

Factors affecting agricultural land prices

B. Delworth Gardner
Carole Frank Nuckton

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In the twenty years that preceded 1920 there was a 245 percent increase in the average per-acre price of farmland (including improvements) before land values fell sharply. Today's escalation in land values—364 percent between 1957 and 1977—prompts some pointed questions: Have land prices reached their peak? If not, when will they plateau, if ever? Will they then decline and, if so, will the descent be sudden or gradual? Answers are not obvious, but some parts of the puzzle are identifiable.

Comparing the most precipitous segments of the two climbs makes the pertinence of these questions even more apparent, for values increased nearly 21 percent in just one year between 1919 and 1920, and over 25 percent between 1973 and 1974. Since 1974, average farm real estate values so far have continued to increase, albeit at a slightly slower annual rate.

The similarity in the twenty-year ascents of the two curves, 1900-20 and 1957-77, can be seen in figs. 1 and 2. Both have a significant amount of inflation as part of the value increases—especially in the steepest segments. Correcting for inflation (dividing nominal values by the GNP implicit price deflator) tempers the recent profile (fig. 2) considerably; still, the 1970's show a 49 percent increase in *real* values of farm real estate.

Clearly the 1970's are not the 1920's. The federal government is much more power-

ful, richer, and more thoroughly involved in the economy. Private financial institutions are much stronger and better protected by federal insurance. A descent from today's summit would probably be quite different from that of the 1920's, but disturbing, even so.

The rise in land prices began during World War II and continued steadily through the 1950's and 1960's, apparently based on a foundation of income derived from the land, increasing productivity of the farm operation, government developmental and income-support policies, and population pressures. The 1970's brought such rapid increases in land prices that one is compelled to look for forces other than these basic four which might have had special impact in the 1970's.

Net farm income

Capitalization theory suggests that the value of a capital asset is determined by its earnings potential. In economic jargon, the price of an asset is determined by the discounted present value of the future stream of net income generated by the investment. For farmland this means that market price movements theoretically should be tied closely to changes in expected net farm income. Figure 3 reveals that before World War II this was the case, for the correlation between the two was quite close. The war years disrupted the pattern as income rose much faster than land values. By the mid-

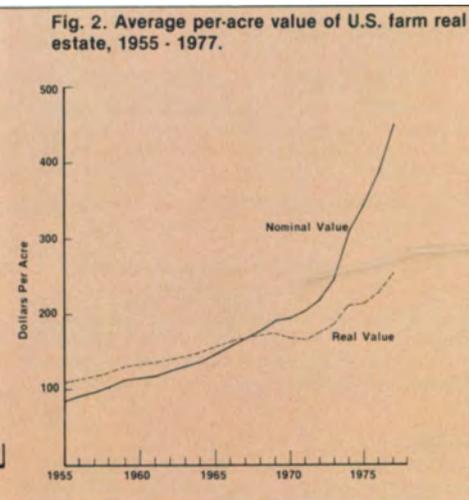
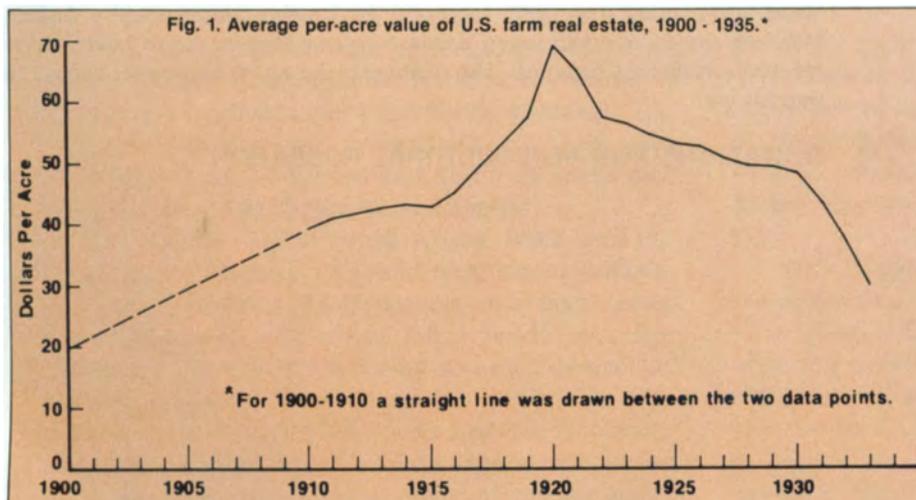
1950's, however, land values caught up with and passed income changes, rising consistently more rapidly through the 1960's. Although factors other than income obviously were behind these land value increases, income change was still extremely important, as evidenced by the rapid translation into land value of the extraordinary income year, 1973. The abrupt separation of the two components after 1973 may cause concern because the value of land is being inflated far beyond its income-generating capacity.

Productivity

Although the cropland base area has remained relatively constant since World War II, it has become much more productive. The primary source of this productivity increase is technological advance: substituting more productive for less productive inputs, using more capital inputs—mechanical power and machinery—and less labor, and utilizing agricultural chemicals, higher yielding crop varieties, and more efficient animal types. The productivity index (1967 = 100) stood at 71 in 1946, 80 in 1956, 97 in 1966, and 116 in 1976. Such gains have gradually, but continuously, added value to U.S. farmland and support the general upward trend.

The government's role

There is little doubt that actions of federal and state governments have contributed



to productivity and added to the land value base. Land grant colleges were established in each state to do research in the agricultural sciences and to extend new knowledge and know-how to farmers. The U.S. Department of Agriculture was established to aid the nation's food and fiber industry. Policies of the U.S. Army Corps of Engineers, the Bureau of Reclamation, and water resources departments in several states produced the draining of swampy marshes and the irrigation of arid land—converting low productivity acres into rich farmland. Thus, government-fostered productivity increases were built solidly into the land and increased its value.

In addition, supply control measures such as marketing quotas and acreage set-aside programs raised the price of agricultural commodities, and much of the benefit was capitalized into higher land values. The same can be said for price supports, direct payments to farmers, soil conservation and water subsidies.

Taxation policies—income, estate, and property taxes—have had mixed effects on land values. In 1975, the property tax took 18 percent of U.S. net farm income into government coffers and may have forced some farmland to convert to higher-valued, nonagricultural uses. Largely in response, preferential assessments—the taxation of land at its use-value rather than its market value—have been enacted in many states. On the one hand, lower property taxes increase net income which becomes capitalized into higher land values; on the other hand, contracts restricting land to agricultural use may lower its market value.

In these various ways the government has affected the land market for many decades. Much, if not most, of the benefits of policies aimed at assisting U.S. agriculture show up eventually in increased land values. Thus, the government's agricultural policy has sustained the long-term upward

Average Annual Rates of Return Yielded by Holding Agricultural Land			
Time Period	Number of Years	Nominal Rate	Real Rate
1946-1977	31	7.12	3.15
1950-1977	27	7.43	3.64
1956-1977	21	7.97	3.88
1960-1977	17	8.30	3.79
1966-1977	11	9.98	4.03
1970-1977	7	12.69	5.89
1972-1977	5	15.60	7.84

trend in land value since World War II, but is probably not primarily responsible for the sudden spurt of the 1970's.

Land scarcity at the rural-urban fringe

Land-use issues come into sharpest focus when a growing urban society extends into a retreating farmland base. Developers of new suburbs, shopping centers, freeways, parks, and utility sites outbid farmers for land. The in-migration to rural areas, a recent nationwide demographic reversal, is putting additional pressures on the agricultural land market as agricultural land in these areas becomes increasingly scarce.

Competing demands for land have bid up prices in many areas of our nation; but such pressures, while contributing substantially to the land value base, are probably not responsible for the phenomenal surge of the 1970's.

The 1970's

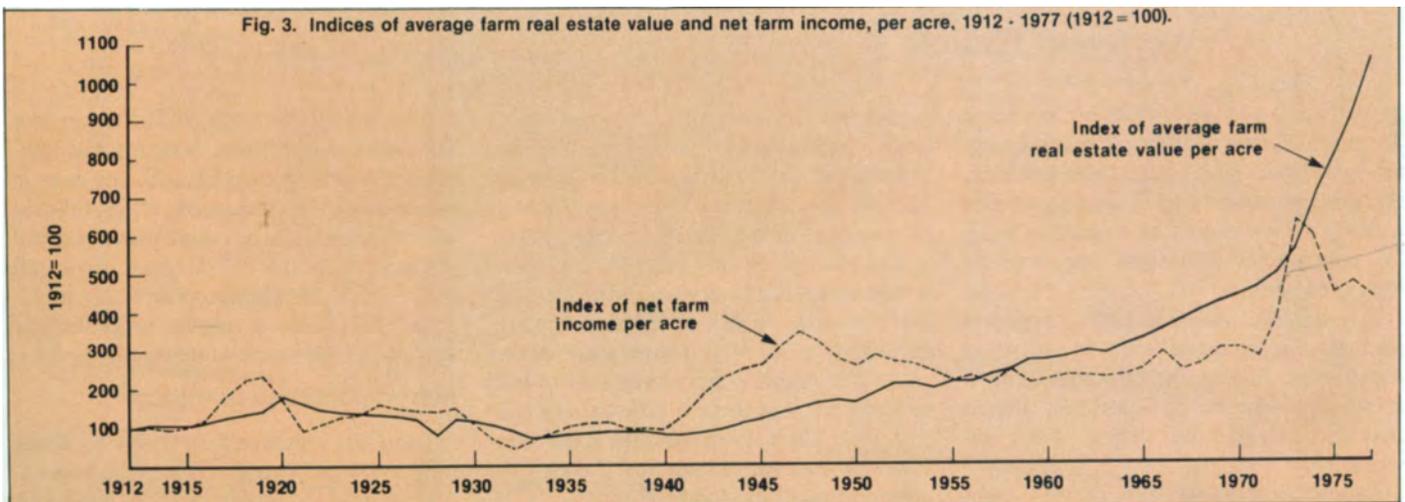
Even when favorable farm income, productivity growth, governmental support, and the increasing scarcity of land are considered together, they do not account for all of the escalation phenomenon of the 1970's. What other factors may have contributed?

The very long upward trend in agricultural land prices, which began in the 1940's, may have suggested to buyers in the 1970's that there were few risks in land investment, and such confidence may have created a speculative "bubble." The more

the size of such a bubble grows, the more serious the situation can be if and when it bursts. Already several signs of stress are appearing: (1) some data from the USDA suggest that one-third of American farmers who have loans with the government and with commercial banks are having difficulty meeting payments; (2) a formidable barrier to entry in farming has been imposed by high land prices; and (3) intergenerational transfer has been made more difficult because estate taxes are based on highly inflated values.

On the positive side, farmers and others who have participated in agricultural land investment have enjoyed excellent returns on capital. The table shows the rates of return in both real and nominal terms for selected time periods. For those entering the market just after World War II and keeping the land during its long upward price movement and through the escalation of the 1970's, a 3.15 percent real and 7.12 percent nominal return was captured annually—an excellent return when compared with almost any other investment. The 1970's, particularly, provided an unparalleled opportunity for capital gain. Expectations of better prices were self-fulfilling as investors outbid each other to enter the market.

The income tax structure led nonagriculturalists to farmland as an excellent investment, thereby increasing the demand for land. Attractive tax-shelter advantages enticed much capital—both from individuals and corporations—into agriculture. Op-



portunities for investment diversification were provided to persons and companies whose incomes were not primarily derived from farming, and gains realized upon resale were taxed at the lower capital gains rather than ordinary income tax rate.

Inflation itself seems to have been the most significant magnet attracting investors to America's farmland. Investors who entered the market seeking a good inflation hedge were rewarded handsomely, for the land market has yielded returns far exceeding the inflation rate. Over the period from 1972 to 1977, per-acre values rose 15.6 percent per year compared with an average annual general price increase of 7.1 percent. As soon as the news of a good inflation hedge is out, it becomes an even better hedge, for prices are bid up in the scramble for shares.

Foreign investors too have been attracted to America's land boom. There is as yet, however, little solid information on the extent of their contribution to higher land prices.

Thus, land fever, caught in the 1970's by investors of all types, has helped cause the surge in land prices. It may be that a cooling off, catching up period must follow.

The major demand for farmland, however, is not from nonagricultural investors but from farmers who seek to expand their

operations. According to the USDA, 63 percent of all farm-tract purchases in 1976 were for farm expansion. The pressure to expand in order to take advantage of economies of scale has been an ongoing force, internal to agriculture. For example, farmers have long sought to spread the high cost of modern equipment over more acres. Demand for land for expansion purposes has become even more intense in recent years. High commodity prices in 1973 and 1974 gave farmers ready cash to purchase additional parcels as well as the incentive to do so. Escalating land values greatly increased their net worth and borrowing capabilities to obtain still more land.

A final clue to the escalation phenomenon is that the largest gains between 1972 and 1977 were in the Midwest grain states. North Dakota, Minnesota, Iowa, Illinois, Indiana, and Ohio all experienced increases of over 160 percent. The leader was Iowa at 225 percent, followed by Illinois at 204. By February 1978, Iowa's percentage increase since 1972 was up to 239. Some Iowa corn land now sells for over \$3500 an acre. Such high land values must be closely connected with expanded world markets for our major agricultural exports—feed grains, cereals, and soybeans.

The world food crisis of 1972 and 1973 and the growth of foreign markets resulted

in extremely favorable commodity prices in 1973 and 1974. The world was open to commodity traffic in many directions, and North America has a comparative advantage in agricultural products. The increased demand coincided with a low volume of stocks in storage, producing rapid increases in prices. Farmers' hopes for the permanence of these favorable prices further stimulated their desire to expand, and exaggerated commodity price expectations became capitalized into the value of the land.

Conclusion

The price of American farmland has been propelled sky-high by forces both internal and external to agriculture. Income-generating potential remains a basic land-value determinant, but that income is buffered by world-wide happenings—climatic, political, and monetary. The impact of inflation has been to accelerate land values far beyond inflation itself. Many other factors—farm expansion, urbanization, rural parcelization, foreign investments in U.S. land, conglomerate corporations entering agriculture, vertical integration in the food system, and so on—have all made their contributions, adding fuel to the fire.

B. Delworth Gardner is Professor of Agricultural Economics, Davis, and Director of the Giannini Foundation; Carole Frank Nuckton is Research Associate, agricultural economics, UC, Davis.

Warp reduction in young-growth ponderosa pine studs

Donald G. Arganbright □ James A. Venturino □ Michael R. Gorvad

Conventional kiln-drying under restraint with an initial plasticization treatment reduced fall-down from 51.0 percent to 34.4 percent.

Increasing amounts of lumber are being cut each year from young, small-diameter ponderosa pine trees. Unfortunately, this material tends to warp severely when it is dried. Downgrading as a result of warp for commercial operations has been as high as 60 percent.

Investigations aimed at finding practical methods for reducing warp in softwood construction lumber fall into three general areas: alternate drying schedules, altered sawing patterns, and drying under restraint.

Except for the first, each of these tech-

niques has led to significant reductions in warp. Drying under top-load restraint appears more practical than other methods because it is either less expensive or easier to integrate into a production system.

The most promising of these techniques is high-temperature drying under restraint. Unfortunately, it has never been tried on ponderosa pine. High-temperature drying without restraint is frequently said to lead to less warp, but there is little data to confirm this. There is, on the other hand, considerable data for radiata pine showing the effectiveness of top-load restraint.

This study was initiated on the premise that top-load restraint was the simplest, most practical method for reducing warp in ponderosa pine. The study: (1) established which form of warp is most prevalent; and (2) compared the effectiveness of a 200 lb/ft² top-load restraint when studs are air dried, kiln dried at conventional temperatures, or high temperature dried.

Materials and preparation

Each test unit was 3 feet wide by 8 feet long by 38 inches high. This resulted in approximately 150 boards or about 800 board