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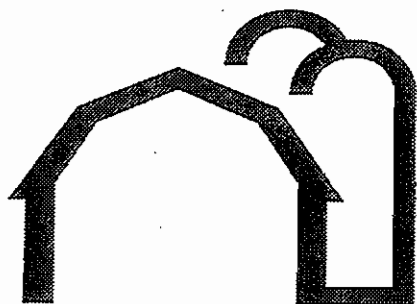
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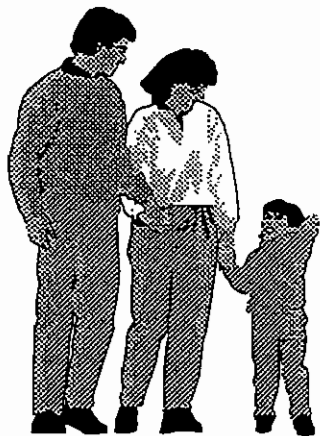




Wisconsin Agriculture in Historical Perspective: Economic and Social Changes, 1959-1995

By Douglas Jackson-Smith

June 1996



Wisconsin Agriculture in Historical Perspective:
Economic and Social Changes, 1959-1995¹

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Introduction

Anyone who travels through the Wisconsin countryside and speaks with an average farm operator will quickly come to appreciate the acute sense of anxiety about the future of agriculture that permeates rural life in the state. Long hours, a lack of vacation time, declining commodity prices, and rising farm expenses have all contributed to a growing inability to find young people interested in taking over Wisconsin farm operations. The loss of farms—particularly dairy farms—in many regions of the state has placed stress on the economic vitality and cultural identities of rural communities that have traditionally depended on farming.

Although the contemporary concerns of Wisconsin's farm residents are rooted in actual declines in the health of Wisconsin's farm economy, it is not necessarily true that they are new or recent phenomena. Indeed, concerns about the present and future viability of agriculture in the state have been heard for many decades. Historians tell us that many of the structural changes in the Wisconsin farm sector represent long-term trends and have deep roots in broader patterns of economic and social change (Cochrane, 1993). To properly interpret the challenges facing Wisconsin farm operators in the 1990s, then, it is essential to understand how they compare to similar stresses faced by Wisconsin farmers in earlier decades.

This report is designed to provide an historical summary of major trends in Wisconsin agriculture against which the

nature and significance of current changes in Wisconsin farming can be compared. Moreover, it is hoped that this report can address a serious gap in the published literature on Wisconsin agriculture. Although many university, state, and federal agencies regularly publish data on Wisconsin agriculture, most of these reports focus on data for a given year, with only slight attention paid to trends over time (WI-DATCP, various years; University of Wisconsin, various years). Even when historical data are reported, they rarely extend farther than 4 or 5 years into the past. As a result, conclusions about the significance of short-run trends can be easily misinterpreted by experts and lay people unaware of the long-run patterns.

The report is organized into two main sections. Initially, a wide range of indicators of economic performance in Wisconsin are summarized. These include measures of the physical scale of agricultural production in the state (numbers of farms, acres of farmland, and the volume of farm products sold), as well as a host of financial indicators of the aggregate economic health of the state's farm sector. The data focus on the period from 1960 through the mid-1990s.

The second section summarizes long-term patterns of change in the structure of agriculture in Wisconsin. The term "farm structure" has a number of meanings, but usually refers to the distribution of farms in the population across a range of characteristics. Most commonly studied are changes in the number and size distribution

of farms, with particular emphasis on trends toward concentration of production in the hands of a smaller number of large-scale farm enterprises. Others have focused on changes in levels of capital investment and reliance on commercial debt among farmers. For still others, the essence of farm structural change involves an increasing separation of ownership, management, and labor functions on farm enterprises. This can occur in a variety of ways: through changes in the organizational form of farm enterprises, including the rise of nonfamily corporate ownership and management of farm enterprises; through changes in the organization of farm labor, in particular the use of non-family hired employees; and through changes in the percent of farmland that is owned by the operator. Finally, the increased participation of farm operator household members in nonfarm labor markets has been seen as a key indicator of structural transformation. The second section of this report summarizes data on all of these different dimensions of structure.

The resulting picture certainly validates the fears and concerns of Wisconsin's rural residents that their traditional dairy farm economy and culture is facing a serious threat. However, it also helps show how the current "crisis" compares and contrasts with past "crises" faced by previous generations. In addition, it underscores the complex relationship that appears to exist between economic prosperity in agriculture and the decline of "family farming" in Wisconsin.

Finally, while university and government researchers have spent significant effort documenting the measurable dimensions of change in rural Wisconsin, farmers and rural residents experience these changes first hand. Quite often, important aspects of social and economic change go unreported in official statistics—either because they were not measured as part of official

record keeping efforts or because they reflect "quality of life" issues that are not amenable to statistical documentation. As a result, the information included in this report reflects a necessarily incomplete summary of the long-term trends in Wisconsin agriculture. Its use and interpretation should be tempered by an appreciation for the real-life experiences of Wisconsin's farming population.

The Changing Wisconsin Farm Landscape, 1959-1992

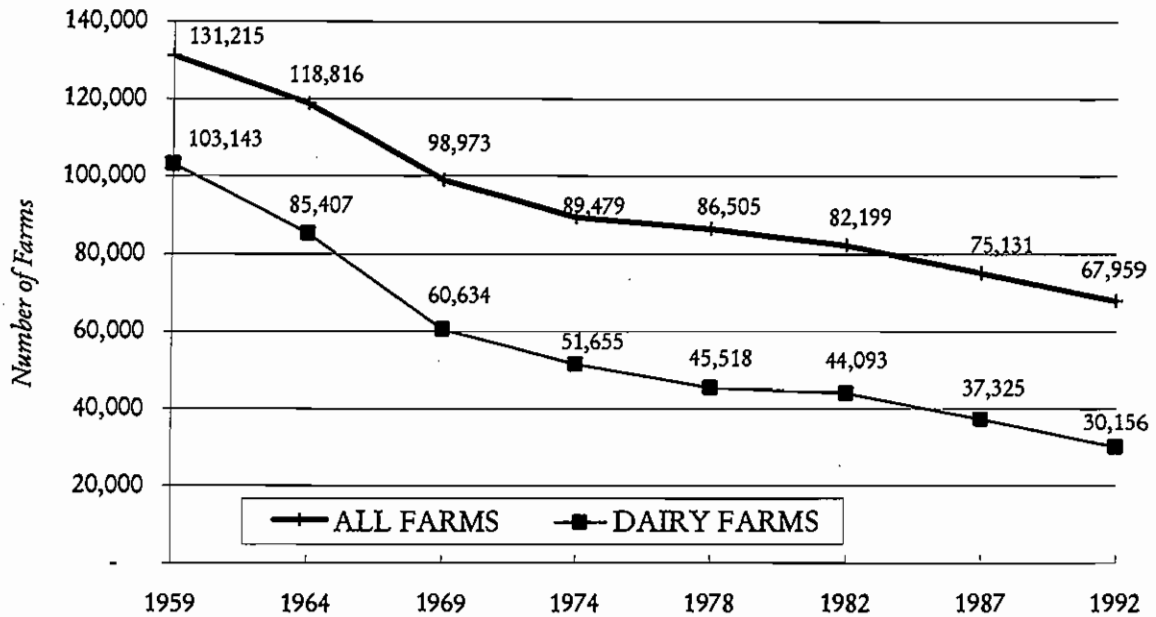
Trends in Farm Numbers

Although the rate of net farm loss has ebbed and flowed over the decades, farm numbers in Wisconsin have steadily declined since the mid-1930s. Figure 1 shows the number of farms (overall) and the number of dairy farms in Wisconsin between 1959 and 1992. Overall, the number of farms declined by almost 50 percent over this period. The number of farms with dairy cows fell nearly twice as fast, from almost 80 percent of all farms in the late 1950s to just over 40 percent of all farms in 1992.

Figure 2 presents the annual percent declines in farm numbers between Censuses of Agriculture from 1959 to 1992. It is readily apparent that the *rate of net decline* in farm numbers was highest during the late 1960s, when it peaked at a 3.6 percent net loss per year. Rates of decline slowed considerably during the 1970s and reached a low of less than 1 percent net loss a year between the 1974 and 1978 Censuses. Interestingly, the rate of net decline has accelerated in recent years to levels comparable with the early 1960s.

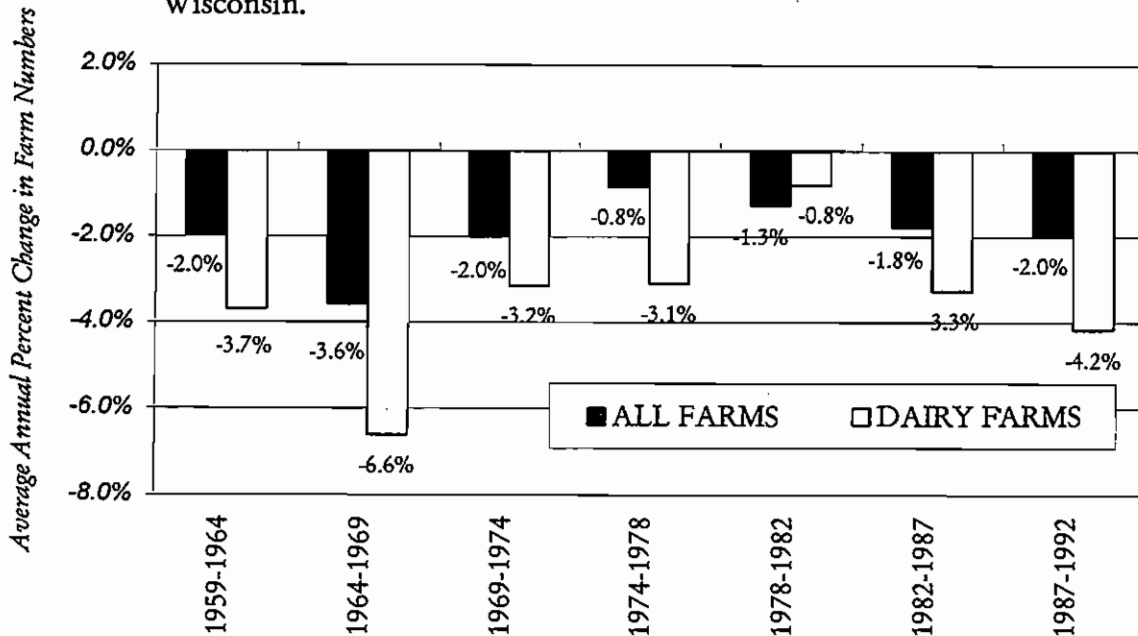
The patterns for dairy farm numbers are similar, though more striking. The rate of net decline in dairy farms peaked in the late 1960s, with an annual loss of 6.6 percent of dairy enterprises, slowed during the 1970s

FIGURE 1: Number of Farms and Dairy Farms in Wisconsin.



Source: U.S. Census of Agriculture, various years.

FIGURE 2: Annualized Percent Change in Farm Numbers in Wisconsin.



Source: U.S. Census of Agriculture data, various years.

(though it continued to decline more rapidly than farm numbers overall), and reached a low of less than 1 percent net loss per year between 1978 and 1982. Net losses in dairy farm numbers jumped back up in the mid-1980s, and increased to the point where the annual rate of net loss between 1987 and 1992 was the second highest of all census intervals since 1959.

Rates of Entry and Exit

The *net* losses in farm numbers understate the actual number of farms leaving agriculture each year because farmers exiting are balanced to some extent by other farmers entering the sector. Unfortunately, until recently there was very little data available about these underlying *gross* rates of entry into and exit out of farming in the United States. Gale and his colleagues at the USDA Economic Research Service have attempted to use Census of Agriculture data to estimate the rates of entry and exit. Specifically, they have used a question in the census that asked how long the operator had been on the particular farm (Gale and Henderson, 1991; Gale, 1994a). Since the net changes in farm numbers are known from the aggregate totals, it is mathematically possible to estimate the rate of exit—for all farms, or for particular subgroups of farms—if one knows the rate of entry. To determine the approximate rate of entry, these researchers assume that anyone who has been on a farm for less than 5 years is a new entrant.³

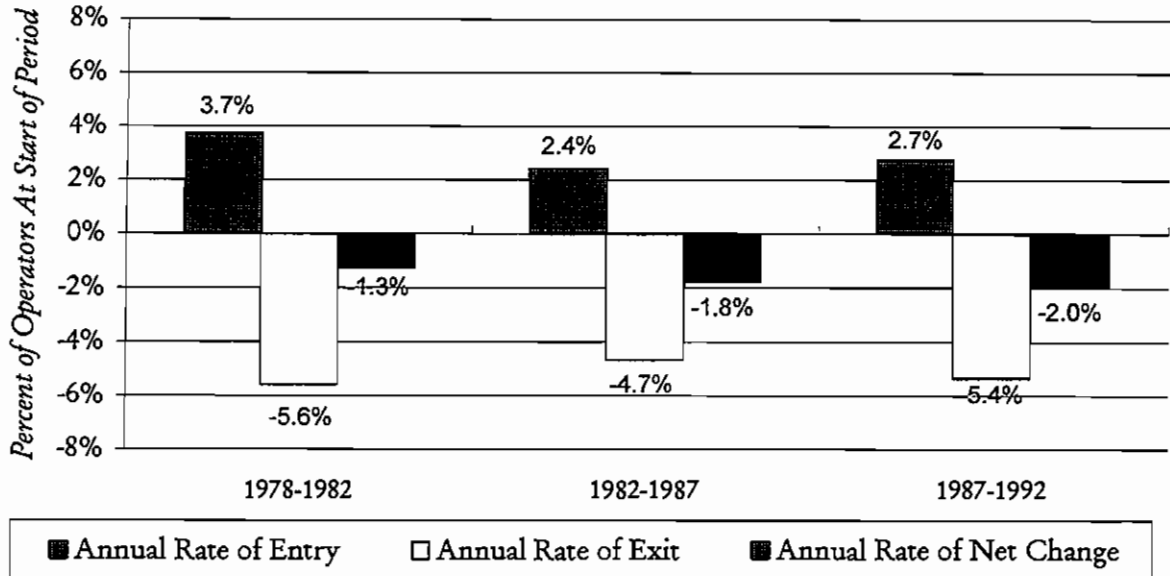
The results of their work suggest that the gross rates of entry into and exit from farming in the United States are much higher than is traditionally thought. As an illustration, Figure 3 presents the estimated rates of entry and exit (and the overall net changes in farm numbers) between the 1978, 1982, 1987, and 1992 Censuses of Agriculture for the state of Wisconsin.

The patterns in Figure 3 suggest that the rate of net decline in farm numbers in Wisconsin generally increased in the 1980s, compared to the 1978 to 1982 period. This increase in the net outflow of farms was not caused by an increase in the rate of *exit*, however, but rather from a rather steep decline in the estimated rate of *entry* into farming. Between the 1978 and 1982 period and the 1982 and 1987 period, Wisconsin's entry rates declined more rapidly than in any other state in the country. In general, however, the rate of turnover in Wisconsin has tended to be fairly close to the national median: between 1987 and 1992, Wisconsin's entry and exit rates were ranked 29th and 25th, respectively, among the 50 states.

Land in Farms

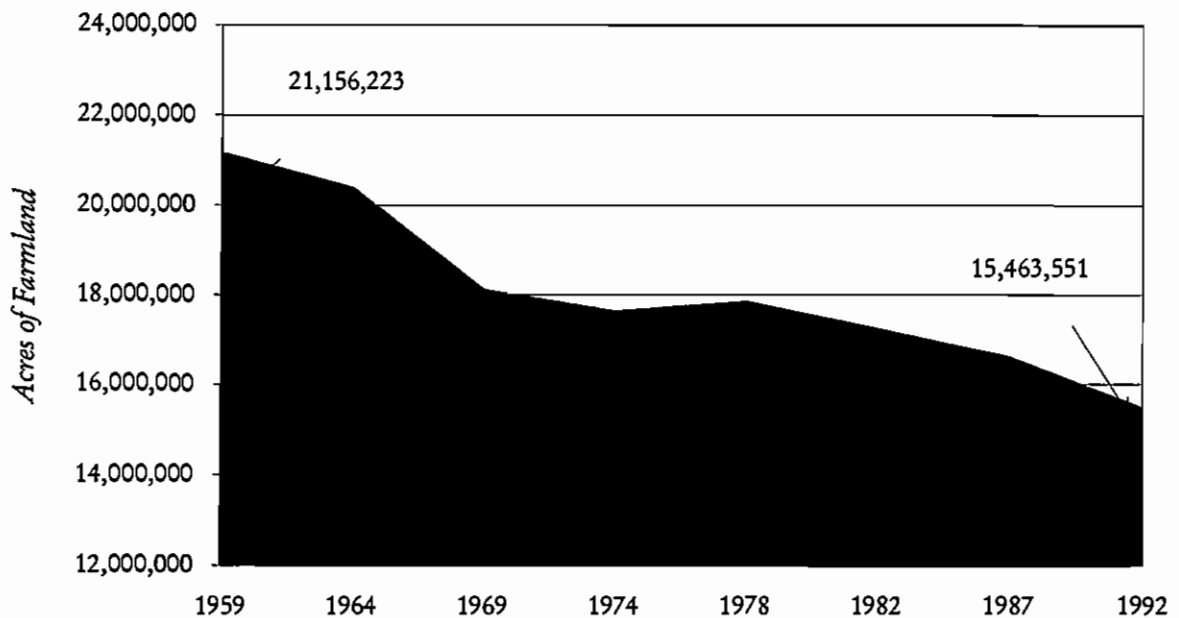
At the same time that farm numbers were steadily declining, the amount of land used for agricultural purposes in Wisconsin also decreased, albeit at a slower pace. Figure 4 shows the total acres involved in agricultural production in Wisconsin between 1959 and 1992. Overall, the amount of farmland declined by 27 percent over this period, an average annual loss of roughly 1 percent. As before, the rate of decline peaked in the late 1960s, when over 2 percent of all farmland was withdrawn from production each year. The 1970s still appear as a rather anomalous period. In fact, the amount of farmland in production actually increased by 0.3 percent a year between 1974 and 1978 as farmers brought idled acreage back into production in response to favorable agricultural product prices. This proved to be a short-lived phenomenon, however, as the rate of net loss of farmland from production increased steadily during the 1980s to over 1.4 percent a year between 1987 and 1992.

FIGURE 3: Estimated Annual Rate of Entry, Exit, and Net Change for Wisconsin Farm Operators, 1978-1992.



Source: Estimates by Gale and Henderson (1991) and Gale (1994).

FIGURE 4: Total Acres of Land In Farming in Wisconsin.



Source: U.S. Census of Agriculture Data, various years.

Physical Agricultural Production

The data in Table 1 indicate the total amounts and average yields of three key agricultural products produced by Wisconsin farmers between 1960 and 1994. To smooth out year-to-year variations, the data are aggregated into 5-year intervals and are presented as averages. The results on the top half of the table represent the average level of overall production and per-acre productivity for the three commodities during each 5-year period. The bottom half of the table reflects the percent change between periods in both overall production and productivity.

Despite steadily declining farm numbers in Wisconsin over the last 60 years or so, the overall volume of agricultural production in the state has generally continued to increase, primarily because of rising productivity on the remaining farms. However, although overall production of agricultural products (in physical terms) continued to increase during the 1980s, it did so at a much slower rate than during the 1970s, and the production of milk has actually declined in the most recent 5-year period. This is largely due to a decline in the *rate of productivity increase* (on a per acre or per cow basis) combined with increased rates of net decline in farm numbers and acreage, and continued losses in dairy cow numbers.

Prices Received for Farm Products

While production continued to rise through the 1980s, albeit at a slower rate than in earlier periods, nominal prices for farm products in Wisconsin generally stagnated in the 1980s, after rapid increases during the 1970s. Figure 5 presents the average price actually received by Wisconsin farmers for corn, hay, and milk between 1960 and 1994, expressed as a percent of 1960 prices. It is apparent that the early 1970s were a period of unusual price increases. While milk prices continued to climb (in nominal terms) until

the early 1980s, corn prices leveled out (with considerable annual fluctuations) after 1975. Hay prices generally rose throughout the 1970s and 1980s, but experienced considerable year to year variability. Rapid price rises in the 1970s were principally the result of a surge in export demand for U.S. agricultural products and favorable government price support programs. High prices in the 1970s slowed the rate of net decline in farm numbers in Wisconsin, encouraged investment in new land and technology, and contributed to rapid land price inflation.

Because much of the increase in commodity prices in the 1970s consisted of general price inflation, it is important to examine trends in the *real* prices farmers received. The data in Figure 6 were adjusted for inflation using the consumer price index and are expressed in 1982 dollars. In real terms, the price for milk in Wisconsin peaked in 1979 and has declined to levels equivalent to 80 percent of that which prevailed in 1960. Similarly, the real price received for corn in Wisconsin reached unprecedented highs in the early 1970s, but has generally fallen since that time, reaching less than half of its 1960 value by the early 1990s. Prices for dry hay doubled in the mid-1970s, but have generally fallen during the 1980s and early 1990s (though hay prices have, in relative terms, been more volatile than prices for corn and milk).

Aggregate Value of Production

Because prices fell more rapidly than production was increasing in the 1980s, the overall value of production on Wisconsin farms has also declined in real terms since 1979. Figure 7 presents inflation-adjusted data for the Census of Agriculture years between 1959 and 1992 for the sale of crops, livestock and livestock products, and a combined measure for the sales of all agricultural products in Wisconsin. Several things are apparent from this figure. First, it is clear

TABLE 1: Total Production and Average Yields for Three Major Agricultural Products in Wisconsin, 5-Year Periods, 1960 to 1994.

	TOTAL ANNUAL PRODUCTION				AVERAGE YIELD			
	Corn for Grain	Milk	Alfalfa Hay		Corn for Grain	Milk	Alfalfa Hay	
Average during 5-year period:	<i>million bushels</i>	<i>billion pounds</i>	<i>million tons</i>		<i>bushels per acre</i>	<i>pounds per cow</i>	<i>tons per acre</i>	
1960 to 1964	109	18.5	7.2		69.3	8,596	2.5	
1965 to 1969	146	18.3	7.1		86.0	9,438	2.5	
1970 to 1974	183	18.7	7.2		85.8	10,317	2.5	
1975 to 1979	256	20.7	7.3		91.2	11,425	2.5	
1980 to 1984	331	23.2	7.7		104.6	12,670	2.6	
1985 to 1989	299	24.6	8.1		104.2	13,648	2.7	
1990 to 1994	339	23.4	8.4		114.8	14,531	2.8	
Percent change from previous period:	<i>percent</i>	<i>percent</i>	<i>percent</i>		<i>percent</i>	<i>percent</i>	<i>percent</i>	
1960-64 to 1965-69	34.1	-1.0	-1.2		24.1	9.8	-1.4	
1965-69 to 1970-74	25.6	2.5	2.4		-0.2	9.3	1.6	
1970-74 to 1975-79	39.4	10.3	0.5		6.3	10.7	-2.0	
1975-79 to 1980-84	29.6	12.2	5.3		14.7	10.9	2.5	
1980-84 to 1985-89	-9.6	6.0	5.2		-0.4	7.7	6.9	
1985-89 to 1990-94	13.3	-4.7	4.2		10.2	6.5	4.1	

Source: Wisconsin Agricultural Statistics, Wisconsin Department of Trade, Agriculture, and Consumer Protection, various years.

FIGURE 5: Index of Nominal Prices Received for Three Major Commodities, Wisconsin, 1960 to 1994.

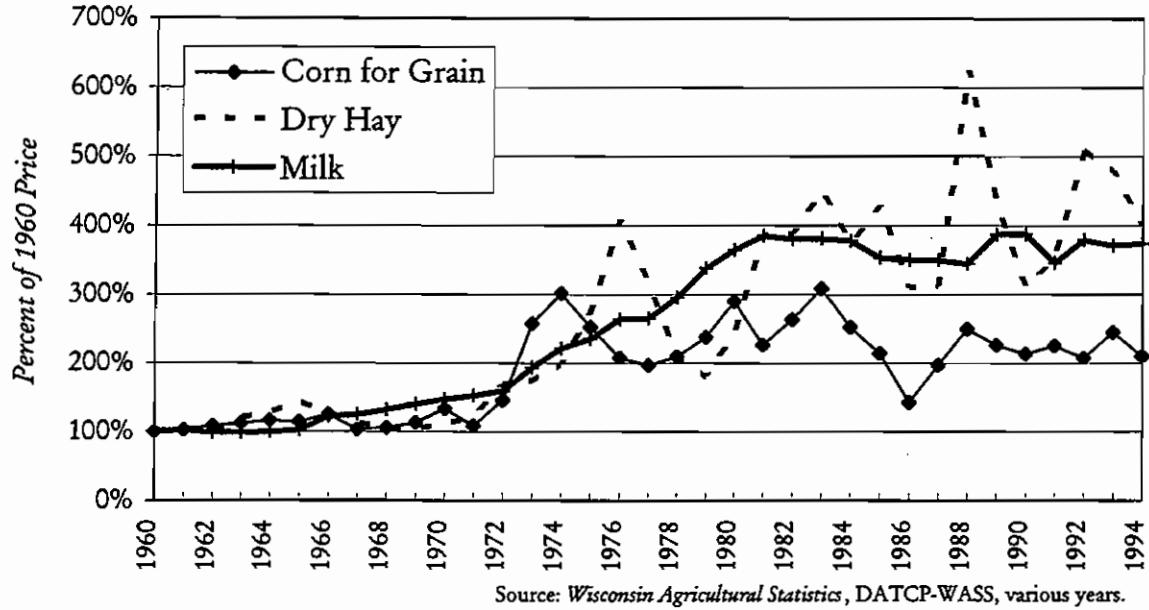
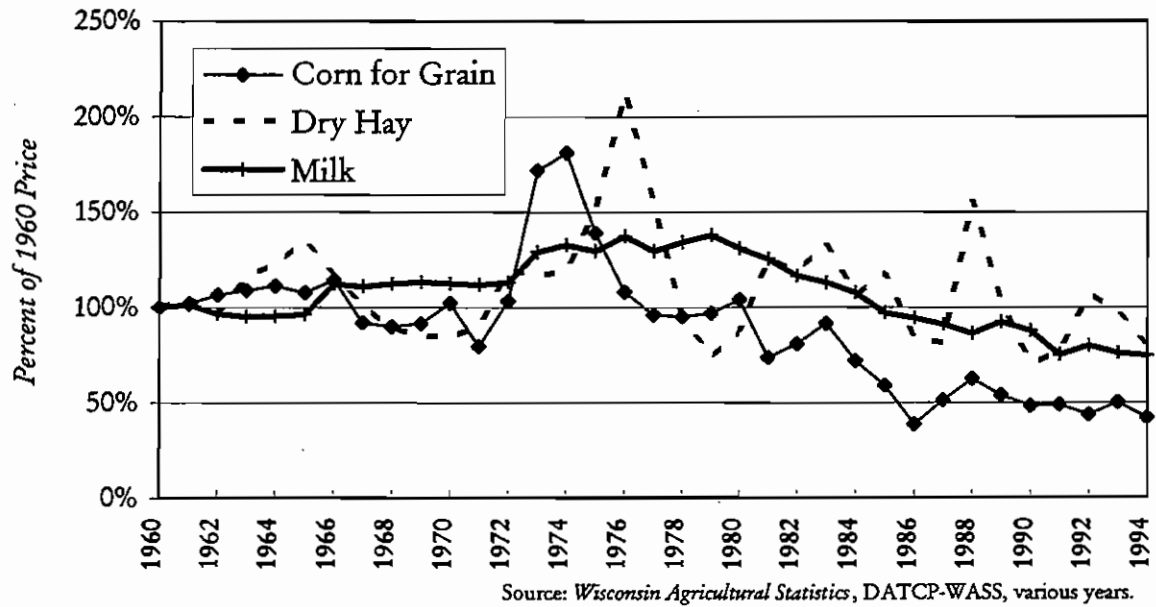


FIGURE 6: Index of Real Prices Received for Three Major Commodities, Wisconsin, 1960 to 1994.



that the sale of livestock and livestock products comprise the bulk of agricultural income in Wisconsin. This is principally composed of milk sales, although the sale of beef cattle (typically a byproduct of dairy production) is also significant. Although dairy farms now comprise less than half of all farms in the state, trends in the dairy sector are particularly significant to the overall performance of the state's agricultural economy. Interestingly, real income from the sale of crops in Wisconsin has also declined since the late 1970s, though less rapidly than livestock sales.

Net Farm Income

A similar pattern is seen in Figure 8, which presents the real value of aggregate gross farm income, total production expenses, and net farm income in Wisconsin between 1960 and 1992.⁴ This figure is useful because it shows the long term trends at the same time it underscores the year-to-year variation in gross and net farm income. Gross farm income rose fairly steadily in Wisconsin from 1960 to 1979, after which it fell dramatically almost every year through 1992. The jump in gross receipts in 1988 reflected the influence of an extreme drought in the midwestern states on farm commodity prices. While the real value of production began a steep decline around 1980, the amount spent on farm production expenses did not decline as quickly, and net farm income levels reached historic lows between 1982 and 1986. Even after farm production expenses fell more rapidly in the mid-1980s, the effect on net farm income was relatively modest. In general, the 1982 to 1992 period represents a period of unusually low (and volatile) net farm income in Wisconsin compared to the previous 22 years.

The focus in this section on the *aggregate* performance of the Wisconsin farm economy can mask some divergent trends among different classes of farms. In

particular, farms with net losses have tended to be concentrated among the smaller size categories, typically part-time farms with incomes from off-farm employment. The data in Figure 9 show the percent of farms in different sales classes which had negative net returns in 1987 and 1992. Taken as a whole, roughly 40 percent of all Wisconsin farms lost money in 1992. However, while 80 percent of farms with gross sales below \$10,000 in 1992 lost money, only 21 percent of farms with sales greater than \$10,000 lost money in that year. It is interesting to note that for farms in both sales categories, the percent of enterprises with negative net returns increased between 1987 and 1992.

The Cost-Price Squeeze

Much of the underlying income problem facing Wisconsin farmers in the 1980s came from a growing disparity between the prices received for their products and the prices they paid for their agricultural inputs. The data in Figure 10 show how indexes of prices paid and prices received by farmers in the United States rose and fell at roughly the same rate between 1910 and the early 1950s. Between 1952 and 1970, however, there emerged a gap between the two indexes as prices paid rose more rapidly than prices received. The boom years of the early 1970s witnessed more rapid growth in the price of farm products, and thus the gap between the indexes narrowed considerably. However, since the mid-1970s, the prices of farm inputs purchased by farmers have risen at a rate roughly four times faster than the average prices paid for farm products. The result has been a significant cost-price squeeze in which a larger share of the gross income on farms has been spent on purchased inputs and other farm expenses, leaving a smaller margin of net farm income.

FIGURE 7: Sales of Agricultural Products on Wisconsin Farms, 1959 to 1992, In Constant 1982 Dollars.

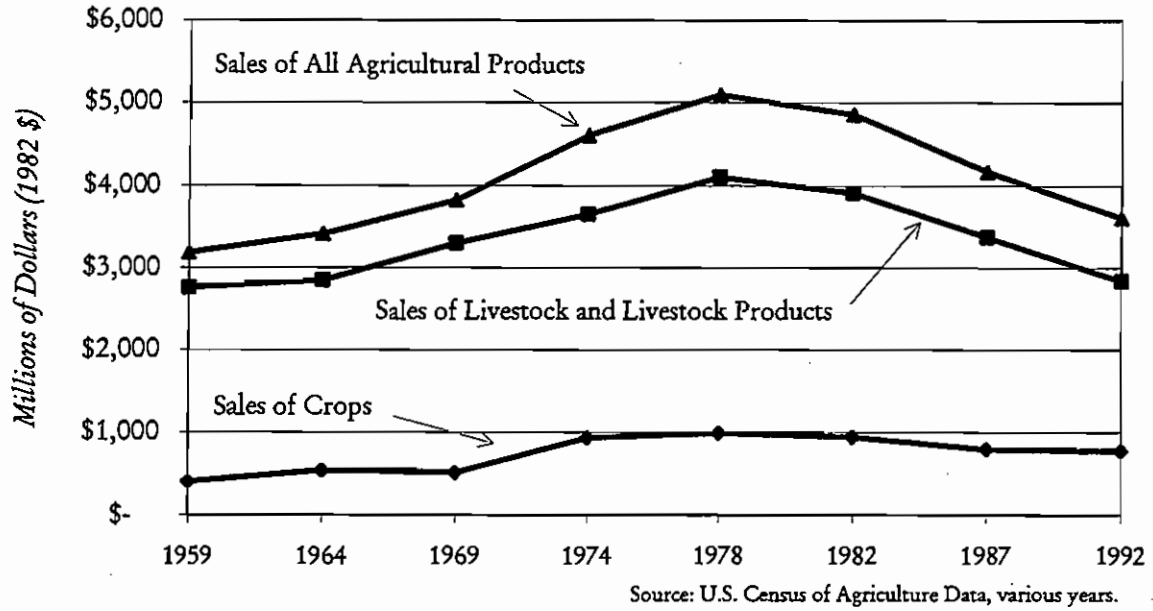


FIGURE 8: Aggregate Gross and Net Farm Income in Wisconsin, 1960 to 1992, (1982 CPI-adjusted dollars).

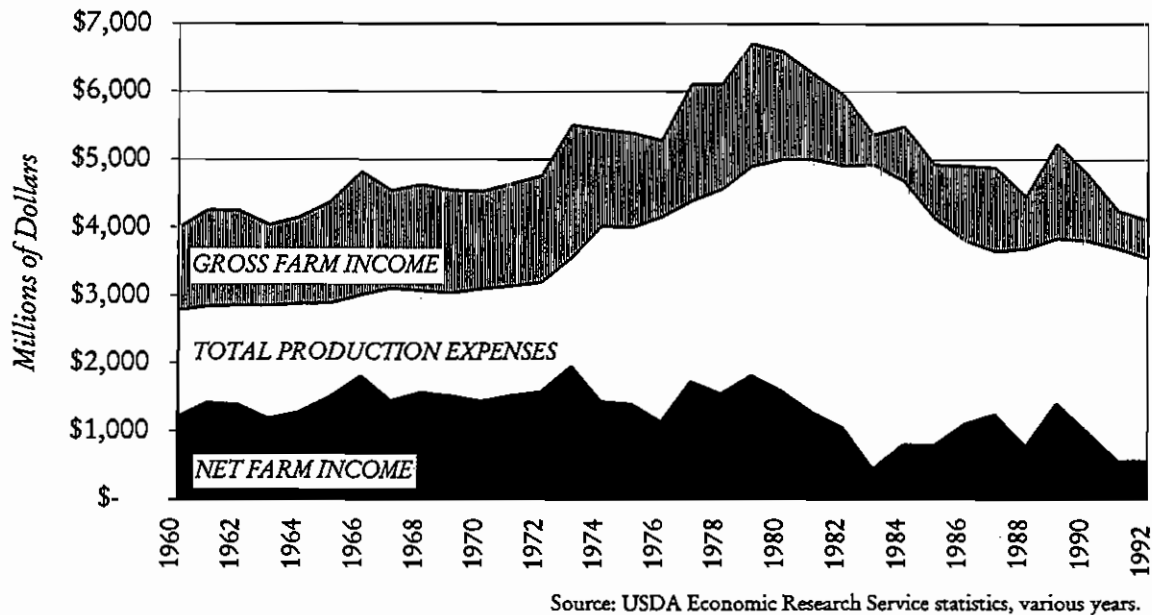
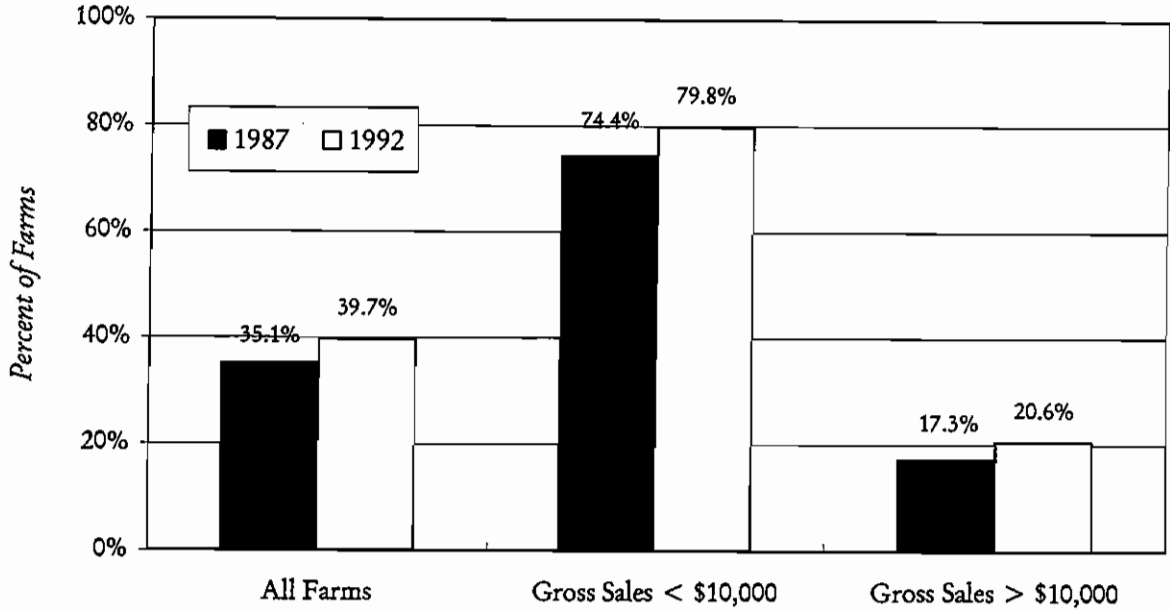
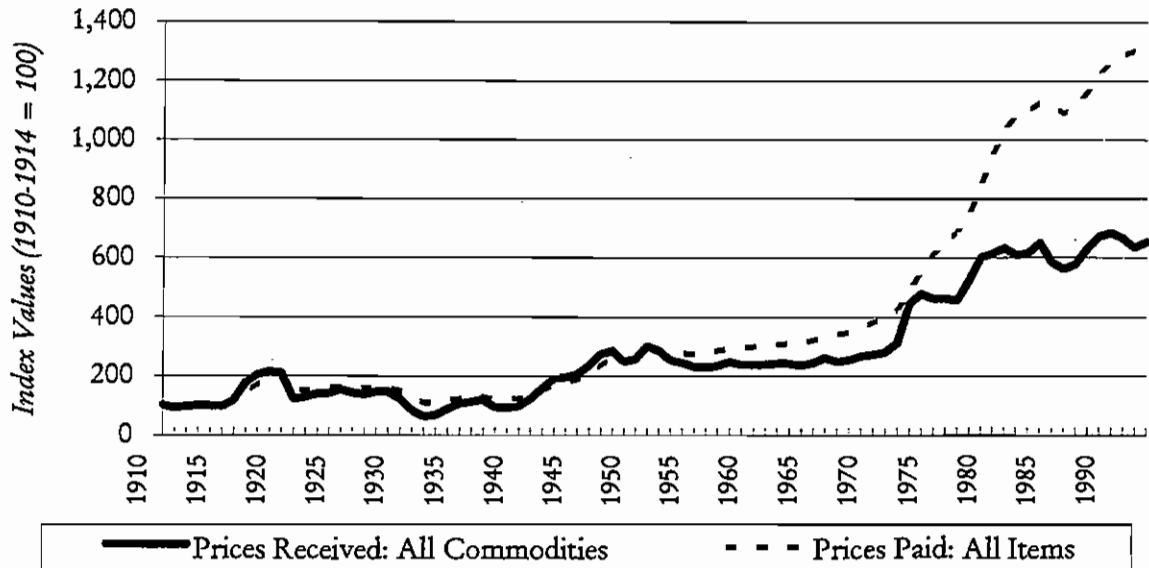


FIGURE 9: Percent of Wisconsin Farms with Negative Net Returns.



Source: U.S. Census of Agriculture Data, various years.

FIGURE 10: Index of Prices Received and Prices Paid by U.S. Farmers, 1910 to 1993



Source: USDA Economic Research Service Statistics, various years.

Farm Assets and Debts

Similar historical trends in levels of farm assets and debts show a close correlation between the value of Wisconsin farmland and buildings (the principal farm assets in Wisconsin) and changes in gross and net farm income on Wisconsin farms. In nominal dollars, the value of farm assets in Wisconsin increased at a steady but moderate rate of roughly 5 percent a year during the 1960s. The rate of growth almost tripled, to 14 percent annually, during the boom years of the 1970s, largely because of rapid inflation in land prices. The value of total farm assets in Wisconsin peaked in 1980 at just under \$33 billion.

The election of Ronald Reagan as President of the United States in 1980 coincided with two significant changes in the macroeconomic context of agricultural production. First, international demand for U.S. agricultural products dropped nearly as quickly as it had increased in the 1970s, putting serious downward pressure on farm incomes. Moreover, in an attempt to control spiralling inflation, the Federal Reserve Board raised interest rates to historic highs, causing a severe debt- and cash-flow crunch on many Wisconsin (and U.S.) farms. This resulted in depressed farm incomes, and precipitated a dramatic crash in farm asset values. For the first time in recent memory, farm asset values declined for an extended period of time, averaging a 5 percent loss annually between 1980 and 1986.

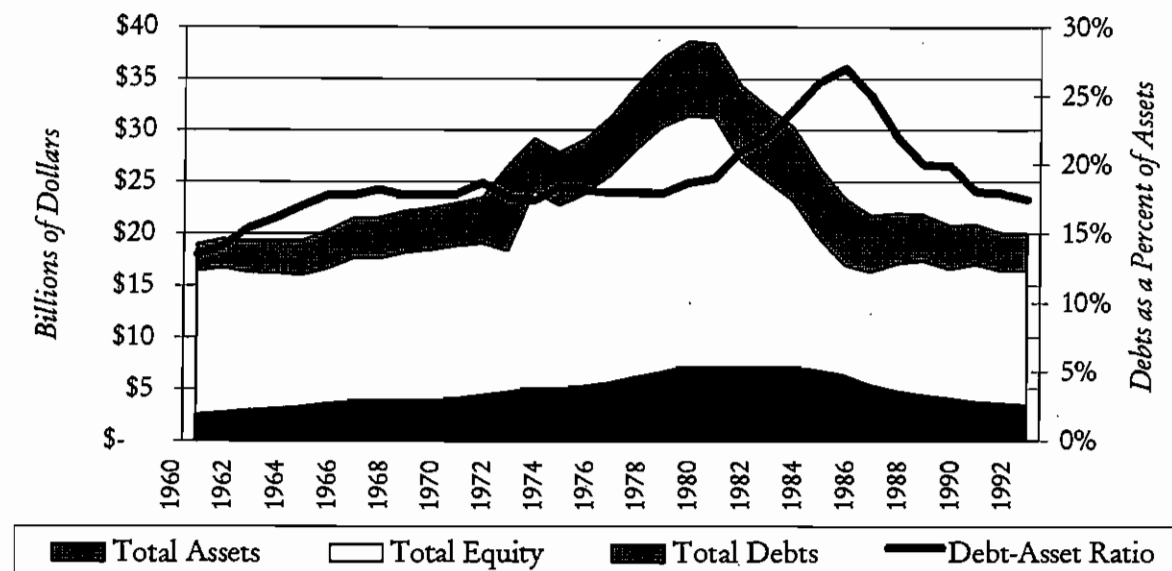
Although farm asset values recovered slowly in nominal terms during the late 1980s and early 1990s, when asset values are adjusted for inflation it becomes apparent that the effects of the 1970s boom were largely wiped out during the 1980s. Figure 11 shows the inflation-adjusted value of farm balance sheets for Wisconsin between 1960 and 1992. In real dollars, assets appreciated at roughly 2 percent per year in the 1960s, increasing to a

rate of 5 percent above the rate of inflation annually in the 1970s. Real asset values peaked in 1979, before dropping by over 9 percent a year between 1980 and 1986. This rate of decline slowed somewhat in the late 1980s but continued to fall at a rate of 1 percent annually between 1986 and 1992. In fact, while asset values almost doubled between 1965 and 1979, the real value of all Wisconsin farm assets in 1992 had declined to virtually the same level of 1965.

Rising asset values also encouraged farm operators to take on significantly more debt—both to purchase land (which seemed, at the time, to be a safe investment) and also to invest in machinery and equipment that enabled them to operate larger farm enterprises. The shaded area at the bottom of Figure 12 shows the real levels of farm debt in the state between 1960 and 1992. The thin black line also reveals the aggregate ratio of debts to assets over the same period. Because debts increased only slightly faster than assets were appreciating, the debt/asset ratio in Wisconsin actually remained fairly constant (between 17.5 and 19 percent) throughout the 1970s. Friedberger (1988) has noted that agricultural banks began to change the ways they loaned money during the latter half of the 1970s, with more banks willing to lend money based on equity appreciation as opposed to cash-flow projections, the traditional basis for determining suitability for farm loans. In essence, bank managers recognized the rapid inflation in land markets and decided that loans for farmland purchase were a sound investment for banks regardless of short-run income prospects.

This situation worked in everyone's interests⁵ as long as assets continued to appreciate. However, when asset values crashed in the early- to mid-1980s, debt levels did not fall at the same rate (since the level of debt is tied to the value of the asset at the time of purchase). The lag between changes

FIGURE 11: Farm Balance Sheets for Wisconsin, 1960 to 1992, Real (1982) Dollars.



Source: USDA Economic Research Service Statistics, various years.

in farm income and asset levels and the amount of outstanding farm debt caused the ratio of debts-to-assets to increase to a historic high of 27 percent in 1985. Over time, farm operators were able to reduce their debt loads (through repayment, buying down debt principal, default, debt forgiveness, or foregoing new loans), and the aggregate debt-to-asset ratio returned to more typical long-run levels (17 to 19 percent) by the early 1990s.

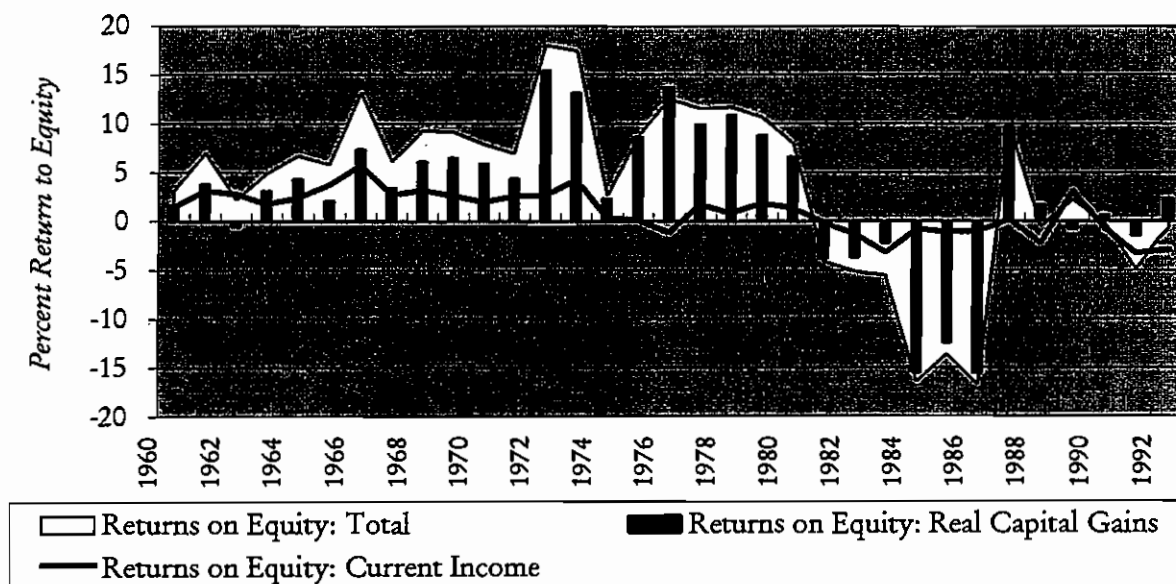
Integrated Financial Performance Indexes

Returns to farming can come from two principal sources: 1) current farm income from the sale of farm products, and 2) real capital gains associated with the appreciation of farm assets (principally land and buildings). The data in Figure 12 reflect the returns to farm operator equity from current income and capital gains in Wisconsin between 1960 and 1992. It is immediately apparent that over the last 32 years, most of the total return to equity in agriculture has come from capital gains, rather than from current income.

During the 1960s, both current income and capital gains were moderately positive, with overall rates of return to equity ranging from 5 to 10 percent per year. During the 1970s, most years saw rates of return to equity above 10 percent, peaking in 1973 with a real rate of return of almost 18 percent. Interestingly, however, returns from current farm income comprised a relatively small portion of overall returns during the 1970 boom years. In fact, current incomes were actually lower (as a share of equity levels) than they had been in the 1960s.

The hike in interest rates and the crash in farm asset values in 1981 led both current income and real capital gains to become negative throughout most of the 1980s. Overall returns to equity were positive only in 1987 and 1989, the former because of a rebound in asset values, and the latter because of unusually high current farm incomes. In general, returns to farm equity have failed to recover to historical levels since the crash of the early 1980s.

FIGURE 12: Returns to Equity on Wisconsin Farms, 1960 to 1992.



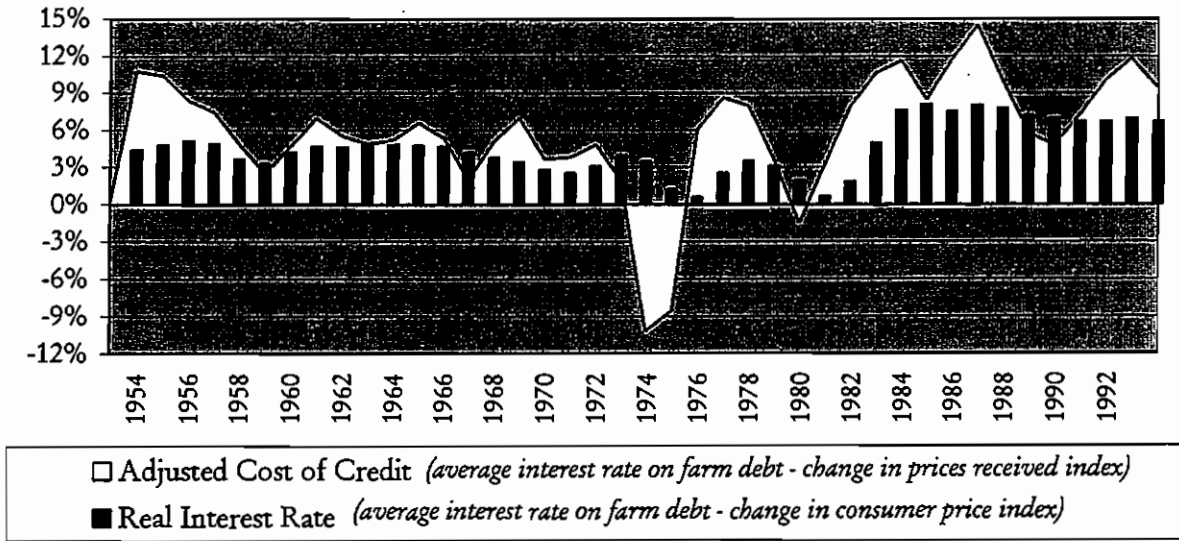
Source: USDA Economic Research Service Statistics, various years.

To make matters worse, the real interest rates on farm debt soared in the 1980s as tight federal fiscal policy aimed at controlling the high inflation of the 1970s forced interest rates well above the rate of inflation.⁶ Figure 13 shows two measures of the cost of credit for farmers between 1950 and 1993. The black bars represent the real interest rate, which is the average rate of interest on farm debt net of inflation. Real interest rates reflect the cost of borrowing capital relative to changes in the cost of living. The second measure (represented by the black line that bounds the white area on the chart) reflects the difference between the interest rates charged on farm debts and changes in the prices received index for farm products in the United States. This latter index roughly approximates the ability of farmers to make interest payments based on current income from farm sales. Because of extreme fluctuations on an annual basis, the data are presented as three-year rolling averages.

During the 1960s, real farm interest rates ranged from 3 to 5 percent. Real interest rates on farm debt were generally quite low—and even negative—during the 1970s, falling below 1 percent in real terms in both 1973-1975 and 1978-1980. This helps explain the rapid expansion of investment in agriculture during that period of time. By contrast, real interest rates increased almost tenfold between 1980 and 1983, and have stayed well above historic levels into the early 1990s. The adjusted cost of credit illustrates how attractive farm loans were to farm operators in the early 1970s, even when capital gains from land inflation are ignored. As before, however, the short-run cost of credit quickly rose in the late 1970s and remained at very high levels throughout the 1980s and early 1990s.

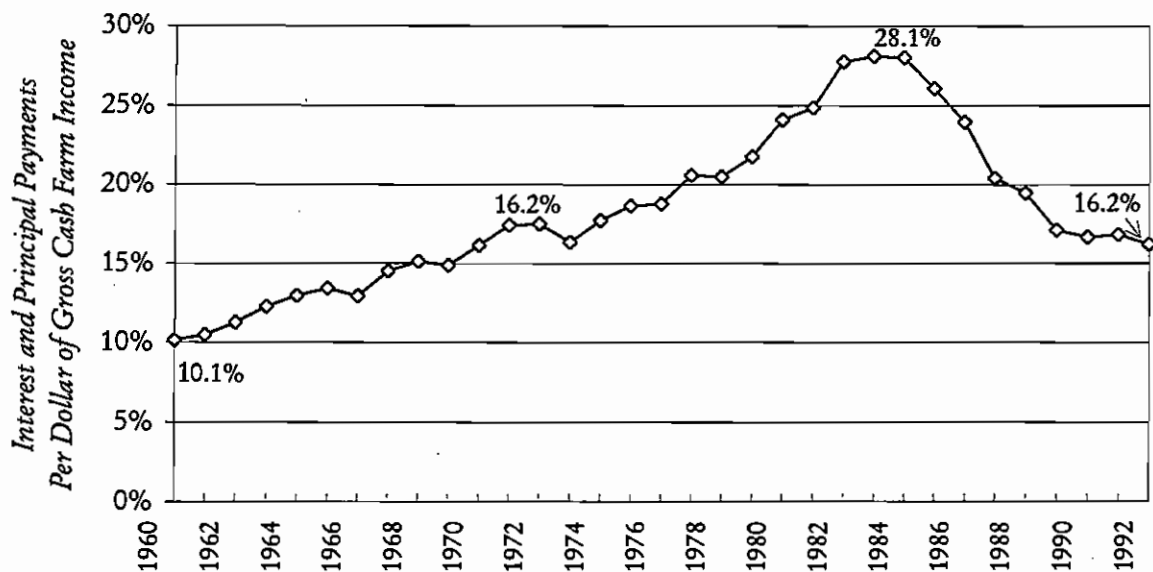
The growing significance of debt financing in Wisconsin agriculture is underscored in Figure 14. Data from the USDA-ERS suggest that interest and principal

FIGURE 13: Effective Cost of Credit in Agriculture, Based on Three Year Rolling Averages, 1950 to 1993.



Source: USDA Economic Research Service Statistics, various years.

FIGURE 14: Debt Servicing Ratio in Wisconsin, 1960 to 1992.



Source: USDA Economic Research Service Statistics, various years.

payments as a share of gross cash farm income in Wisconsin rose steadily from 10 percent in 1960 and peaked at 28 percent in 1985. It fell rapidly in the late 1980s to roughly 16 percent in 1992 (a level that was roughly equivalent to the situation in 1971).

Patterns of Aggregate Structural Change in Wisconsin, 1959 to 1992

There is a complex relationship between macroeconomic conditions in agriculture and patterns of structural change in the United States. As several observers have noted, historical data suggest that family-type farms are most likely to survive (relative to more "capitalist-type" farms) during periods of low profitability and depressed returns to investor equity. This so-called "paradox of family farms" derives from the ability of family-labor enterprises to curtail consumption and minimize labor costs during extended periods of low commodity prices (Friedmann, 1978) and from their willingness to continue in farming because of the non-monetary benefits associated with an agricultural lifestyle (Mooney, 1988).

Because of the link between depressed farm returns and the survival of family farms, it is not very surprising that the contemporary wave of interest in family farm agriculture emerged at the end of the 1970s, when prices and net incomes had been generally moving upward, and real capital gains from investments in farm assets had yielded unusually high returns (Buttel and Newby, 1980; USDA, 1981). This section attempts to provide an overview of the variation in the direction and intensity of structural transformation in Wisconsin agriculture between 1959 and 1992. Drawing on the results of the previous section, particular attention is given to a comparison of three major epochs: the early period of intense outmigration from agriculture during the 1960s, the "boom" years of the 1970s, and

the crisis years of the 1980s.

The Size and Scale of Wisconsin Farms

As was discussed previously, the number of farms in Wisconsin has been declining steadily since the 1930s. At the same time, the scale of farm enterprises has grown along a wide range of dimensions. The data in Table 2 provide a number of indicators of the changing size and scale of farms in Wisconsin for Census of Agriculture years between 1959 and 1992. The data in the top half of the table represent the mean characteristics of Wisconsin farms. The bottom half of the table presents average annual rates of change between census years for some of the key indicators.

Because the overall amount of land in agriculture declined more slowly than farm numbers, the average acreage on Wisconsin farms has increased by over 40 percent—or 1 percent a year—from just over 160 acres per farm in 1959 to almost 230 acres in 1992. The *rate* of increase in farm size was most rapid in the 1960s and 1970s, slowed between 1978 and 1982, accelerated during the mid-1980s, and has been relatively slow again in the late 1980s and early 1990s. In addition to a general increase in mean farm size, Table 2 provides considerable evidence for a bipolar—or "dualistic"—pattern of farm growth, with an increasing concentration of farms at the lower *and* upper ends of the size spectrum relative to those in the mid-sized acreage classes. This pattern was most evident during the 1970s, when the smallest farms (with less than 50 acres) increased from 10.5 to 17.7 percent of all enterprises, while the proportion with over 500 acres increased from 3.3 to 6.9 percent. Meanwhile, the proportion of farms with between 50 and 180 acres has declined rather steadily over the entire 33-year period. During the 1980s, the process of dualism was less pronounced: there was less of a tendency for smaller farms to increase (in relative terms), and more of a

TABLE 2: Indicators of Farm Size and Scale in Wisconsin, 1959 to 1992.

Farm Characteristics	1959	1964	1969	1974	1978	1982	1987	1992
Average Farm Size	161.2	171.5	183.0	197.0	206.2	209.7	221.0	227.5
<i>acres</i>								
Acreage Class:	<i>percent of all farm operators</i>							
1 to 49 acres	10.7	10.7	10.5	11.8	14.5	17.7	17.0	18.0
50 to 179 acres	57.1	53.8	50.6	46.0	41.3	38.0	36.6	35.5
180 to 499 acres	30.4	33.0	35.6	37.6	38.1	37.5	38.4	37.6
500 to 999 acres	1.5	2.2	2.9	3.9	5.1	5.7	6.6	7.0
1,000 acres or more	0.2	0.3	0.4	0.7	0.9	1.2	1.5	1.8
<i>dollars per farm</i>								
Nominal Dollars								
Sales of farm products	7,323	9,237	14,706	26,297	39,820	59,059	65,351	77,395
Value of farmland and buildings	21,309	26,765	42,448	85,560	175,095	232,606	182,950	210,179
Value of farm machinery and equipment	n.d.	n.d.	10,742	23,751	40,204	53,698	54,037	66,001
Real Dollars (1982 CPI-adj. \$, unless specified)								
Sales of Farm Products (1982 PPI-adj. \$)	18,216	23,685	32,680	33,975	45,405	59,059	68,430	72,229
Value of Farmland and Buildings	70,664	83,317	111,614	167,475	259,151	232,606	155,411	144,498
Value of Farm Machinery and Equipment	n.d.	n.d.	28,245	46,490	59,504	53,698	45,903	45,376
<i>average annual percent change over period</i>								
<i>1969-1974 1974-1978 1978-1982 1982-1987 1987-1992</i>								
Nominal Dollars								
Average Farm Size (acres)	1.2	1.2	1.3	1.5	1.2	0.4	1.1	0.6
Sales of Farm Products	4.8	4.8	9.7	12.3	10.9	10.4	2.0	3.4
Value of Farmland and Buildings	4.7	4.7	9.7	15.0	19.6	7.4	(-4.7)	2.8
Value of Farm Machinery and Equipment	n.d.	n.d.	n.d.	17.2	14.1	7.5	0.1	4.1
Real Dollars (1982 CPI-adj. \$, unless specified)								
Sales of Farm Products (1982 PPI-adj. \$)	5.4	5.4	6.7	0.8	7.5	6.8	3.0	1.1
Value of Farmland and Buildings	3.3	3.3	6.0	8.5	11.5	(-2.7)	(-7.7)	(-1.4)
Value of Farm Machinery and Equipment	n.d.	n.d.	n.d.	10.5	6.4	(-2.5)	(-3.1)	(-0.2)

Source: Census of Agriculture, Wisconsin Series, various years.

tendency for the size distribution of farms to shift into the larger acreage classes.

Because it is based on a physical quantity, farm acreage provides a consistent measure of farm scale over time. However, changing technology and input intensity can result in vastly different levels of farm output (and income) from the same acreage. Another measure of farm scale is the value of gross farm sales generated by the average farm unit. Table 2 suggests that nominal gross farm sales in Wisconsin increased by over 7 percent a year, on average, from 1959 to 1992. Since much of that growth is accounted for by inflation, an adjusted measure of gross farm sales is also included in Table 2. Controlling for changes in the farm producer price index (PPI), the average annual growth rate over the 33-year period was 4.3 percent.⁷ The real value of gross farm sales on a per-farm basis increased rapidly during the 1960s, slowed from 1969 to 1974, then rose very quickly between 1978 and 1982. In the 1980s, the average level of real gross farm sales grew relatively slowly, increasing by just over 1 percent a year since 1987.

Because of the effects of inflation and the way census data are reported, it is difficult to compare the distribution of farms in gross farm sales classes across time. A farm may appear to move between categories while the size of their operation (in terms of physical output) remains the same. Because the nominal and real boundaries of sales classes change from census to census, it is impossible to develop an accurate measurement of changes in the concentration of production over time.

One attempt to adjust for inflation at the national level suggests that there was considerable increase in the share of farm operators in both the largest and smallest size classes between 1969 and 1982 (Brooks et al., 1990). The U.S. Census of Agriculture only recently began reporting the proportion of

farms which produced various fixed shares of total gross farm sales. These data suggest that the value of farm production is fairly concentrated in the hands of a relatively few farms in Wisconsin. In 1992, for example, 11.3 percent of all farms produced half of the value of all gross farm sales. Just over a quarter of all farms produced 75 percent of all sales. Moreover, the proportion of farms responsible for the bulk of farm production declined between 1987 and 1992, suggesting that there has been an increase in the concentration of production over time. While these figures may seem striking, it is worth noting that Wisconsin has a much *less* concentrated farm sector than most of the rest of the nation (Peterson and Brooks, 1993).

A third measure of farm scale relates to the amount of capital investment in the farm operation. Again, changes in the value of capital investment are obscured by the effects of inflation. In actual (unadjusted) dollars, the average value of farmland and buildings increased at about the same rate as gross farm sales (7 percent annually). After adjusting for changes in the consumer price index, the per farm value of farmland and building assets actually increased by just over 2 percent a year over the 33-year period. In addition, there was considerable variation in the rates of asset appreciation (or depreciation). While average farmland assets grew at relatively high rates in the late 1960s and 1970s, they declined (in real terms) between 1978 and 1992. To some degree, the extreme swings in farmland asset values reflect the fact that farmland became a speculative investment for many farm (and nonfarm) investors in the 1970s. However, since the value of farm machinery assets (which are less likely to be influenced by speculators) closely tracked changes in the value of farmland and buildings, it can be concluded that there was real growth in the capital intensity of Wisconsin agriculture in the 1970s, and a real *decapitalization* of farm production during the 1980s.

Business Organizational Form and Enterprise Type

One of the main concerns of proponents of family farm agriculture during the late 1970s was that nonfarm corporate firms were increasingly displacing traditional sole-proprietor farm enterprises (Rodefeld et al., 1978; Vogeler, 1981). The data in Table 3 suggest that while there has been a slight increase in the corporate form of organization among Wisconsin farm producers, the vast majority of farm enterprises in 1992 were still managed and owned by individual farm families (over 85 percent) or were organized into family partnerships (10 percent). In addition, most of the growth in corporate organization among farms came from an increase in the proportion of family-owned corporations, the bulk of which were legally incorporated solely for accounting and tax purposes. The relatively low proportion of corporate farms masks some of their importance in terms of the value of production, however. While incorporated farms comprised less than 4 percent of Wisconsin farms in 1992, they did produce over 17 percent of the total value of farm sales.

Although most farms are still single-proprietor enterprises, there has been a gradual trend toward increasing specialization in the production of particular products on Wisconsin farms. The percent of all farms in the state producing selected crops and livestock between 1959 and 1992 is also illustrated in Table 3. It is clear that the proportion of farms which have any milk cows in the "dairy state" declined dramatically since 1959. Because dairy farms typically generate much higher levels of gross farm sales, net farm income, and per acre investments and cash expenditures relative to other types of farms in Wisconsin, the shift away from dairy farming has contributed to the overall decline in the value of aggregate farm production in Wisconsin that was

discussed above. The percent of farms raising hogs and pigs, oats for grain, and vegetables for harvest also declined over the same time period. By contrast, the production of hay and corn for grain remained relatively stable on most Wisconsin farms, and an increasing share of farmers produced soybeans. Although dairy farms comprised just over 40 percent of all farms in 1992, they produced over 60 percent of the value of total farm sales. By contrast, cash grain and other livestock farms comprised 12 and 25 percent of all farms, but produced just 6 and 19 percent of all farm sales, respectively, in 1992.

Census data allow us to classify farms according to the commodities that comprise the majority of their gross farm sales.⁸ Characteristics of dairy farms which relied principally on the sale of milk and milk products are listed at the bottom of Table 3. It is apparent that dairy farms in Wisconsin have tended to be increasing in scale—both in terms of acreage operated, and also the number of milk cows per operation. The annual rate of growth in mean herd size does appear to have moderated somewhat during the 1980s and early 1990s.

Changes in Tenure Status

As farms have gradually become larger in Wisconsin, the proportion of operated land that is owned by the farm operator has slowly declined. The data in Table 4 present a number of indicators of the tenure status of Wisconsin farm operators since 1959. In aggregate, the proportion of total Wisconsin farm acreage that was owned by the operator declined from 83.7 percent in 1969 to 73.5 percent in 1992. Although the decline was evident in each successive census period, the rate at which rented land is proportionately increasing has slowed over time.

The census data also classify farm operators into one of three tenure classes: full owners, who own all of the land they

TABLE 3: Organizational Forms and Enterprise Types of Wisconsin Farms, 1959 to 1992.

	1959	1964	1969	1974	1978	1982	1987	1992
<i>percent of all farm businesses</i>								
Organizational Form of Farm Business								
Individual or Family (sole proprietorship)	n.a.	n.a.	87.2	90.7	87.9	86.2	86.0	85.8
Partnership	n.a.	n.a.	11.7	7.9	10.1	10.9	10.5	10.2
Corporation	n.a.	n.a.	0.7	1.2	1.8	2.7	3.1	3.7
(Family Corporation)	n.a.	n.a.	n.a.	n.a.	(1.6)	(2.5)	(2.9)	(3.4)
(Non-Family Corporation)	n.a.	n.a.	n.a.	n.a.	(0.1)	(0.2)	(0.2)	(0.3)
Other (coop., state, institutional)	n.a.	n.a.	0.4	0.2	0.2	0.3	0.3	0.3
Percent of Farms Producing Any:								
Milk Cows	78.6	71.9	61.3	57.7	52.6	53.6	49.7	44.4
Beef Cows	n.a.	13.7	n.a.	21.5	17.6	17.5	13.8	15.3
Hogs and Pigs	39.8	30.3	25.8	20.1	17.8	14.7	11.8	10.0
Hay	n.a.	n.a.	77.0	83.0	82.4	78.8	80.4	75.4
Corn for Grain or Seed	68.7	54.2	50.9	58.8	65.4	64.0	64.8	54.0
Oats for Grain	81.4	75.2	n.a.	n.a.	58.8	49.4	41.3	32.7
Soybeans for beans	3.3	4.7	4.7	5.8	5.3	6.9	7.5	13.2
Vegetables harvested for sale	9.7	8.4	7.2	7.0	6.0	5.2	5.6	6.3
<i>mean characteristics</i>								
Characteristics of Dairy Farms **								
Acres Operated	178.8	191.8	206.9	229.1	250.0	258.6	275.0	293.1
Herd Size	22.0	27.0	30.4	35.8	39.2	43.9	48.2	51.8
<i>average annual percent change over period</i>								
Average Annual Change on Dairy Farms								
Acres Operated	1.4	1.5	1.5	2.1	2.2	0.8	1.2	1.3
Herd Size	4.2	2.4	2.4	3.3	2.3	2.8	1.9	1.5

NOTES: ** - Dairy farms include only those farms on which sales of milk and milk products comprises more than half of gross farm sales.

Source: Census of Agriculture, Wisconsin Series, various years.

TABLE 4: Tenure Characteristics of Wisconsin Farms, 1959 to 1982.

	1959	1964	1969	1974	1978	1982	1987	1992
Aggregate Ratio of Owned to Operated Land	n.a.	n.a.	83.7	80.9	77.9	75.7	74.3	73.5
	<i>owned land as percent of operated land</i>							
Tenure Class	<i>percent of all farm businesses</i>							
Full Owners	69.5	71.1	73.3	67.6	62.1	59.0	58.1	57.1
Part-Owners	18.9	19.7	19.6	26.3	30.3	32.4	33.4	34.4
Full Tenants	11.5	9.1	7.1	6.0	7.6	8.6	8.5	8.6
	<i>percent of farm acres operated</i>							
Full Owners	n.a.	62.3	63.9	54.7	47.5	43.5	41.4	39.1
Part-Owners	n.a.	27.6	29.0	39.2	45.8	49.3	51.2	53.6
Full Tenants	n.a.	10.1	7.1	6.1	6.8	7.3	7.4	7.4
	<i>percent of all farm businesses which are full owners</i>							
Percent Full Owners by Commodity Type								
Cash Grains	n.a.	n.a.	n.a.	n.a.	65.3	59.9	62.4	57.9
Field Crops	n.a.	n.a.	n.a.	n.a.	77.0	75.4	77.8	74.0
Fruits, Vegetables, and Specialty Crops	n.a.	n.a.	n.a.	n.a.	73.6	73.2	72.3	73.3
Non-Dairy Livestock	n.a.	n.a.	n.a.	n.a.	76.2	76.1	74.7	72.0
Dairy	n.a.	n.a.	n.a.	n.a.	49.1	45.8	41.7	38.5
Percent Full Owners By Sales Class								
Less than \$10,000	n.a.	n.a.	n.a.	n.a.	n.a.	81.9	82.6	82.3
\$10,000 to \$40,000	n.a.	n.a.	n.a.	n.a.	n.a.	65.7	66.2	65.5
\$40,000 to \$100,000	n.a.	n.a.	n.a.	n.a.	n.a.	45.1	44.5	45.2
\$100,000 to \$249,999	n.a.	n.a.	n.a.	n.a.	n.a.	31.4	28.4	29.7
\$250,000 to \$499,999	n.a.	n.a.	n.a.	n.a.	n.a.	26.2	25.6	21.4
\$500,000 or more	n.a.	n.a.	n.a.	n.a.	n.a.	35.9	43.5	29.6

Source: Census of Agriculture, Wisconsin Series, various years.

operate; part owners, who own some and rent some of their farmland; and tenants, who rent all of their operated acreage. As is indicated in Table 4, the proportion of farm operators who were full owners in Wisconsin rose in the 1960s, but has declined in every census since 1969. In 1992, roughly 57 percent of all operators were full owners. While there has been a slight increase in the proportion of operators who were full tenants in Wisconsin during the 1980s, in general they remain a relatively small proportion of the total farm population (6 to 9 percent). The most rapid increase has come in the proportion of part-owners, who comprised over a third of all farm operators in 1992 (up from only 19 percent in 1959). When tenancy classes are considered in terms of acreage, the importance of part-owner farms is even more pronounced. In 1964, over 60 percent of all farmland was operated by full owners. By 1992, this had declined to under 40 percent of all farmland. Meanwhile, over the same time period, part-owners almost doubled their share of farmland from 27.6 percent to 53.6 percent.

The bottom half of Table 4 presents limited data on the proportion of farm operators who were full owners based on farm commodity type and sales classes. It is evident that dairy and cash grain farms were much less likely to be fully owned by the operators than farms in the other commodity categories. Moreover, while the proportion of full owners among most of the commodity types remained relatively stable between 1978 and 1992, the proportion of dairy farmers who owned all of their land dropped from 49 percent to 38.5 percent. Tenure status is also significantly related to the level of farm sales. Generally speaking, the proportion of farm operators who are full owners decreases with increasing levels of gross farm sales. Interestingly, however, the largest farms (in terms of gross sales) are somewhat more likely to be full owners than the next smallest size class.

Use of Hired Labor

To many, the defining characteristic of a family farm form of agricultural production relates to the absence of wage labor relations and the industrial-style organization of a hired labor force. The data in Table 5 provide a quick overview of the importance of hired labor on Wisconsin farms.⁹ The results suggest that hired labor has become significantly *less* common on Wisconsin farms over the last 30 years or so. By 1992, a smaller proportion of Wisconsin farm operators reported hired labor expenses than in any other census since the 1930s. The information on hired labor in Table 5 is also disaggregated by commodity group and sales class. It is apparent that the use of hired labor is most common on dairy, fruit and nut, and horticultural specialty crop farms. Hired labor is relatively uncommon on cash grain, field crop, and non-dairy livestock operations. Within each commodity group, however, the proportion of operators reporting hired labor has generally declined over time, suggesting a general pattern toward increasing reliance on unpaid family labor (and, probably more so, the increased use of labor-saving mechanization).¹⁰ Not surprisingly, the use of hired labor is positively related to farm sales. Over two-thirds of farms with sales exceeding \$100,000 reported some hired labor expenses in 1992.

While the proportion of farms reporting *any* hired labor has not increased significantly since the late 1950s, there does appear to be an increase in the use of *full-time* hired labor (defined as laborers who worked more than 150 days a year) between the early 1960s and the 1970s and 1980s. It is not clear (to this author), however, if this apparent increase is merely an artefact of census definitions and reporting procedures. In any case, the overall proportion of farms with full-time hired laborers in Wisconsin has declined steadily since the late 1970s. When the data on full-time hired laborers is

TABLE 5: Use of Hired Labor on Wisconsin Farms, 1959 to 1992.

	1959	1964	1969	1974	1978	1982	1987	1992
<i>percent of farm businesses</i>								
Farms Reporting Any Hired Labor Expenses								
All Farms	45.5	45.0	47.6	42.0	47.2	46.7	45.9	40.7
By Commodity Group								
Cash Grains	n.a.	n.a.	n.a.	23.0	30.1	28.7	30.2	22.7
Field Crops	n.a.	n.a.	n.a.	28.8	32.3	34.6	28.4	27.7
Vegetables and Melons	n.a.	n.a.	n.a.	29.3	30.3	35.4	33.6	34.3
Fruits and Nuts	n.a.	n.a.	n.a.	71.1	53.9	45.4	54.0	45.5
Horticultural Specialties	n.a.	n.a.	n.a.	59.1	66.3	58.7	50.8	54.4
Non-Dairy Livestock	n.a.	n.a.	n.a.	31.9	31.3	30.1	32.9	26.1
Dairy	n.a.	n.a.	n.a.	43.3	59.9	61.9	61.2	58.8
By Sales Class								
Less than \$10,000	n.a.	n.a.	n.a.	n.a.	22.8	20.1	19.1	16.1
\$10,000 to \$40,000	n.a.	n.a.	n.a.	n.a.	45.4	40.6	38.3	29.2
\$40,000 to \$100,000	n.a.	n.a.	n.a.	n.a.	66.8	62.1	58.9	49.4
\$100,000 to \$249,999	n.a.	n.a.	n.a.	n.a.	n.a.	76.0	75.9	69.5
\$250,000 to \$499,999	n.a.	n.a.	n.a.	n.a.	n.a.	91.0	93.4	89.4
\$500,000 or more	n.a.	n.a.	n.a.	n.a.	94.4	95.1	97.5	93.8
Farms Reporting Any Full Time Hired Workers **								
All Farms	10.0	11.0	n.a.	35.4	36.6	34.3	n.a.	32.3
By Commodity Group								
Cash Grains	n.a.	n.a.	n.a.	3.8	6.0	9.1	n.a.	10.1
Field Crops	n.a.	n.a.	n.a.	6.5	6.1	6.6	n.a.	9.1
Vegetables and Melons	n.a.	n.a.	n.a.	8.4	9.1	11.2	n.a.	12.8
Fruits and Nuts	n.a.	n.a.	n.a.	28.2	19.9	21.4	n.a.	24.1
Horticultural Specialties	n.a.	n.a.	n.a.	31.3	38.7	40.8	n.a.	33.4
Non-Dairy Livestock	n.a.	n.a.	n.a.	7.3	9.2	10.5	n.a.	10.5
Dairy	n.a.	n.a.	n.a.	16.7	32.8	40.9	n.a.	38.8

Notes: ** - Full-Time Hired Workers are those that worked more than 150 days a year.

Source: Census of Agriculture, Wisconsin Series, various years.

disaggregated by commodity type, it is evident that dairy and horticultural specialty farms were the most likely to employ hired labor on a full-time basis. Moreover, dairy farms were more than twice as likely to use full-time hired laborers in 1992 as they were in 1974.

Changes in Farm Operator Characteristics

Aside from information about the characteristics of farm enterprises, the Census of Agriculture also gathers limited information about the farm operator. Table 6 presents information about the age and off-farm labor force participation characteristics of farm operators in Wisconsin between 1959 and 1992. Although there has been some variation from year to year, the average age for Wisconsin farm operators has fluctuated between 48 and 51 years old in every Census of Agriculture since the late 1950s. Given the dramatic transformations of Wisconsin agriculture in other regards, this stability in the mean age of operators is striking. When data are disaggregated in Table 6, it becomes apparent that the relatively static mean age of operators disguises some interesting changes in the proportion of farm operators in different age groups. In particular, there has been a significant increase in the proportion of farm operators who are over 65, and a drop in the proportion of operators who are under 25 years old in the two most recent census periods.

Variation in the proportions of farm operators in different age groups are partly the result of short-term rates of exit *within* certain age groups. Indeed, other research has shown that the 1980s were a period in which young operators were particularly vulnerable to financial failure, and older operators often delayed retirement due to a scarcity of new entrants and depressed farm asset values (Jackson-Smith, 1994; 1995). Variations in the demographic structure of the farm operator population also reflect the long-run impacts of

entry rates. Particularly large (or small) entry cohorts at one point in time are reflected as "bubbles" (or "troughs") that work their way through the age structure of the population over time. Figure 15 shows how the large proportion of operators in the 65 and older group in 1987 and 1992 represented a "bubble" of operators who were 55 to 65 years old in 1978, 45 to 54 years old in 1969, and so on all the way back to when they were an unusually large group of 25- to 34-year-olds in the late 1940s. It is possible that this group reflects an infusion of soldiers returning to the Wisconsin countryside following the conclusion of World War II.

The proportion of farm operators with off-farm employment is also displayed in a number of ways in Table 6. The proportion of Wisconsin farm operators who had *any* off-farm employment increased from 40.7 percent in 1959, peaked at 46.5 percent in 1974, declined to 42.5 percent in 1987, and then increased slightly to 43.7 percent in the 1992 Census of Agriculture. Despite the slight increases during the 1970s, it does not appear that off-farm employment *per se* has increased in any major way among farm operators in Wisconsin over the last few decades. This is further reflected in the fact that the proportion of operators who said that their principal occupation was farming hovered around 68 to 71 percent between 1978 and 1992. The data do suggest that an increasing proportion of the operators who had some off-farm employment were now working at full-time jobs. While the proportion of farm operators with part-time jobs dropped between 1978 and 1992, the proportion with full-time jobs actually increased in Wisconsin.

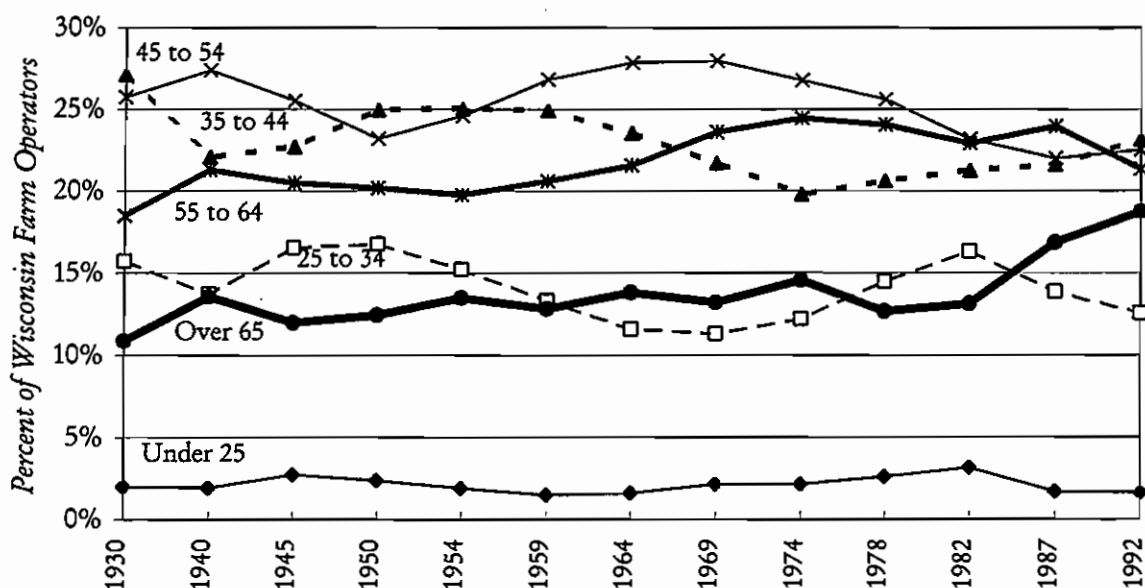
Estimates from the U.S.D.A. suggest that off-farm income has been an important source of supplemental income on family farms in Wisconsin. Since operators were not significantly increasing their off-farm labor force participation over this period, it is likely

TABLE 6: Characteristics of Wisconsin Farm Operators, 1959 to 1992.

	1959	1964	1969	1974	1978	1982	1987	1992
Average Age of Operator	48.8	49.7	49.7	50.2	49.0	48.4	50.3	50.6
Age Group	<i>percent of farm operators</i>							
Under 25 years old	1.5	1.6	2.1	2.1	2.6	3.2	1.7	1.6
25 to 34 years old	13.3	11.6	11.3	12.2	14.5	16.3	13.9	12.6
35 to 44 years old	24.9	23.5	21.7	19.8	20.6	21.3	21.6	23.1
45 to 54 years old	26.8	27.9	28.0	26.8	25.6	23.2	22.0	22.5
55 to 64 years old	20.6	21.6	23.6	24.5	24.0	22.9	24.0	21.4
65 years old or more	12.8	13.8	13.2	14.6	12.7	13.1	16.9	18.8
Days Worked Off-farm								
None	59.3	57.7	53.9	53.5	54.0	56.3	57.5	56.3
Any	40.7	42.3	46.1	46.5	46.0	43.7	42.5	43.7
(1 to 99 days)	(17.1)	(15.2)	(13.6)	(10.2)	(11.1)	(10.2)	(9.1)	(8.3)
(100 or more days)	(23.7)	(27.1)	(32.5)	(36.2)	(34.9)	(33.5)	(33.4)	(35.4)
Principal Occupation								
Farming	n.a.	n.a.	n.a.	73.3	68.5	70.5	71.0	68.0
Other	n.a.	n.a.	n.a.	26.7	31.5	29.5	29.0	32.0

Source: Census of Agriculture, Wisconsin Series, various years.

FIGURE 15: Age Composition of Wisconsin Farm Operators, 1930-1992



Source: U.S. Census of Agriculture Data, various years.

that much of this increase in off-farm income came from farm household members other than the farm operator. Unfortunately, the existing secondary data sources on off-farm employment have serious limitations in describing the nature and intensity of changes in off-farm employment on Wisconsin farms. The Census of Agriculture does not gather information on off-farm employment by other farm family members, and the USDA data set is not available at the household level.

Summary and Conclusions

Macroeconomic Conditions and the Economic Performance of the Farm Sector

This report provides an overview of the important short- and long-run trends in macroeconomic conditions which affected agriculture in the United States and Wisconsin over the last 30 years or so. In the broadest terms, the period from the late 1950s

through the early 1970s was one in which there was a massive outmigration from agriculture. Farm prices rose relatively slowly and only a rapid increase in productivity prevented a decline in the real value of aggregate net farm income received by farm operators. A period of unusual prosperity in farming followed in the 1970s as an increase in international demand for U.S. food products and the availability of relatively cheap credit combined to create a rapid rise in agricultural commodity prices and a dramatic surge in the levels of investment in farmland and farm machinery.

In general, the 1980s witnessed the reversal of most of the key macroeconomic conditions that underlay the boom years of the 1970s. A prolonged international recession caused a rapid contraction in the market for U.S. farm commodities abroad, and led to a corresponding rise in agricultural surpluses (and a decline in prices received by farmers) here at home. Real interest rates

soared to post-war historic highs, partly due to federal fiscal policy aimed at reducing inflationary pressures in the economy, but also as a consequence of massive increases in government borrowing to cover federal budget deficits.

This report also details some of the consequences of the 1970s "boom" and the 1980s "crash" for the aggregate performance of the Wisconsin farm economy. The rate of net decline in farm numbers slowed considerably during the 1970s, but increased between 1982 and 1992 to levels comparable with those that prevailed in the late 1950s and early 1960s. The total physical output for most major commodities tended to rise throughout the entire 30 year period (with large annual fluctuations), but the rate of productivity increase has slowed considerably in recent years. Prices received for farm products in Wisconsin increased rapidly in the 1970s, but have since declined in real terms to levels comparable with those that prevailed in the pre-boom period. As a result, the aggregate gross value of farm production, adjusted for inflation, peaked in Wisconsin in 1979 and has declined most years ever since. Since expenses associated with farm production have not declined commensurate with the fall in the prices received by farmers, the real value of net farm income has fallen even more rapidly since the late 1970s. In particular, total net farm income received by Wisconsin farmers reached post-war lows in 1982 and 1986.

Changes in farm income received by Wisconsin operators were closely associated with changes in the value of farmland and machinery assets. During the boom years of the 1970s, the real value of farm assets rose at over 5 percent a year. During the crash which began in 1981 and extended through 1986, asset values fell by almost 9 percent annually. Since massive debt levels accumulated by farmers during the boom period declined less rapidly than farm assets

in the 1980s, a larger and larger portion of gross farm sales in the state had to be devoted to principal and interest payments. The aggregate ratio of farm debts to farm assets peaked in 1985 and 1986, during what is usually considered to be the height of the 1980s "farm crisis." Overall, real returns to farmers in Wisconsin were significantly lower in the 1980s (compared to the 1970s), both because of depressed levels of real net farm income, but also because of massive capital losses due to the devaluation of farmland and machinery assets in the 1980s.

Farm Structural Change in Wisconsin Between 1959 and 1992

Many assume that changes in the economic context of farm production are associated with changes in the structure of agriculture. Along most dimensions, a comparison of farm structural change in Wisconsin during the 1970s and 1980s reveals more variation in the *degree* or pace of change than in the direction or general tendencies toward which farm structure is evolving. Farm numbers and land in farming have steadily declined in Wisconsin since early in this century, though the rate of decline in farm numbers and land in farming was most rapid in the late 1960s, slowed considerably in the 1970s, and accelerated again in the last decade.

The relationship between economic conditions and changes in the average size or scale of farms in the state is more complicated. Mean farm acreage and gross sales increased at relatively rapid rates throughout both the 1960s and 1970s, and at a more modest pace after 1982. There is some evidence for the emergence of a more dualistic farm structure, with farm enterprises concentrated in the largest and smallest size categories, though the polarizing tendencies in Wisconsin were much stronger in the 1970s than during the farm crisis years. Similarly, a long-run decline in the importance of dairy

farming in Wisconsin slowed somewhat in the mid- to late-1970s (when the relative proportion of dairy farms actually increased), but has accelerated in the late 1980s and early 1990s as milk prices continue a 15-year long downward trend. Meanwhile, one measure of capital intensity in Wisconsin agriculture—the average value of farm assets—rose modestly throughout the 1960s, soared much faster than the rate of inflation during the 1970s, then crashed precipitously between 1982 and 1987.

Changes in the characteristics of the farm labor force in Wisconsin showed only a modest relationship to shifts in underlying economic conditions in agriculture. The average age of farm operators has been slowly increasing over the last few decades, though an unusually high rate of entry by young operators in the late 1970s caused the average age to dip in the 1982 Census of Agriculture. During the 1980s, the proportion of farm operators over 65 years of age increased quite rapidly, while the proportion under 35 shrank considerably. This suggests that the farm financial crisis discouraged young farmers from entering the sector and prevented older operators from leaving at a normal retirement age. Meanwhile, periods of farm prosperity were more likely to be associated with increases in the percent of farm operators who had off-farm employment. On the other hand, off-farm employment by *other members of the farm household* appears to have increased fairly dramatically during the 1980s, which might help explain why the proportion of Wisconsin *farm operators* reporting any off-farm job activity actually declined between 1978 and 1987. Finally, despite the concerns of some scholars that the emergence of wage-labor relations was inevitable on farm enterprises within a capitalist society, the proportion of Wisconsin farm enterprises which reported hired labor expenses generally declined over the last 35 years, though there was a slight upturn during the late 1970s and early 1980s.

Other structural trends within Wisconsin agriculture have shown a weak (and even contradictory) connection to macro-economic conditions. Since the late 1960s, there has been a steady decline in the proportion of farmland in Wisconsin that is owned by the operator, and in the proportion of farm operators who are full owners of all of the land they farm. This decline began in earnest during the expansionist years of the 1970s, but continued throughout the period of retrenchment that characterized the mid- to late-1980s. In addition, throughout the last 30 years there has been a growing tendency for Wisconsin farmers to create formal business partnerships or family corporations; this tendency does not seem to have been affected much by either the boom years or the ensuing farm financial crisis.

How Does the "Crisis" of the 1990s Compare to Earlier Periods of Change?

In the introduction to this report it was noted that there is a serious level of concern about the future of agriculture in Wisconsin among the state's farmers and rural residents. The trends summarized above suggest that these concerns are well founded. Adjusted for inflation, farm product prices and farm incomes among Wisconsin's agricultural producers are reaching historic lows. The dairy sector—the most profitable and significant commodity sector in Wisconsin agriculture—seems to be under particular pressure. Moreover, unlike similar declines in the 1950s and 1960s, productivity improvements are no longer keeping pace with declines in farm numbers and farm product prices, resulting in real losses to producers and to the state economy.

The general decline in agricultural economic performance does not appear to have been associated with a dramatic decline in the significance of family farming in the state, however. While the relative contribution of large-scale, corporate farms

that use mainly hired laborers has increased over time, the Wisconsin farm sector is still dominated by small- and mid-sized family labor farming enterprises. What does seem to have occurred is that family-scale operations have been forced to work longer hours, milk more cows, and engage in more off-farm employment as strategies for survival in the farm economy of the 1990s. It is not clear whether or not these new stresses will inevitably result in a more rapid transformation of Wisconsin agriculture to a more industrial farming structure, or whether it will lead to a generalized decline in the significance of agriculture in the state as production moves out of Wisconsin to other regions of the country.

Endnotes

¹This report is based on material originally included in Jackson-Smith, 1995.

²This paper benefited from the comments of Monica Nevius as well as the members of my dissertation committee (Fred Buttel, Brad Barham, Jess Gilbert, Pete Nowak, and Gary Green).

³Obviously there are problems with this approach. In particular, it is possible to overcount entrants since anyone who has moved from one farm to another during the inter-census period might appear to be a new farmer in the second census, when in fact they were also farming at the time of the first census. In addition, there were relatively high rates of nonresponse to this question, which necessitates some adjustments to the data. (See Gale and Henderson (1991) for methodological details.) Despite these limitations, Gale and Henderson's estimates are probably the most accurate available for entry and exit rates at the state and national level. Moreover, they are consistent with patterns seen in Canada, where longitudinally matched census data are available, and in the

recent U.S. Census of Agriculture longitudinal data file (LDF).

⁴Gross farm income includes receipts from the marketing of crops and livestock, government payments, other farm-related cash and noncash income, adjusted for changes in inventories over the year. Farm production expenses include cash expenses on inputs, interest, labor, rent, and property taxes plus an estimated cost for "capital consumption" reflecting the net depreciation of farm machinery, equipment, and buildings. Net farm income is derived by subtracting farm expenses from gross farm income. All data are adjusted to 1982 dollars using the consumer price index.

⁵By the end of the 1970s, rapid inflation in land prices was increasingly seen as a problem because it was thought to present an obstacle for the entry of young, new farm operators into the sector (USDA, 1981). In that light, it is curious to note how rates of entry into agriculture were actually higher in the late 1970s than they were during a period of land *deflation* in the early 1980s (see Gale, 1994a).

⁶Harl (1986) notes that burgeoning federal budget deficits associated with large tax cuts and increases in defense spending during the early 1980s also contributed to unusually high real interest rates during this period.

⁷When the producer price index is used as a deflator, the value of gross farm sales are adjusted for changes in the prices farmers receive for their products (when averaged across all commodities). The PPI-adjusted sales figures are a reasonable approximation for the *volume* of farm production, and thus provide another type of scale index.

⁸These classifications are usually referred to as the "standard industrial classification" (SIC) codes.

⁹It should be noted, however, that census data on hired labor include paid family members in addition to nonfamily wage and salaried workers.

¹⁰These results are corroborated by time-series data collected by the USDA National Agricultural Statistics Service on the characteristics of the paid and unpaid family and nonfamily farm labor force. They suggest that the proportion of family labor on Wisconsin farms remained between 68 and 76 percent of the total farm labor force between 1974 and 1984. Nonfamily hired laborers were most commonly used at the end of the 1970s, and generally declined relative to family and unpaid laborers through the early 1980s. Unfortunately, the USDA ceased releasing state-specific labor force data in 1984.

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