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LAND VALUES RESEARCH APPROACHES AND DATA NEEDS

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LAND VALUES RESEARCH APPROACHES

AND DATA NEEDS^{*}

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I. The Research Setting

A dominant theme in land values research throughout the history of the discipline of economics is that land is not reproducible. Its possession is thought to confer monopoly power, in greater or lesser degree. This physical concept of land supply formed the basis of classical economic theory, and it is still a surprisingly robust theme. If it no longer serves as a basis for theory in the higher reaches of contemporary economic thought, it is very much alive in the every-day conduct of economic affairs. Our experience with inflation in the past two decades has provided a nation-wide lesson in the desirability of land ownership. From 1968 to 1980 the real value of common stocks (Standard and Poor's Composite Index of 500 deflated by the Consumer Price Index) was cut in half (Pearce, 1982, p. 6). In the same period the real value of farmland increased two and one fourth times (USDA, 1981A, pp. 51-53, deflated by the CPI). Comparable data on residential building land are ambiguous, but the trend can be inferred from the fact that the median price of existing homes rose by 9.8 percent

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per year from 1969 to 1980, or over 2 percent more than the rate of inflation (Pearce, 1982, p. 18). The nation was given an unmistakable signal: buy land.

In the presence of these trends it is important to set out a principle that will guide the following discussion. In the sense that will be used here, land is perceived as an economic variable, responsive to the major forces that guide the combination of resources in the production of goods, services and intangible values that satisfy human wants. It is produced, in this economic sense, in the laboratory, through the techniques by which it is used, by the institutions that are established to regulate its use, and by the perceptions of its users. Its supply can be augmented, diminished, and destroyed. It is subject to the laws of substitution as well as to those of supply and demand. It is a major factor of production, of exceptional durability and with a production cycle that must be measured in terms appropriate to the supply cycles of invention, innovation and the creation and restructuring of social institutions.

In this view, economic land is a social creation. Its supply is a function of the total structure of markets, tools, techniques and the laws, conventions and regulations that govern their use. A given area of land in the hands of one social group yields an output in goods and satisfactions that may be many times the output that can be obtained by another culture.

Louisiana, at the fertile mouth of a great river system, has 48,523 sq. miles and a population of 4.3 million. Cuba, with 44,206 sq. miles has 9.8 million. Java, with 51,032 sq. miles, has a

population of over 90 million. Something more than a natural endowment of land in its physical dimensions is needed to explain these variations.

The values that attach to land in these settings are unquestionably related to its productivity. This productivity, in turn, is a complex variable, reflecting an interaction between the natural endowment and the cultural group. Productivity and hence value cannot be measured independently of the people who use the land or desire its products and services. Land value, in the sense used here, is a constantly changing concept in which the principal change agent is a function of social organization. Research into land values involves the researcher in the full range of relations among people with respect to land. If any sub-discipline within the field of economics merits characterization as a social science it is the study of the values of land.

The use of the term values in the plural is intentional. There is no single value for a tract of land; there are many values. In the constraints set for this paper it is important to stress the distinction, made by Doving in an opening paper in this workshop, between factor values and asset values. Land is a factor of production and the majority of research studies of land values stress this aspect. It is also an asset, a repository of values, and in this function it is closely analogous to gold, jewels, or the precious metals. Questions involving the value of land are akin to questions involving the value of money.

It is the asset value of land that gains in importance in times of crisis or rapid change. The initiative that led to this workshop can be justified on many grounds. Among the most important is the

prominence given to the asset values of land in recent years - by foreigners seeking a safe haven for wealth, and by natives seeking a capital gain. Trends in the value of land as a factor of production seldom give rise to political controversy. Trends in the asset values of land almost invariably do.

In the discussion to follow, the focus will be on agricultural land. This should not be interpreted as a failure to recognize the importance of research into the values of non-agricultural rural lands, or of urban lands. It is instead tacit acknowledgement of the compelling fact that we have no uniform time series of data on non-farm land values. Much good research is undertaken into value trends in urban and non-agricultural rural lands, but it is typically episodic, and location-specific. The only national land values data base we have is for agricultural land.

II. Land Values and the Land Market

Whether desired as a factor of production or a storehouse of value, land is priced through market processes that have several unique features. Befitting land's immobility and durability, annual transactions in the rural land market are a small fraction of the total number of farms and an even smaller fraction of the number of ownership units. Since 1926, the year in which data on land transfers were first collected for the US as a whole, the peak year of transfers for all reasons was 1933, when the transfer rate reached 91 per thousand farms, of which only 16.8 per thousand were by voluntary sale. Foreclosure, tax forfeiture, inheritance, gifts, and miscellaneous reasons accounted for the rest.

The trough year for farmland transfers was 1981, with total transfers of 36.4 per thousand farms, and voluntary sales of 22.7 per thousand (USDA, 1981 A, and prior years). Only in the depression years of 1931-35 did transfers by voluntary sales fall below 23 per thousand farms. And in no year since 1926 have transfers for all reasons been as low as they were in 1981.

The land market is a thin market. Although the flurry of land market activity following the unexpectedly large grain sales to the USSR in 1972-73 lifted the rate of transfer by voluntary sales to 41 per thousand farms in 1973 and 1974, the rate has declined steadily since 1974. In the major grain-growing states of the Corn and Wheat Belts, voluntary sales in 1981 involved only about 2 percent of the number of farms; in North Dakota (the national low) only 1 percent. At a 2 percent rate of annual sales, farm land in the major grain belts would on average enter the land market only twice in a century.

The market in which land values are mirrored in land prices is not only thin, it is highly location-specific. To speak of "a land market" in this context is misleading. There is no national land market, nor are there state- or region-wide markets. There are only local markets, and the boundaries of these markets vary widely in the states and regions. They have narrowed markedly in the past two decades in areas of rapid farm enlargement. National data to illustrate this trend do not exist, but it can be illustrated with data from Minnesota. In an 18-county area of Southcentral and Southwestern Minnesota, containing the highest-priced corn and soybean land in the state, 90 percent of farm land buyers lived within 30 miles of the tracts purchased in 1961. In 1981 this distance had been more than halved, with 90 percent of all buyers living within approximately 14 miles of their purchases and two-thirds within 5 miles (Smith and Raup, The Minnesota Rural Real Estate Market in 1981, and similar reports for prior years). For the state as a whole, the median distance of buyers' residences from the tracts they purchased in 1981 was 4 miles.

Some sense of the degree of regional variation in the spatial extent of the farm land market is provided by data from North Carolina. Using survey techniques comparable to those used in Minnesota, the average distance of buyers' residences from farmland purchased in 1979-80 was 55 miles. The median distance was approximately 8 miles, or double the Minnesota figure (Danielson, 1981, pp. 53-54).

The narrowing of the geographic dimension of the farmland market is a reflection of a more fundamental shift in the function of the market. Until well into the 1950's the market's primary role was identified with the transfer of intact farm units from former operators

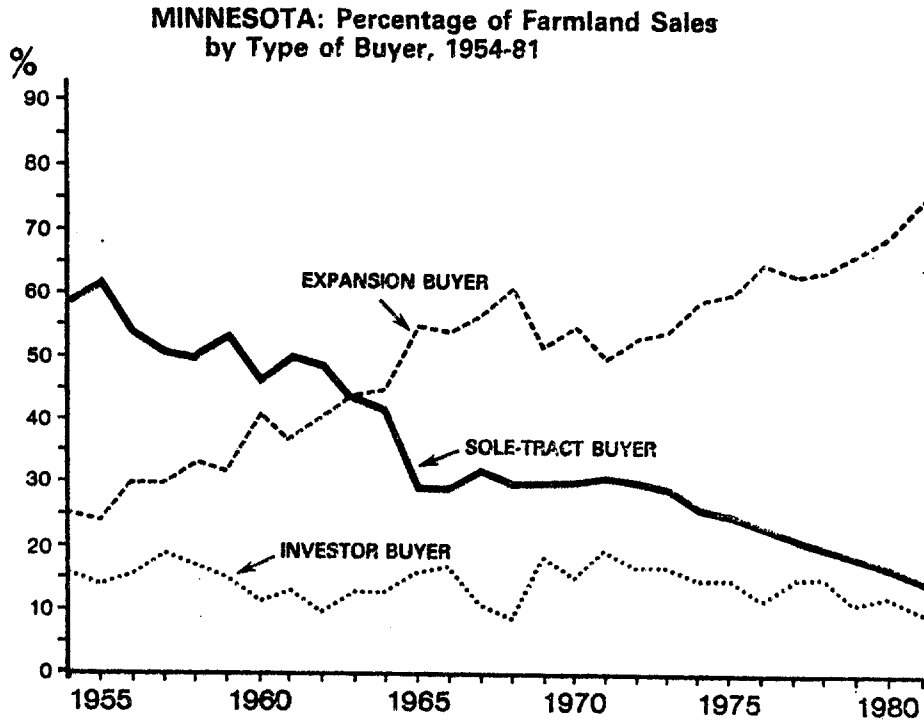
to new operators, principally in connection with the process of intergenerational transfers. Beginning in the 1950's this function of the land market has experienced a profound transformation. No national time series of data is available to document this shift but its magnitude is suggested by data for Minnesota in Figure 1.

In 1954-55 approximately 60 percent of all sales of farmland in Minnesota were of intact farm units being transferred to new operators. Land purchases for farm enlargement by farm operator who were adding the tracts purchased to land already owned accounted for 25 percent of all sales. Investor buyers who did not intend to operate the land themselves and who were not adding the tracts purchased to land already owned accounted for the remaining 15 percent.

By 1981 the percentages of sales of intact farm units and of land for farm size expansion had more than reversed: only 17 percent of all sales in 1981 were of intact farm units to new operators; 72 percent were to farm expansion buyers, and 11 percent to investors (Smith and Raup, 1982, pp. 5-6).

This shift reflects a change in the nature of the market. It once was a principal tool in the accomplishment of intergenerational transfers. Its function has been transformed into a major tool for farm-size enlargement. This explains the narrowing geographic extent of the market. It also explains much of the buoyancy of farmland prices in the major farming areas. The thinness of the market, its narrow geographic extent, and the predominance of farm expansion buyers result in a process of price formation in which successful bidders are near-by farmers who have a unique advantage in calculating costs and returns from the purchase of additional land.

Figure 1:



This pattern has not been uniform throughout the United States. The proportion of sales to investor and speculative buyers has been above the national average in the Atlantic seaboard and Gulf Coast states, extending westward into Texas and the Southwest. Purchases of rural tracts for part-time farms or rural residences have been most frequent in these same areas, and in Appalachia and the Mountain states of the West. By regions, the highest proportion of purchases by absentee buyers occurred in the Southern Plains, the Delta States, and the Northeast (USDA 1981 A, p. 28). Non-farm buyers have had a major influence in setting farmland prices in the Eastern, Southern and Western perimeters of the nation and in mountain areas. Here farm expansion buyers have played a reduced role.

For farmland in the upper reaches of the current price range in Illinois (above \$3,000 per acre) it is reported that prices per acre since 1978 would require the net income from three acres to pay for the purchase of a fourth acre, given current and prospective net income and interest rates (Scott, 1981). In South Central Minnesota (Economic Development Region 9) land prices paid in 1981 were approximately 35 times net cash rent per acre, after deducting property taxes (Smith and Raup, 1981, Thomas 1981).

These prices cannot be explained by conventional capital theory that derives the value of an asset from its capitalized anticipated net earnings. Much of the recent analysis that has focused on the gap between land prices and capitalized net earnings has attributed it to the present value of anticipated capital gains (Duncan, 1977, Melichar, 1979). Based on reported prices through 1979, Melichar concluded that

"Owners of farm assets have thus been receiving about half of their total real return in the form of current income and half in the form of real capital gains" (Melichar, 1980, p. 4).

Since 1979 the prospect of continued real capital gains lost much of its glitter, yet farm land prices continued to rise, to an index of 158 in 1981, (1977=100) or 26 percent above the index of 125 in 1979 (USDA, 1981 A, p. 12). A reasonable conclusion is that farmland prices since about 1978 have reflected the virtual dominance in the market of farm expansion buyers. In the Corn Belt and Northern Plains they accounted for 80 to 90 percent of all sales in 1981. Nationally, 67 percent of all sales in 1981 were to buyers who intended to operate the purchased land as part of another farm (USDA, 1981 A, p. 27).

Increasingly throughout the 1960's and 1970's and through 1981, prices for farmland were set primarily by buyers who had existing land to serve as an income base, a credit base, or a base for the calculation of possible increasing returns through farm size expansion. These prices, from a low and declining number of sales made predominately to farm expansion buyers, are the fact base conditioning the judgement of reporters who submit the estimates of land value collected periodically by the U.S. Department of Agriculture through its Farm Report surveys. These estimates, in turn, are the basis for the time series of index numbers of farmland value prepared for each state. This has become a very narrow base for imputing values to all of the nation's farmland.

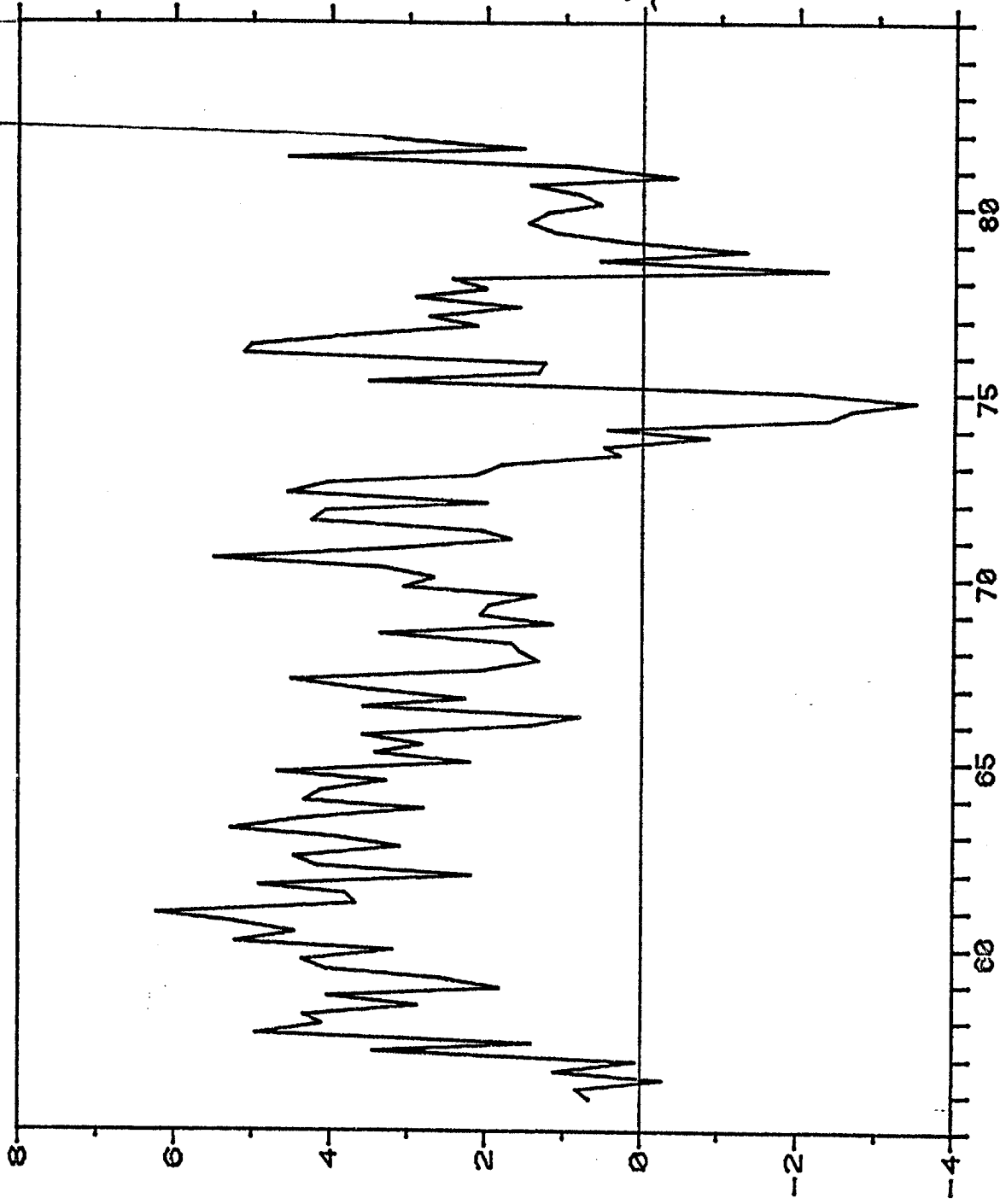
It is also a diminishing base. With the passage of time there will be a decline in the population of farmers with low debt levels who can use their superior credit status to finance the purchase of additional land. This has been accelerated by the increase in real

interest rates since 1980. From the fourth quarter of 1972 through the first quarter of 1981 the real rate of interest on Federal Land Bank farm mortgage loans, deflated with the implicit GNP deflator, was below 3 percent in all but five quarters. In eight quarters the real rate of interest was negative, by as much as 3.5 percent in the fourth quarter of 1974. On an annual basis, from 1973 through 1981 the real rate of interest on FLB farm mortgage loans was below 2 percent for seven of the nine years. These trends are displayed in Figure 2 (Federal Reserve Bank of Minneapolis, 1982).

If we deflate with the Consumer Price Index, the results are even more dramatic. In the eight years from 1973 through 1980 the real rate of interest on FLB mortgage loans deflated by the CPI was negative in 18 of the 32 quarters. Farmland buyers who could qualify for FLB loans could benefit from a real rate of interest that was approximately a negative 3.0 percent in 1974, a negative 2.2 percent in 1979 and a negative 3.2 percent in 1980. These results are charted in Figure 3. We entered the 1980's with a population of prospective land buyers that had been nurtured for nine years on real rates of interest that were ridiculously low or negative (see Appendix Table 1).

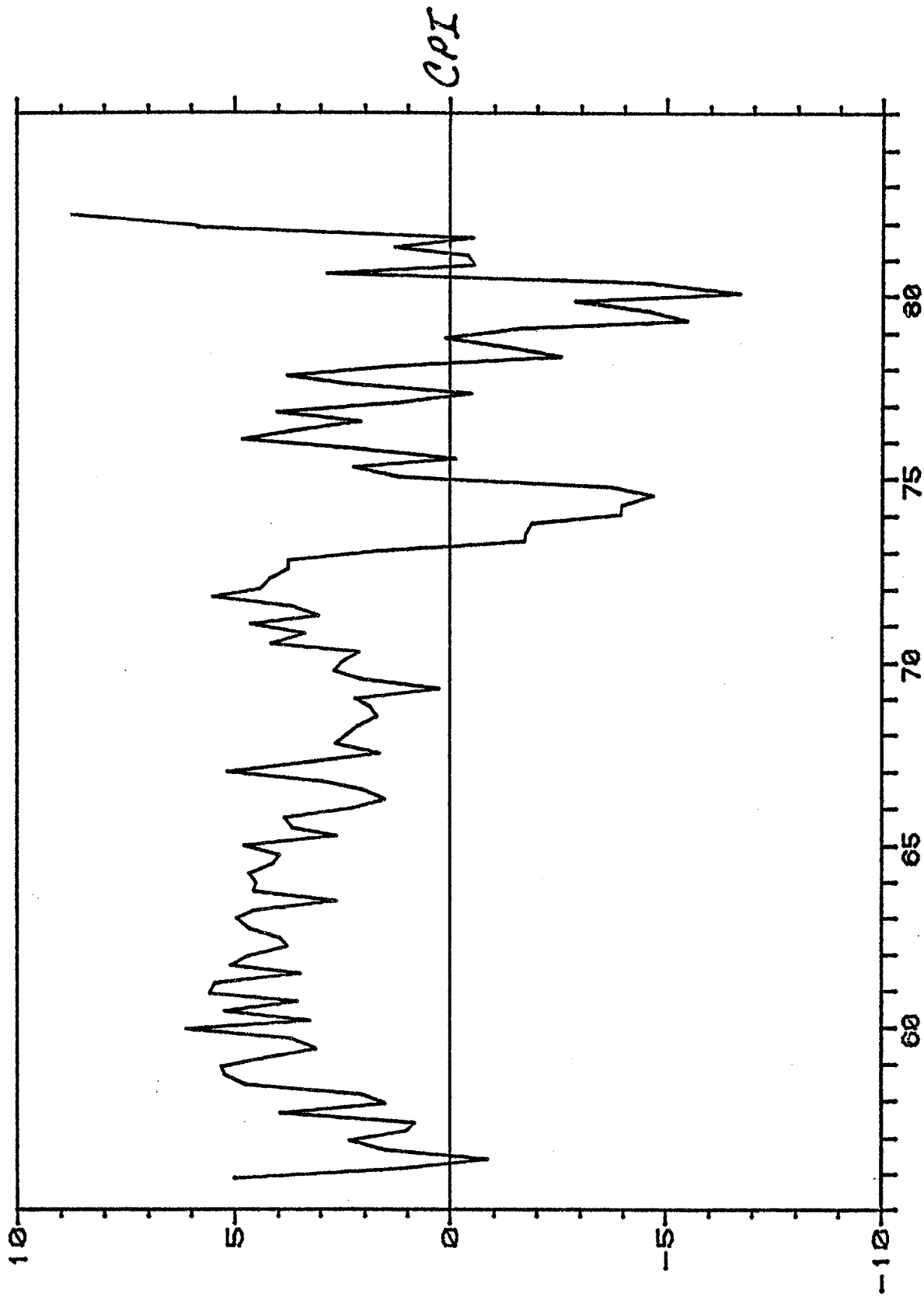
The reversal in 1981-82 was unprecedented. In the first quarter of 1982 the real rate of interest on FLB loans, deflated by the GNP deflator, jumped to 8.49 percent and to 8.78 percent if deflated by the CPI. In no year from 1935 through 1981 had the annual average real rate of interest on FLB loans exceeded 5 percent, whatever the deflator used. The farm land market is now faced with a cost of credit that is beyond the range of experience of this generation of farm operators or land buyers.

Average Real Interest Rate Charged by Federal Land Banks



IMPLICIT GNP
DEFLATOR

Average Real Interest Rate Charged by Federal Land Banks



Low or negative real rates of interest reward the acquisition of debt. This message has been clearly understood by farmland buyers. In 1950, debt was incurred in 58 percent of all farm real estate transfers, with a ratio of debt to purchase price of 57 percent. In 1981, debt was incurred in 90 percent of all transfers, and the ratio of debt to purchase price had risen to 78 percent (Table 1). By 1981 farmland prices were debt-supported to an extent unknown since the mid-1930's. The market had become exceptionally vulnerable to interest-rate changes.

The price-enhancing influence of cheap credit on farmland values since 1960 arose from economic trends whose origins were largely outside of the agricultural sector. They were powerfully augmented by endogenous forces from within agriculture in the 1970's, through the unexpected expansion of large foreign markets for U.S. agricultural products, especially grains and soybeans. Using the average of two crop years, the U.S. in 1970/71-71/72 exported 45 percent of its wheat, 13 percent of its corn, 17 percent of its sorghum, and 50 percent of its soybeans. Ten years later, 1980/81-81/82, the export percentages were 64 for wheat, 31 for corn, 41 for sorghum, and 55 for soybeans (USDA, 1981C, and 1982C, p. 21).

In the meantime, total production of wheat, corn, and soybeans had expanded to record levels. Wheat production in 1980/81-81/82 was 57 percent greater than in 1970/71-71/72, corn output in the same period rose by 66 percent, and soybean production almost doubled. In no decade since the 1870's had wheat or corn production increased by the percentages

Table 1: Shifts in Credit Financing
of Farmland Transfers, U.S.
(48 States), 1950-1981^{a/}

<u>Year</u>	<u>Percentages of Transfers on Which Debt Was Incurred</u>	<u>Ratio of Debt to Purchase Price</u>
1950	58	57
1960	67	65
1970	78	73
1981	90	78

^{a/} US Dept. of Agriculture, Farm Real Estate Market Developments,
ERS, CD-86, August 1981, pp. 31-32.

achieved in the 1970's (U.S. Dept. of Commerce, 1975, pp. 510-14).

It was truly a "hundred-year flood" - of grain.

The combination of phenomenal output increases and sharply rising exports lifted the gross value of agricultural exports from \$8 billion in 1971 to \$43 billion in 1981 (USDA, 1982B, pp. 3-5). Without necessarily imputing a direct causal relationship, it is worth noting that the real value of gross agricultural exports (deflated with the implicit GNP deflator) increased from 1971 to 1981 by a multiple of 2.13 while the real value of agricultural land increased almost as much, by 1.95.

By the end of the 1970's the U.S. had reached a degree of dependency on export markets for its agricultural output that can only be compared with its colonial era or the peak of cotton culture in the ante-bellum South. Over one out of every three crop acres produced for export in 1981. In 1971, it had been one out of every five (USDA, 1972, p. 5).

The prospect of export market outlets on this scale undoubtedly was a major reason for the continued increase in land prices in the 1970's. The media were filled with abundant references to an impending world food crisis. There were credible reasons to believe that the Soviet Union had made a policy decision to rely on substantial grain imports to meet a demand for animal products that its domestic feed supplies could not support. Expanding trade relations with China nourished a belief that there would be export markets for all the grains and soybeans the U.S. could produce, currently and for the foreseeable future. These

expectations were capitalized almost instantaneously into higher prices for farmland.

In the process, the regional pattern of farmland values was significantly restructured. The principal beneficiaries were, not surprisingly, the corn and soybean producing regions that were most distant from tide-water markets. In 1970, the Corn Belt and the Lake States accounted for 30.9 percent of the total value of agricultural land in the United States. By 1981 this percentage had increased to 35.1 (Table 2). A similar proportionate increase in the share of total value occurred in the Mountain States, where farmland demand for recreational and residential purposes was a strong contributing reason.

The losers in relative terms were the Northeast and Pacific rim (where increases in value per acre did not offset actual declines in farmland area) and the Delta States and Southern Plains. The inclusion of the Delta States and Southern Plains among the regions that lost relative value shares is somewhat surprising. With 1977=100, the indexes of farmland values per acre for Mississippi, Arkansas and Louisiana were among the highest in the nation in 1981. The explanation is of two parts. These regions lost substantial areas of farmland to non-farm uses during the 1970's, thus reducing their shares in total value. In addition, their indexes of value per acre were further above the national average at the beginning of the decade than they were at the end of the decade. Their boom in farmland prices had started earlier, and was not propelled as powerfully by the expansion of export grain markets after the Russian grain purchase of 1972.

Table 2 Regional Shares in Total U.S.
Farmland Value, 1970, 1975, 1981
(48 States)

<u>Region</u>	<u>1970^{a/}</u>	<u>1975^{b/}</u>	<u>1981^{b/}</u>
		PER CENT	
Northeast	5.4	5.9	4.4
Lake States	7.1	7.7	8.7
Corn Belt	23.8	24.0	26.4
Northern Plains	11.1	11.9	11.0
Appalachian	7.7	7.5	7.0
Southeast	6.4	6.9	6.3
Delta	7.1	5.1	5.8
Southern Plains	13.3	12.5	11.1
Mountain	8.5	9.3	9.3
Pacific	11.4	9.1	10.1
	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

^{a/} USDA, FREM, CD-81, July 1976, p. 17

^{b/} USDA, FREM, CD-86, August 1981, p. 17

The relatively poor showing of the Southern Plains is also a reflection of the comparatively depressed status of ranching and cattle feeding throughout much of the 1970's. In contrast, the dairy regions of the Lake States ended the decade in a relatively prosperous condition, reenforcing the upward pressure on land values generated by foreign market expansion for corn and soybeans.

These regional shifts are consistent with an interpretation that assigns the greatest benefit from a sudden market expansion to those lands that are relatively more distant from market. The Upper Mississippi Valley has been a major beneficiary of the restructuring of regional patterns of wealth in land in the past decade. It is also the region that is most vulnerable to land value declines triggered by rising real rates of interest or declining export markets.

In summary, we entered the 1980's with levels of land values that reflected prices set in the thinnest market in a half-century, fueled by a decade of inflationary expectations, stimulated by unprecedented low or negative real rates of interest, and buoyed by visions of near-limitless foreign markets. The need for timely and comprehensive research in land values has not been matched since the land price boom that followed the first World War.

III. The Need for Better Land Value Data

Haunted by the memory of the collapse in land values in 1920-21, a major effort was made by the U.S. Dept. of Agriculture during World War II to monitor farmland value trends at state and sub-state levels. This effort tailed off at the end of the 1940's and from about 1950 on we have had nation-wide data whose validity did not go below the state level. Iowa and Minnesota were the only states that continued an uninterrupted effort to collect and report land market data at a sub-state and county level. For any analysis of land value trends on a national scale we must work with one figure per state

Some indication of the variance this conceals is given by the fact that there are high-valued and low-valued counties in Minnesota with field crops as their principal agricultural land use in which county average sales prices for farmland in the 1970's showed a spread of 5-fold (Landwehr and Raup, 1981, pp. 35-37). In Iowa, with much more uniform land quality, the spread was at least 3-fold in any given year. (Iowa State University, 1979).

Several states resumed the periodic collection and reporting of land market data in the 1960's and 1970's, among them Illinois, Nebraska, North Carolina, North Dakota, and Wisconsin. In other states, episodic land market studies have appeared from time to time, typically in the form of Master's theses, with little uniformity in research conception, methodology or reporting. As a result, comparative land value data cannot be assembled at any level below that of a state. The most important point

to make about data on farmland values in the United States is that they defy disaggregation.

A second point is that the sub-state research that has been attempted has usually been confined to market reporting or "price discovery". In only a few states is it possible to disaggregate state-wide data to determine on a county or sub-state level the characteristics of buyers and sellers, variations in financing methods, reasons for sales, intended use by buyer, quality of land and buildings, and similar data that are essential for any useful interpretation of land market trends. This limits the usefulness of price reporting and prevents the analysis of price trends in terms of underlying economic and social changes.

Where analysis has been attempted, there has been a preoccupation with attempts to show that land values are in fact explainable by capitalized net earnings. There is a family of state and national land value studies dating from the 1950's and 1960's, exploring the extent to which government farm price support programs were being capitalized into higher land prices. To the extent that theory has guided the design of research undertakings, capitalization theory has been virtually unchallenged. In contrast to a number of studies of urban land values, location theory has rarely been used in research into farmland values. One summary study of the "Effects of Location and Road Type on Market Values of Real Estate" was published by the U.S. Dept. of Agriculture in 1958, but it apparently has not been repeated (USDA, 1958, pp. 20-33). In a less conventional framework, the rise of auction land markets would

seem to provide an excellent opportunity for the use of game theory in the analysis of land price formation. The fact that these approaches have been so little used is a reflection of the fact the investment in land value data collection has been confined to the U.S. Department of Agriculture or has assumed the characteristics of a cottage industry among economic research workers at the state level, with each product unique and largely hand-crafted. Our national investment in land values research is remarkably small, in view of the importance that land plays in the nation's stock of wealth.

Why should we be concerned about the magnitude of the investment in urban and rural land values research? Because farm land in a market economy is the principal credit base for agriculture. Residential property is the major component of net worth of the home-owning population. Real estate values in money terms are the measure of tax-paying capacity that undergirds the financing of most public services at the levels of state and local government. And in an era that is contemplating the destructive potentials of nuclear war, it is appropriate to recall the German experience following the devastating inflation of 1923. When all confidence in the Reichsmark had been destroyed, restoration involved replacement with a Rentenmark, for which the foundation reserve was a mandatory mortgage on all of the real property in the Reich - hence the name Rentenmark (Mendershausen, 1955; Guttman and Meehan, 1975). Money matters, but so does land. How and why it matters can be summarized under the following headings.

The Early Symptoms of Hereditary Agriculture. A major contemporary trend that calls for renewed interest in the quality and quantity of

research into rural land values is the declining volume and proportion of voluntary sales of farmland. In 1981, the proportion of voluntary sales in total farmland transfers was 62 percent. With the exception of 1962, this is the lowest proportion recorded in any year since the wartime years of the 1940's. (USDA, 1981 A, and earlier years).

Inheritance, gifts, and estate settlement have in recent years accounted for an increasing fraction of total transfers, and especially in the areas of highly productive land. Much of the most productive farmland in the Middle West, for example, has never been transferred by voluntary sale since the days of early settlement. We are witnessing the gradual development of a process of hereditary transfer of farmland.

Tax law changes introduced under The Economic Recovery Tax Act of 1981 will accelerate this process. The act continued the authority for valuing land for estate tax purposes at what is now called its "current use value", first introduced in The Tax Reform Act of 1976. This can reduce the value of farmland in an estate from 40 to 70 percent, or more (USDA, 1979, p. 156). To qualify, the net value of farm assets must be 50 percent of net estate value, and at least 25 percent must be in real estate, valued at market prices (Internal Revenue Code, Sec. 2032A). This has two principal effects. The tax advantage can be a basis for higher bid prices for land, if purchase will qualify the owner for the benefit of "current use" valuation. In addition, it increases the incentive to hold land until death, thus insuring that an increasing proportion of farmland, especially in the larger estates, will be transferred by inheritance and will never enter the market. The valuation problems these tax features introduce have greatly increased the importance

of land value data series, and have increased the difficulty of interpreting land value trends.

Rural Site Values. An expanded effort in land value data collection is also needed due to the rapid expansion of rural residences, part-time farms and decentralized commercial land uses into areas formerly classified as agricultural. Land uses are becoming so inter-mixed that our rural land value data series will rapidly lose validity unless effort is devoted to a more precise separation of uses and users. One of the most pressing needs is for more accuracy in separating land values from building values.

Given the predominance of farm expansion buyers in field crop areas, the presence of a set of farm buildings adds virtually nothing to the value of the land for agricultural use. In Minnesota, farmland without building sold in four of the eight years, 1974-1981, for as much or more per acre as was paid for land including buildings (Landwehr and Raup, 1981, p. 15) In contrast, for rural residential users or part-time farmers, buildings may be perceived as the major component of the real estate they are buying. Transactions for these uses are frequently negotiated in terms of square feet of area, "front footage" on highways, lakes, or streams, or in terms of the presence or absence of water areas. This precludes reporting in terms of conventional "per acre" prices, and tends to understate the potential level of farm prices in areas subject to strong recreational and residential demand. These are often areas with relatively poor agricultural potentials but

lots of lakes and trees. A dual set of values is developing, with a relatively low peak for farm land uses and a much higher peak for residential uses. In this situation, land prices lose precision and market trends are difficult to detect without detailed examination of each transaction.

Rural Industrial Location. This situation is further complicated by the pronounced tendency in recent years to relocate industrial facilities in rural areas. The diffusion of nonfarm land uses into farming areas is no longer confined to the perimeters of urban centers. This introduces new concepts of land quality and reduces the usefulness of land classification based on soil productivity. One future problem will be to incorporate locational and nonagricultural quality measures into land classification systems and land market reports.

Horizontal vs. Vertical Parcelization of Property Rights. An associated problem arises from the increasing parcelization of rights in land. Problems of physical parcelization are burdensome for land record keeping and taxing authorities, but can be accommodated within existing systems of records of rights in land. This can be called "horizontal parcelization". A more intractable problem concerns the creation of partial rights through easements, the separate sale of mineral or water rights, the use of covenants running with the land to implement land use plans, the creation of agricultural preservation districts, and similar examples of "vertical parcelization" of rights in land.

Many of these separable rights are of recent origin or have gained new significance as a result of a search for new tools of land

use planning and guidance. Recording systems have been slow to adapt, and it is frequently difficult to determine the influence of this separation of rights on land values. A future problem in land value analysis will center on the difficulty in determining who owns what. Precise data on who actually owns or controls land are frequently among the least available statistics at the local level of government. The increasing vertical parcelization of rights in land will make this problem worse.

Multiple Cropping. Land use and land value statistics for agricultural land in the United States have never been confronted with the complexities introduced by multiple cropping. We have developed data series for irrigated or irrigible lands but not for lands that can yield an area of "harvested cropland" greater than there is in "cultivated land". We now face this problem. Multiple cropping of oats and clover is common in Washington, and of tree crops and sown crops in Washington, Oregon and California. Double-cropping of soybeans (principally with wheat) took place on 9 percent of the 70 million acres planted to soybeans in 1980 (OTA, 1981, p. 359). In 1981, over one-fourth of all soybeans produced in the Delta States and the Southeast came from double-cropped land (USDA, 1981 C, p. 11). The potentials opened up by this type of land use can produce value changes similar to those introduced by irrigation. Our land value data series need rapid restructuring to incorporate this development.

Creative Financing. The onset of high interest rates in the late 1970's spawned a novel variety of real estate financing measures

that have had the general effect of masking real movements in land prices. Seller financing through contracts for deed or land contracts has permitted a trade-off between the stated price per acre and the terms of repayment. If the seller accepts a rate of interest on the unpaid balance that is much lower than current money-market rates, he has in effect reduced the sale price of his property. However, it is typically the stated price and not the down payment plus the present value of the contract that is reported and published (Texas A and M University, 1981, pp. 2-3). This distortion is especially critical in a period in which prices are trending downward. It can only be corrected by more detailed reporting of financing arrangements than is currently available.

Seller financing also introduces distortion into reports of bankruptcies, foreclosures, or distressed sales. A distressed mortgage is foreclosed, but a failed land contract leads to repossession, not foreclosure. This terminological confusion can have the effect of understating the degree of land-based credit difficulties if the focus is on foreclosures. This potential distortion is especially likely in areas in which seller financing has predominated in farmland transfers, as in the Lake States and Upper Midwest. Pointing out that in 1974 the OECD observed that international debt statistics could not serve as a basis for an "early warning system" for a credit crisis, The Economist concluded in 1982 that nothing had changed but the size of the debts and the possibility of a crisis (Economist, 1982, p. 78). The same judgment can be made regarding the analysis of land based credit and

supporting land value data in the United States, with the additional observation that over time the land value data have become more aggregate, and more ambiguous.

Valuing Lands Outside the Market Sector. One final problem for the future grows out of the need for land valuation techniques that can be used in valuing public lands. An affluent society is demanding increasing areas of public land for recreation, wildlife habitat, and environmental protection. Once converted to public use, no conventional market test can be used to determine trends in the value of these lands. The problem here is similar to that faced in socialist economies, in which land use decisions must be made in the absence of any market-based determinants of relative land values. The area of rural land that is now essentially outside of the market sector is large and increasing. Devising methods to update the shifts in the relative value of these extra-market lands will be one of the challenges facing future efforts at land value determination. This is one area in which fruitful exchanges could take place between nominally capitalist and socialist countries.

IV. The Public Interest in Land Values Research

Why should public agencies be interested in research into farmland values? Because we live in a world in which events have rendered asset values in agriculture much more vulnerable to forces outside agriculture than at any time in our modern history. Among these forces is the secular decline in the real cost of international transport of bulk goods.

International trade was historically confined to luxuries and goods with high ratios of value to weight or bulk. It was only in the 19th century that it became economic to transport bulk goods and staples over long distances. The big decline in sea-borne freight rates came after 1950, with the introduction of super-tankers and bulk carriers of 60,000 to 100,000 tons and more.

This transport cost revolution has changed basically the international division of labor, and the structure of markets. Grain producers in America have been the initial beneficiaries, as they have expanded production and exports to meet this sudden increase in markets. Land values are the repository of these benefits. A cargo of grain on board ship at U.S. Gulf ports in 1981 could be sent anywhere in the world for less per ton than the freight rate from western North Dakota to Duluth, Minnesota (USDA, 1981B, p. 5). This is restructuring land values, and the full effects are yet to come.

What does it mean to be dependent on export markets?

- 1) We can no longer manage farm commodity price policies as a domestic affair.

- 2) Grain surpluses in excess of domestic needs will pose an almost unmanageable storage problem if held off the market in an attempt to force upprices.
- 3) Some segments of American agriculture are still producing primarily for the domestic market and will opt for a closed market and protectionist policies, if given a choice. The dairy sector is the most prominent example, but most livestock sectors will fall into this category.
- 4) A divergence is to be expected between field crop and livestock sectors, in their attitudes toward foreign trade policies. The field crop sector (sugar cane and beets are an exception) is heavily dependent on exports. The livestock sector is primarily confined to the domestic market.

We have assumed that foreign demand for our grains was more inelastic with respect both to **income** and price than it has proved in recent months to be. Talk of world hunger and population explosions has led us to believe that foreign customers will demand our grains at almost any price. A fear of running out of land has fostered a belief in the inelasticity of supply response, at home and abroad. We are in danger of underestimating the capacity of world and domestic agriculture to respond to price incentives or to more favorable political and social circumstances.

The magnitude of risk introduced by these unknown elasticities of demand and supply is illustrated by the history of recent forecasting efforts. No forecaster came close in predicting the depths of the decline

in the Russian grain crop in the three years 1979-81. Similarly, forecasts of the U.S. wheat and corn crops made in 1979 or 1980 were far below the levels actually reached in 1981 and quite probably in 1982.

Given this degree of uncertainty, we need to ask: What events could trigger a massive change in expectations on a scale that would alter the structure of land values in American agriculture? We can hazard some guesses:

- 1) A major grain surplus and storage crisis in the U.S.
- 2) A break-up of OPEC.
- 3) Reemergence of the USSR as a grain exporter.
- 4) A devastating drought or famine.
- 5) War, or the threat of war.

The imponderables involved in an evaluation of these risks dictate a strengthening, not a weakening, of support for land values research at the national level. Some tasks can only be done well at the level of central government. The collection and analysis of a uniform national data series on land values is one of these tasks. What is needed is a reexamination of the division of labor between central government and the states, universities and local research agencies.

Experience points clearly to the conclusion that the collection and analysis of land value data at the sub-state level is best left to the universities. Other data collection efforts exist, for example, by state taxing authorities, by the Federal Land Banks, and in some

areas by the Federal Reserve Banks. These efforts are typically focused on specific operational needs - to appraise credit risks, or to determine local tax-paying capacity in equalizing the distribution of state aids to schools and local governments. These data collecting agencies lack research staff, and suffer from the infirmity imposed by their need to subordinate data analysis to agency mission.

The justification for a continuing commitment of University research capacity to land value data collection and analysis rests primarily on questions of completeness, public confidence, and credibility. An aura surrounds land value data that places them in a class different from other assets or commodities. The private-treaty nature of most land transactions places the land values research worker at the margin of acceptable public inquiry into private affairs. Only a minority of states in the United States have found it possible to maintain continuing land value analysis efforts. These have been conducted almost exclusively by universities, not agencies of government. A university's reputation is at risk, and has value, in many dimensions. Its ability to conduct a sustained land values analysis effort is one of the most sensitive and exposed of these dimensions.

If this division of labor is to be fruitful, the universities need a renewed appreciation of the importance of land values research. Stimulation for work in this field was once provided by regional research committees supported with funds dedicated to regional research by the Agricultural Research and Marketing Act of 1946. This support was

largely dissipated by the loss of regional focus after 1970. A reorientation of research effort is needed at the regional and state levels. Research workers at these levels are closer to the problem areas, and more aware of local variations in national trends. The national trends are now very clear. Real farmland values declined 2 percent nationally in the year ending in February 1981, and 9 percent from February 1981 to April 1982 (USDA, 1982D). The warning signals of an impending threat to the asset structure of American agriculture could not be clearer.

Appendix Table 1

Real Rates of Interest on Federal Land Bank Loans; Real Values of Stocks,
Standard and Poor's Composite Index of 500 Stocks
1960-1981

Year	Rate of Interest, Federal Land Bank Land Based Mortgages Deflated by:		Real Value of Stocks, Standard and Poor's Composite Index of 500 Stocks Deflated by:	
	GNP Implicit Deflator	Consumer Price Index	GNP Implicit Deflator	Consumer Price Index
	----- Percent -----			
1960	0	0	.81	.63
1961	4.71	4.54	.96	.74
1962	3.71	4.39	.88	.69
1963	4.04	4.31	.97	.76
1964	4.00	4.20	1.12	.88
1965	3.34	3.94	1.19	.93
1966	2.54	2.78	1.11	.88
1967	3.02	3.22	1.16	.92
1968	2.32	2.52	1.20	.95
1969	2.46	2.21	1.13	.89
1970	3.31	2.77	.91	.72
1971	2.72	3.44	1.02	.81
1972	3.30	4.14	1.09	.87
1973	1.75	1.23	1.02	.81
1974	-.73	-3.00	.72	.56
1975	-.51	-.44	.69	.53
1976	3.43	2.93	.77	.60
1977	2.54	1.88	.70	.54
1978	1.00	.64	.64	.49
1979	.56	-2.20	.63	.47
1980	1.37	-3.16	.67	.48
1981	1.93	.81	.66	.47

Source: Federal Reserve Bank of Minneapolis, Data series on Real Rate of Interest and Stock Prices, Print Out of May 19, 1982.

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