the minimal management requirement for investment in cash rented farmland. It is based on the lower risk of fall in asset values of farmland compared to non-farm assets.

Undervaluation of future income. The argument of underpricing rests on the assertion that "....society can accept a lower discount rate than private investors....". This argument has been a subject of controversy for decades. A review of the literature indicates that the core of the controversy is not whether or not future income is worth more to society than to private investors.^{9/} The issue is whether society should depart from private standards in evaluating alternative investments even if it were granted that future income is worth more to society than to private investors. As recognized in the above quotation, a lower social discount rate does not "....preclude the fact that society as well as individuals will always prefer to earn a higher rate of return on investments." This quotation recognizes a divergence between the opportunity cost of capital and the likely lower rate of social time preference.^{10/}

The following simple but revealing example will clarify the assumptions inherent in using a social discount rate to evaluate the present worth of future income to society. Assume two alternative investments by a foreign national. One is an acre of farmland which would transfer to the foreign investor \$50 per year forever. The alternative investment yields \$81.37 annually but for 10 years only. Assume for illustration that the market price of assets reflects a discount rate of 10 percent, which is equal to the opportunity cost of capital while the social discount rate is 5 percent. At the market discount rate of 10 percent, both farmland and the alternative investment will be priced at \$500. However applying the social discount rate of 5 percent, gives a value of \$1,000 per acre of farmland but only \$628 for the alternative assets. If the social discount rate is the appropriate for measuring the value of future income to society, the market underprices all capital assets but the degree of undervaluation increases with the length of time the income stream from the asset extends into the future.

This simple example exposes a crucial assumption inherent in using a social discount rate rather than the opportunity cost of capital for measuring present

worth of future income streams to society. The assumption is that income streams are not reinvested but consumed as they are received or that reinvestment imposes high transaction costs. In the present example it would appear preferable to sell to the foreign investor the alternative asset with a 10 year life and retain the farmland with its perpetual income stream. However, a perpetual income of \$50 could also be generated from the alternative investment which yields an income stream of \$81.37 for 10 years. By consuming only \$50 per year and investing the balance of \$31.37 at the opportunity cost of capital a total of \$500 would accumulate at the end of 10 years which would sustain a perpetual income of \$50.^{11/} The above is merely an illustration of the statement that any accumulation of wealth can be made permanent. The validity of applying a social rate of discount to future income streams depends on the assumption that future levels of investment will be below the levels desired by society. Consequently it is preferable to retain non-depreciating farmland in U.S. ownership and sell shorter lived investments.

In conclusion we find some basis for the claim that foreign investment cash rented farmland is likely to be held longer than other passive foreign investments. The basis is that market values of farmland are more stable than market values of non-farm asset. From this fact it also follows that sale of farmland to foreign investors will reduce the stability of market value of the remaining U.S. asset base. However, even if it is agreed that future income is worth more to society than to individual investors, use of a social discount rate to compare the value of farmland to the value of less durable assets assumes that the level of national investment will be too low and can not, without high costs, be raised to adequate levels by policies to encourage investment.

Footnotes

- 1/ For data and discussion see (6 p. 5).
- 2/ From 1970 to 1982, dividends slightly more than doubled while stock prices rose 29 percent. In real terms dividends remained about constant while stock prices fell 48 percent.
- 3/ In his presidential address to the American Economic Association, Moses Abramowitz documents and discusses the decline in U.S. private sector productivity from 1965 which accelerated sharply from 1973. His review of future prospects finds that "official and other responsible projections foresee productivity growth rates that lie above zero, but significantly below the average postwar rate." However: "The uncertainty surrounding any such forecasts can hardly be overstated". (1 p. 11)

Ibbotson and Sinquefeld project inflation adjusted returns to common stocks to fall from 7.0 to 6.3 percent in the period from 1976 to 2000. However their method depends mainly on sampling the historical record from 1926 to 1974 (7).
- 4/ Investors in cash rented farmland and stocks face the same tax schedules on annual income and capital gains. Nevertheless cash rented farmland provides some tax advantage over stocks through scheduling of major maintenance outlays for structures and other improvements in years of high income.

5/ Rates of return from net cash rent have declined for the past 4 decades in all southern farming regions and are now similar or lower than rates of return in the Cornbelt, Lake States and Northern Great Plains which have generally been stable until about 1975. Urban impacts on farmland prices have also contributed to the decline in rates of return from rent.

6/ Assume two assets both of which yielded an income of "a" in the past year. Income from asset 1 is expected to remain constant while income from asset 2 is expected to increase at the rate of g next year and continually thereafter. Appreciation for asset 1 will be zero while asset 2 will appreciate at the rate of g (10, p. 1090).

For asset 1 asset value will be $V_1 = \frac{a}{i}$ where i is the discount rate.

The total rate of return will be $\frac{a}{V_1} = i$.

For asset 2, asset value $V_2 = \frac{a(1+g)}{i-g}$. The rate of return from current

income plus asset appreciation will be:

$$\frac{a(1+g)}{V_2} + g = \frac{a(1+g)}{\frac{a(1+g)}{i-g}} + g = (i-g) + g = i$$

Thus total rate of current returns from both assets is the same, equal to i.

However the return from income of the rising asset is less, equal to i-g.

7/ The only known comparison of prices paid for farmland by foreign and domestic buyers which considered land quality is a small sample of 14 foreign and 133 domestic purchases of Iowa farmland. Prices paid for each of three land classes were not significantly different (5).

- 8/ Based on special tabulations of 2,754,000 acres of foreign owned agricultural land reported as of February 1980 and classified as cropland, pasture and miscellaneous agricultural land. Forest land is excluded.
- 9/ However Tullock has challenged the proposition that future income is worth more to society than to the present generation (12). Since future generations are likely to have higher income than the present generation, Tullock likens redistribution of income for the benefit of future generation to a "Robin Hood activity stood on its head".
- 10/ Baumol concludes the rate which is optimal for allocation of resources is necessarily higher than that which accords the public's subjective time preference (2). Moreover he concludes that there is no way that society can come out ahead by taking resources from high yielding returns to undertake lower yielding investments. He agrees with Tullock that by and large the future can take care of itself. However he does not conclude that the future should be left in every respect to the free market. The exceptions are (1) externalities and irreversibilities such as destruction of soil and scenic vistas (2) the need for a general program to encourage investment where indicated by overall economic conditions.
- 11/ In this example it was assumed that annual income would remain constant for the farm and non-farm investment. However even if income from farmland were rising, a non-farm investment yielding constant income

but a total return equal to that of farmland could, with reinvestment, yield identical growth in income and asset value. For example, assume farmland yields 5 percent annual returns and has an annual growth in asset value of 5 percent while non-farm investment has constant annual returns of 10 percent. Returns from a \$1,000 invested farmland for the first 3 years will be as follows:

<u>Year</u>	<u>Asset value</u> <u>dollars</u>	<u>Current earnings</u> <u>dollars</u>	<u>appreciation</u> <u>dollars</u>	<u>Total earnings</u> <u>dollars</u>
1	1000	50	50	100
2	1050	52.5	52.5	105
3	1102.5	55.125	55.125	110.25

Returns from \$1,000 invested in the non-farm asset will be as follows provided half of current income is reinvested.

<u>Year</u>	<u>Asset value</u> <u>dollars</u>	<u>Total earnings</u> <u>dollars</u>	<u>Reinvestment</u> <u>dollars</u>
1	1000	100	50
2	1050	105	52.5
3	1102.5	110.25	55.125

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APPENDIX

SOURCES AND METHODS FOR ESTIMATING CASH RENT

SOURCES AND METHODS FOR ESTIMATING CASH RENT

Gross rent and market value per acre of cash rented land were based on farmer estimates obtained in annual USDA surveys. The three crop reporting districts in Illinois, Kansas, and Mississippi were selected because estimates of gross rent were considered adequate and itemized expenses for representative farms were available from which the landowners expenses could be estimated or extrapolated. In the case of Montana ranchland, an area larger than a crop reporting district was required because data for none of the individual crop reporting districts were considered adequate. Details on data sources for the four region can be found in the article covering the 1940-1979 period (6).

The average U.S. net rent per acre was based on a weighted mean of estimates of net rent for 25 states for which gross rents and land value for cash rented farmland were available since 1940,^{1/} and which included approximately 70 percent of all cash rented farmland in 1978.^{2/} To maintain a constant land base so as to minimize changes in net rent due to shifts in location of cash rent land, constant, (1978) weights were used, based on the acres of cash rented farmland in each state.^{3/} Weighting by acres rather than by value of cash rented land is conservative since it gives greater weight to grazing land which generally have a lower rate of return than cropland. Average rates of

1/ Included were all states in the Cornbelt, Lake States, the Northern and Southern Plains, and all states in the Appalachian Region except Kentucky. Three states each were included from the Northeast and the Southeast (Delaware, Maryland, Pennsylvania, Alabama, Georgia and South Carolina) and one state, Mississippi, from the Delta Region. Estimates were on a per acre basis for farms rented for cash except for Kansas since 1976, Nebraska since 1970 and Texas since 1967. For these three states weighted means for irrigated cropland, dryland, cropland and pasture were used.

2/ Based on special tabulations from the 1978 Landownership Survey (9).

3/ Weights are based on acres under straight cash lease reported in the 1978 Landownership survey. Estimates of U.S. average net rent differed for some years depending on whether weights are based on all cash rented land or cash rented land for owners reporting owning farmland only. The maximum difference was 0.2 percentage points in net rent expressed as percent of land values. The net rent to value ratio used was an average of the result obtained by the two weighting methods.

return from net rent for any year would have ranged up to 0.5 percent higher if weighting had been by value of cash rented land. Net rent was taken as gross rent less property taxes (15) and less cost of maintenance of improvements, taken at three percent of the value of buildings. Value of buildings was derived from the ratio of value of buildings to total value of land and improvements, published periodically in Farm Estate Market Developments (14). Separate building to total value ratios were developed for 5 time intervals between 1940 to 1981 and for each farm region.

Since the 25 states from which the weighted estimates of U.S. rent to value ratio were developed included no states from the Mountain and Pacific regions, the ratio of net rent to value, excluding those regions was compared to net rent value ratio for the 48 conterminous states from 1960 through 1968, both as computed by Reinsel and Johnson (11). Since the net rent ratio, excluding the Mountain and Pacific regions was 4 percent higher than the 48 state average, the ratios for the 25 state average was lowered by 4 percent.

Appreciation of cash rented farmland was assumed to be the same as appreciation of all farmland. This assumption was adopted when it was found that the rate of appreciation of cash rented farmland was similar to the rate of appreciation of all farmland. The 1940 Census Agriculture reported a per acre average value of cash rented farmland at 94 percent of the value of all land in farms (16, p. 148). The 1969 Farm Finance Survey of the Census of Agriculture reported a ratio of 99 percent for farms rented entirely for cash (17, p. 23). The ratio was calculated for the period 1978 through 1980 for the 22 states for which per acre values are published in Farm Real Estate Market Developments for both farms rented for cash as well as for all land in farms. The ratio was 92 percent. Since the ratio of cash rented value per acre to value per acre of all farmland remained fairly constant, both classes of land must have appreciated at nearly the same rate.

