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In recent years the public perception has grown that getting started in farming is very difficult and perhaps almost impossible without substantial inherited wealth or family backing. This study considered conditions faced by beginning farmers in Livingston and Jefferson Counties, New York, and Lyon County, Minnesota, at four different points in the twentieth century: 1910, 1930, 1950 and 1978. Since 1910 the amount of equity required to enter agriculture has increased and this increase has been especially noticeable for tenants. The amount of equity required, however, when measured in terms of the number of years of farm wages needed to acquire it, has declined for beginning owner-operators for all three locations studied since 1910. In addition, the debt repayment position of young farmers in the situations considered during 1978-80 was comparable to that of the 1910-12 period, which has sometimes been called the "Golden Age of American Agriculture."

Perspective for This Study

Many questions are being raised about the nature of changes in farming. Will farm units on which family members provide most of the management and labor continue to be the dominant type of farm organization? Has American agriculture become over specialized? Has specialization and the increasing size of farm businesses contributed to soil erosion and water pollution?

The question of entry to farming and the associated control over resources is related to all of these public concerns. In proposed legislation such as Congressman Bedell's "Beginning Farmer Assistance Act" the argument is made that if the entry of young family farmers is restricted, the consolidation of farm units and the takeover of farming by nonfarm interests will be hastened. It is said that the family farm system is threatened when young farmers find it "too difficult" to enter agriculture. A threat to the family farm system is perceived as a threat to the dependability and relatively low cost of the nation's food supply. In this view the single most important obstacle to starting farming is the high price of and lack of financing for the purchase of farm real estate (Sherman and Webb, 1980, p. 1).

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The problems of entry into farming do not fit into the microeconomic analysis of barriers to entry that is applied to modern industrial conglomerates, such as automobiles or steeel, or to such professions as medicine or law. In most parts of agriculture there are no oligopolists standing ready to cut prices to keep out new producers. In farming there are no licenses, no exams to pass and few secret technologies. In fact, agriculture fits the free entry qualifications of the perfect competition definition more closely than most sectors of our industrialized economy. In agriculture the question of entry relates not only to the difficulty of entry, but to who is starting and what kinds of business organization they are using. In short, the question of the difficulty of starting farming is a structural issue.

In at least seven states the perception of beginning farmer problems has led to the development of special state programs that subsidize interest rates, guarantee loans and create tax incentives that encourage landowners to rent or sell their land to young farmers. The details of these programs vary, but they all share the common goal of attempting to help young farmers finance their entry into agriculture. In Minnesota, Louisiana and Texas the legislation focuses on guaranteeing farm real estate loans and subsidizing interest rates or payments. In Oklahoma, Iowa and Georgia money from the sale of tax exempt bonds is authorized for loans with below market interest rates to young farmers for the purchase of farm real estate and non-real estate production items. The North Dakota program includes both loan guarantees and tax incentives for landlords who rent or sell their land to young farmers. On the federal level several bills have been introduced to aid beginning farmers, including two which seek to use federal funds to back state level programs. The Family Farm Entry Assistance Act introduced by Senator Gaylord Nelson in 1979 and The Beginning Farmer Assistance Act introduced by Congressman Bedell in 1981 are examples. No federal bill aimed specifically at aiding young farmers has yet been reported out of committee.

Amid this welter of activity and concern the question however remains if entering agriculture is actually any more difficult than it ever was. Is the burden of capital accumulation and debt repayment growing heavier? After all, tight margins and a lack of operating capital are nothing new in American Agriculture. The signs do not all point to a heavier burden for beginning farmers. For instance, the downpayment requirements of most lenders have decreased and loan terms have become longer on both personal property and real estate (LaDue, 1979, p. 111). Until 1947 the Federal Land Bank was limited to lending up to 50 percent of the value of real estate, but the legal limit has been raised over the years to as high as 85 percent today. In recent years many lenders have shifted away from lending purely on the basis of collateral to lending with an eye on the ability

of the borrower to repay. For young farmers, who have traditionally been short on collateral and long on the willingness to work, this shift may be beneficial. That is not to say that the overall lot of beginning farmers is easier, but that it is not clear that things are worse either.

Earlier Studies

The goal of this study is to measure objectively the lot of beginning farmers and how it has changed over time. This is not a new area for research. Some of the earliest farm survey work undertaken in this country by G. F. Warren in the early part of this century, was done with a concern for beginning farmers. At the close of World War II studies were undertaken in several parts of the country to observe how young farmers started farming and the factors that led to their success. Similar studies were done in the 1960's and 1970's. Common findings were that successful young farmers often had family help, ran livestock operations and started on rented land.

In the 1960's several studies examined the minimum resource requirements for beginning farmers who desired given levels of income. In 1969 Thomas and Jensen used budgeting methods to study the opportunities of young farmers possessing various levels of management skill. They found that the opportunities were good for the excellent manager, while the average manager faced dim prospects. In the 1970's attention was focused on the problems of beginning farmers as part of an effort to understand the life cycle of the family farm and how entry and exit from agriculture could be accomplished more smoothly and efficiently.

A common feature of these studies is focus placed on the problems of beginning farmers at some point in time or over a short span of years. Only a couple of studies have looked at changes over a longer period. In 1961, Brake and Wirth surveyed a group of Michigan farmers and asked questions about how they started farming and how much capital they had when they started. This study found that borrowed money and rented land were more important after 1955 than they had been before. In 1979 LaDue used census and United States Department of Agriculture (USDA) data to develop measures of the changes in the financial problems of beginning farmers between 1945 and 1977. LaDue found that while the investment required to begin farming has increased greatly over the 28 year period, credit terms have been modified to make it easier for a beginning farmer to finance his operation. In spite of the easier credit terms, LaDue found that the length of time necessary to earn a downpayment to begin farming had tripled from 1945 to 1977 for both real estate and non-real estate capital. He found that there was no significant difference between farm and nonfarm employment in terms of how long it took to earn the money for a downpayment. LaDue's work indicates that repayment capacity has improved over the last 20 years, but even so a beginning farmer must be 2.5 times as efficient as the average farmer to service his debt.

Purpose of Study

In an effort to expand our understanding of the situation of beginning farmers, this study compares entry into farming at four quite different time periods: 1910-12, 1930-32, 1950-52 and 1978-80. Farm management data from cost account research, farm business summary records and farm management surveys are used to develop representative budgets for beginning commercial farmers in Livingston and Jefferson Counties, New York, and Lyon County, Minnesota. Specifically, the study focuses on four indicators of the lot of beginning farmers:

1. The change in the amount of capital required for a beginning farmer.

2. The number of man years of farm wages that would be required to earn the equity needed to start farming.

3. The repayment capacity of the beginning farmer with average yields and prices, over the first 3 years of farming.

4. The wealth of the young farmer at the end of the 3 year period.

The financial aspects of the beginning farmer's situation are considered in some detail. While financial problems are not necessarily the most important problems of beginning farmers, they are the problems which have attracted the most interest from the public and from legislators.

The basic working hypothesis of this study is that starting farming now is not more difficult than it was earlier in the 20th century. This hypothesis is designed to test the assertion often heard in policy discussions that it is much more difficult to start farming now than in earlier times. It is probable that during certain periods in the past, such as the mid-1930's, starting farming was more difficult than at the end of the 1970's, but this study seeks to determine if there were periods when it was substantially easier and if so the nature of these differences.

METHODOLOGY

This study endeavors to make comparisons of comparable farm situations across a substantial span of time. Typical farms in three different locations at four different times are considered. Individual farm records from earlier studies were used wherever possible. The U. S. Census of Agriculture, farm business association records, cost account records and farm surveys provided the basic information for analysis.

Target Population

The target population of this study is the set of beginning, full-time, commercial farmers in Livingston and Jefferson Counties, New York and Lyon County, Minnesota, in 1910, 1930, 1950 and 1978. These locations reflect quite different sets of land resources and market outlets. Information is available for farmers who cooperated with surveys, cost accounts and farm business summaries in those times and places. There remains a problem of defining and identifying a consistent group of beginning full-time farmers in each of these periods.

Defining a Beginning Farmer

One of the most common characteristics used to identify beginning farmers is age. The terms "young farmer" and "beginning farmer" are sometimes used interchangeably. The public concern for beginning farmers is not focused on those who tire of urban life and decide on a second career in farming, but on the young person who wants to make farming his profession. Public concern is for "young beginning farmers". Defining beginning farmers by age groups has the advantage of simplicity. A person's age is readily definable and age information is included in most of the data to be used.

If age categories are used, a decision must also be made about the limits of the young farmer category. The FCS has defined young farmers as those under 35 years old. This coincides with a break in the age groups in the census of agriculture and can be considered a logical cut-off point. In short defining beginning farmers as those 34 and under in the existing data sets excludes very few beginning farmers; at the same time it may include some young farmers with relatively large equity positions.

Time Periods

The target population focuses on beginning farmers identified in studies in 1910, 1930, 1950 and 1978. The initial consideration in this choice was that the years coincide with the dates of the United States Census of Agriculture, which provides a general benchmark against which the more specific data from other sources can be examined.

The choice of 1910 as the earliest date stems from the lack of individual farm data prior to that and from the traditional use of the 1910 to 1914 period as a reference point in American agriculture. Parity prices are based on this period of relative well being in American farming.

In 1900 very little farm management data were available anywhere in the United States. While some studies of the cost of growing specific crops were undertaken in the Midwest in the

1890's (Pond, et al., p. 46), no systematic attempt was made to gather actual farm income and cost figures until after the turn of the century. Some of the first farm survey work was done in New York by G. F. Warren. His first field work was done in 1903, concerned with apple production in Wayne County, but the first whole farm survey that was deemed complete enough for publication was conducted in 1908.

The argument can be made that conditions have changed so much since 1910 that nothing relevant for the 1980's can be learned by going back that far. Just because data are available back to 1910 does not imply that they are going to be useful. When it is said that it is harder to start farming than it used to be, the time used for comparison is not ordinarily specified. How far back can one reasonably go? An obvious turning point in American agriculture is the closing of the public domain. By 1900 most of the undeveloped public lands that could be converted to farming without irrigation or other capital intensive improvements were being farmed.

The conditions of agricultural finance in 1910 offer a sharp contrast to today's conditions. Almost all agricultural lending was secured by real estate. Mortgage terms were for five years at most, with annual interest payments and a balloon payment of the principal at the end. Long term, commercial mortgages were not available to farmers until the founding of the Federal Land Banks in 1916. Intermediate and short term credit was in short supply, especially for the tenant who had no land to mortgage. But changes in credit conditions are precisely the kind of change that this study seeks to examine. The situation of the beginning farmers in 1910 was in some sense comparable to that for the beginning farmer of 1978; land prices were rising rapidly and costly new technologies were being adopted, but the credit conditions under which the beginning farmer of 1910 operated were radically different.

The 1978 period was chosen because it is the most recent date of an agricultural census. Limited time and resources dictated that a total of only four periods could be considered. Even spacing of the periods suggests that one period be chosen in the 1950's and one in the 1930's. Nineteen hundred and fifty was chosen over 1954 or 1959, because it offers the possibility of using evidence from the young farmer studies that were done in New York and Minnesota at that time and because it was an agricultural situation that was generally thought of as prosperous. Farm prices were no longer at wartime highs, but had not yet fallen to grain glut lows. Memories of the depression were restraining farmland price increases. On the surface it seemed like a good time to start farming and many young people did.

Choosing a period between 1920 and 1940 is harder. These were hard times for farmers in general, and presumably just that much harder for beginning farmers. The choice of 1930 offers a

view of conditions just before the beginning of the massive government intervention in agriculture that has been characteristic ever since. The three year study period ends just before Roosevelt's inauguration and the tumult and false starts of the farm programs in the mid-1930's.

For each time period chosen, budgets were constructed for the first three years of a representative farm business. Only three years of data are available between 1978 and 1981. For consistency the three year time span is used for the other periods as well.

In several cases no survey, cost account, or farm business record is available for the census year, but is available in a proximate year. In those cases the data from the proximate year are used and costs and sales are adjusted to the census year by the Producer Price Index. The PPI or Wholesale Price Index is used because it is available in all the time periods considered and because it covers a group of commodities similar to the items associated with farm expenses and production. The PPI is also used to adjust capital and sales values to constant dollars for comparisons of changes in beginning farming between study periods.

An alternative for converting cash flows to 1980 prices is to multiply the quantities sold in a given year by 1980 prices. This approach has several problems. First product prices are available only for commodities commonly produced in that period and the same products are not produced in each period. For instance, farm churned butter was a common product in 1910, but no price is available in 1980. Second, even when a price is available in 1980, the market structure is usually quite different form earlier periods. In 1930 soybeans were a minor hay and oilseed crop with few processors, but in 1980 it is a major commodity. Over the same period flax declined from a major oilseed to a minor crop. Third, the quantities and prices of inputs are not available so that adjustment of the expense category must depend on price indices.

Locations

The choice of locations for the study is based on the availability of data, the researcher's personal knowledge of agriculture in southwest Minnesota, the need for sites where agriculture is a major industry in all the time periods and the desire to look at several different types of farming. Data for the 1910 period are available in only a few states. New York is an obvious choice since the data for 1910, as well as the subsequent periods is well preserved and accessible. In Minnesota individual farm business records are available for the periods when the Southwest and Southeast Farm Business Associations were organized, 1928 to the present for the Southeast Association and 1939 to the present for the Southwest Association. In addition some detailed cost account records from the 1930's are available. Data from the 1910 period in Southwestern Minnesota are available in published form based on the first cost accounts completed in the state.

Within these states it is necessary to focus on some subdivision, because farming enterprises and conditions may vary widely. The county was chosen as a unit of inquiry because the agricultural census offers data on a county level and because the cost account, survey and farm business summary data can be separated by counties. However, it is not possible to use only data from the specified county in all cases. Not enough observations are available for some counties in some periods, so observations from nearby counties with similar conditions are used. Hence the focus of the study is on a county, although some of the information used pertains to the region or state.

In New York, Livingston and Jefferson Counties were the sites of early farm management surveys and both counties have had farming as a major industry all through the study period. All counties near major cities have been avoided in both New York and Minnesota because the rise in land values and other influences of urbanization would further complicate the comparative analysis over time.

In Minnesota, Lyon County was chosen because of the researcher's familiarity with southwest Minnesota, because of early cost account work done there and because of the contrast it offers to the New York sites. The researcher operated a farm near Rock Rapids, Iowa, from 1972 to 1976, 60 miles south of Lyon County and three miles from the Minnesota border. Agriculturally, conditions in northwest Iowa and southwest Minnesota are almost identical. Data are also available for counties in southeast Minnesota, but the southwest was chosen because its grain, hog and beef farms provide a different type of farming from the predominantly dairy farms in New York. The locations chosen are characterized by a well developed, market oriented agriculture dominated by family units.

Business Organization

This study is limited to sole proprietorships and partnerships in which the partners work on the farm. The study does not include farms organized as corporations or those in which a nonfarm investor is a partner.* Partnerships are included with sole proprietorships because in most recent years a husband and wife might organize their farm as a formal partnership, when in fact its organization differs little from the traditional family farm. Data from partnerships are used only if all partners are under the age limit, hence father-son partnerships are not accepted for study.

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* Organizing a family corporation does not solve the problem of financing a beginning farmer or facilitate entry by itself.

Because of limited time and resources only two tenure types were studied. The owner-operator was selected because of the prominent place that this tenure type has in most policy discussions of family farming. The other tenure type was the tenancy arrangement most common in the area which required the smallest operator equity.

Comparability of Data Sources

The farm management data in the cost accounts, farm surveys and farm business association records differ primarily in the size of the business involved and the level of management. All three sources generally reflect business sizes that are above the census average and a management sophistication beyond that of the average farmer. Of the three sources of data used, the farm surveys come the closest to the average farm business size and management level of all census farms; but even the surveys omitted some census farmers. The surveyors made judgments on who was primarily a farmer and who was primarily a rural resident who happened to produce farm products in addition to another source of income.

In this study the arithmetic mean is used to measure central tendency. If the raw data were available in all cases the median might be a preferable measure, because the median would not be as sensitive to the occasional very large farm operation. But because the census and the published versions of the surveys, cost accounts and business summaries all use the mean, that measure must be used in this study.

Product prices and yields on a state basis were obtained from published USDA sources. In some cases county figures exist for yield estimates, but for consistency only the state figures were used for comparisons across time. Changes in input prices, except for land prices, were handled by adjusting farm expenses with the PPI. Land prices by county came from the Agricultural Census. For the measure of change in wealth at the end of three years, the land prices were adjusted by land price information in the USDA publication, Farm Real Estate Market Developments and its predecessors.

Methods of Finance and Interest Rates

The financial conditions considered in this study are those provided by the institutional lenders: commercial banks, insurance companies, the Farm Credit System and the Farmers Home Administration (FmHA). Lending from private individuals and merchant credit always has and still does play a major role in

agricultural finance. Private lending is especially important in real estate. In 1979, 57 percent of all southwest Minnesota farmland transactions were financed by contracts for deed (Henneberry and Raup, p. 22), which in most cases means that a private seller is financing the sale. Merchant credit is often used for operating capital. Accounts with dealers of fertilizer, feed, seed and farm equipment are one of the oldest sources of short term credit (Sparks, p. 23). This specification of financial arrangements also excludes methods used to gain control of additional capital which are not explicitly in the form of loans. For instance, no leasing arrangements are considered in the analysis. This may tend to increase the cost and decrease the availability of capital in the study particularly in the last two time periods.

This study is limited to institutional lenders because of the wide variety of arrangements under private lending, merchant credit and other sources of capital. The terms of the institutional lenders are used as a proxy for the more complicated actual financial structure which often includes several sources of capital. In all cases this study will use the most generous terms offered by the institutional lenders. This is done for two reasons. First, if a lack of equity is a major problem for beginning farmers, they are likely to try for the lowest downpayment and longest repayment period available. Second, the most liberal terms can be most readily determined. Average terms are not available for all periods.

Interest rates are easily specified. The lowest rate offered by a non-FmHA institutional lender is used on the first run of each budget developed. This assumes that a beginning farmer would do some shopping around and choose the lowest interest rate. The rates published in the Agricultural Finance Databook are used. FmHA terms are not used in the first run since FmHA terms would make some of the results totally predictable. The possibility of a 100 percent loan by FmHA would mean that the equity required to start farming in 1950 and 1978 would regularly be lower than in 1910 and 1930. Once the baseline budgets are established, secondary analysis of FmHA credit and the terms of the Minnesota Farm Security Program follow.

Maximum real estate lending terms were often established in law, or by official company policy, or were so firmly entrenched in custom that specification is possible for all 4 periods. Until the founding of the Federal Land Bank in 1916, real estate loans were generally limited to 5 years with all the principal paid in a lump sum at the end of the term. Most

lenders limited loans to 50 percent of the value of the real estate. After 1916, the most favorable non-FmHA real estate terms have usually been those of the Federal Land Bank, which has had the option of 40 year amortized loans. Initially the FLB required 50 percent equity, but that has been lowered over the years.

Terms of non-real estate loans are more difficult to specify. A wide variety of loan arrangements has been used and there is little published information concerning them. In addition, a farmer may take out and pay-off several short term, non-real estate loans in the course of a year, so that the terms applying to the overall non-real estate debt are closer to the sum of the terms than to the terms of individual loans. Modeling the non-real estate debt realistically would require a knowledge of the timing of sales and purchases. This information is not available.

The general direction of terms for non-real estate debt has been toward lower equity requirements and longer terms on some items. In 1910 most farm lending was based on real estate collateral, even for non-real estate purchases such as equipment or livestock. A Wisconsin study in 1915 (Hibbard and Robotka) observed that tenants found it difficult to obtain credit; non-real estate credit came from personal notes, chattel mortgages and merchant credit. Gradually lenders included non-real estate assets in the credit calculations and today intangible items such as management ability are also included in the lending decision (Hoag, p. 103).

A three year period is used in the study for non-real estate debt repayment. For 1950 LaDue gives 60 percent as the average equity requirement for non-real estate loans (p. 119). It is unlikely that the equity requirement in 1910 would be less than that. A three year term with 60 percent equity requirement is also used for 1930 and 1950. Commercial banks have always been able to grant longer repayment periods by writing demand notes with no specified term, (LaDue, p. 104) but the desire of bankers for liquidity has in practice favored short periods.

Non-real estate loan terms of over one year were first used by the FmHA, with 7 year loans available in 1950. LaDue indicates that during the 1960's the FCS and commercial banks lengthened non-real estate repayment terms. By 1978 a seven year maximum was used by the banks and FCS. To preserve the idea that FmHA credit is less restrictive than other sources, the 1978 repayment period used for other lenders is 5 years. The average equity requirement used is 40 percent. For simplicity, the same terms for non-real estate loans are used for both tenants and owner-operators. Conditions for loans associated with the study are summarized in Table 1.

Table 1. LOAN CONDITIONS FOR INSTITUTIONAL FARM LENDERS*
Assumptions for New York, Minnesota, 1910, 1930, 1950, 1978

Year and loan type	Percentage equity required	Repayment period in years	Interest** rate
Real estate loans of institutional lenders except the Farmers Home Administration (FmHA)			
1910	50	5	6
1930	50	40	5
1950	50	40	4
1978	15	40	8
Non-real estate loans by institutional lenders except the FmHA			
1910	60	3	8
1930	60	3	8
1950	60	3	6
1978	40	5	9
FmHA real estate loans			
1950	0	40	4
1978	0	40	5
FmHA non-real estate loans			
1950	0	7	5
1978	0	7	8

* Includes commercial banks, insurance companies, the Farm Credit System and the Farmers Home Administration.

** Non-FmHA real estate, and 1950 and 1978 non-real estate interest rates from Emanuel Melichar and Marian Sayre, Agricultural Finance Databook, Division of Research and Statistics, Board of Governors of the Federal Reserve System.

Measuring Entry Problems

Measurement of the difficulty of entering agriculture is considered in three main categories: initial equity, repayment ability and the change in wealth in a three year period. The first two categories have been chosen because public concern and legislative action has focused on helping beginning farmers with equity accumulation and repayment problems. Wealth has been included because of its importance in farm decision making. All through American history, farmers have been willing to put up with relatively low current incomes in the hope of building up wealth. This motivation is especially strong in inflationary periods.

Table 2. AVERAGE ANNUAL WAGE RATES FOR FARM WORKERS
New York and Minnesota, 1910-1980

Year	New York	Minnesota
1910	$ 312	$ 330
1911	318	330
1912	324	348
1930	660	534
1931	540	402
1932	414	294
1950	2,090	2,165
1951	2,296	2,418
1952	2,418	2,543
1978	5,824	6,178
1979	5,949	6,885
1980	6,406	7,238

Source: USDA, Farm Labor.

Initial equity is measured in two ways. First, the equity required under maximum credit terms is adjusted to constant 1980 dollars by the PPI. Second the required equity is divided by the average annual wage of farm employees in the state to get an idea of how many man years of work the equity represents. The farm worker wage was chosen for several reasons. In the traditional analogy of the agricultural ladder, the way an

individual entered farming was to save money while working as a hired man. Also, employment as a farm worker is available to every person considering farming as a career. Some individuals may be qualified for higher paying, nonfarm positions, but farm labor represents a kind of common denominator available to all. The wage rates used are given in Table 2.

Repayment ability is measured by the ratio of funds available for debt service to the repayment required under the credit conditions established. This ratio is affected by the definitions used for family expenditures and cash farm income. In the first budgets, family expenditures are represented by the average annual wage of farm workers in the state. This income based proxy for expenditures is used because realistic family expenditure estimates are difficult to obtain. A later calculation of the budget for Minnesota in 1910, 1950 and 1978 includes family expenditures based on records from all the families in the data sets used for those periods. Judging from the Minnesota expenditure records, the farm wage tends to underestimate actual expenditures of established farm families. Families who are in the process of becoming established in farming, however, must reduce expenditures to conserve funds.

The cash income used in calculating the repayment ratio does not deduct for taxes and business growth. This is meant to calculate the repayment ability on a worst case basis. How much debt could this beginning farmer service while just staying in business? Only immediate cash operating expenses are deducted from gross income. Cash income is defined as income before deductions for new equipment, additional breeding livestock or more land. It is not always possible to identify all the capital expenditures in the raw data. Livestock purchases are special problems. It is hard to distinguish animals bought as part of a regular feeding or breeding operation from those bought for expansion. However, in most cases expenditures on land and equipment can be identified. Noncash costs, such as depreciation, are also not deducted from the cash income.

Cash income is figured on a before tax basis because the effect of income taxes on most of these farmers would be small. In 1910 there was no income tax. In 1930 most farmers were not liable for income tax. In 1950, farm incomes were relatively low and the tax liability would have been small. The 1978-80 period is the only one selected when taxes are an important element; however, depreciation and investment credit can wipe out most of the tax liability for a farmer who started by purchasing a full-time farm operation as is postulated in this study.

The change in wealth at the end of the three years is measured by estimating the change in the market value of the land and of livestock and the change in owner equity minus the three years of equipment depreciation and the opportunity cost of using the initial equity capital in another use. The change in the market

value of land is based on state average real estate figures from USDA. The change in the market value of livestock is estimated by multiplying the numbers of major livestock species by the price on January 1 of the first year and by the price on December 30 of the third year. The livestock value at the end of the third year is expressed as a percentage of the initial livestock value. This percentage is used to inflate or deflate the average value of livestock capital obtained from individual farm data.

The change in owner equity is taken to be primarily the principal paid on loans, minus any increase in debt from unpaid interest. In addition, any funds beyond those needed for family living, operating expenses and debt service are included, even though part of the "extra" income would probably go for consumption in a realistic situation. Equipment is depreciated straight line over 10 years in all cases. This figure may over estimate depreciation in earlier periods when technology changed more slowly and equipment was simple and durable (Peck, 1914, p. 25), while underestimating depreciation in the 1978-80 period.

Opportunity cost was figured in the wealth calculations because the change in wealth considered here is the difference between the wealth at the end of three years on the farm and the wealth that the individual would have had if he had not entered agriculture. The opportunity cost is an estimate of how that wealth would have increased if employed in nonfarm occupations. The interest rates for the opportunity cost is figured at the going rate of interest for farm loans, though some researchers would argue that the cost is actually much higher since the owner bears more of the risk than the lenders (Aplin, Casler and Francis, p. 52). Because the beginning farmer is more likely to experience financial distress than the established farmer, this risk is considerable.

The primary importance of this measure of wealth is in the sign of the change. Has wealth increased or decreased? Is the beginning farmer better off for having started farming? The magnitude of the wealth change is a less reliable figure, but for comparison the wealth change will be expressed in constant 1980 dollars adjusted using the PPI.

SOCIAL AND ECONOMIC CONDITIONS

Beginning farmers in the 1980's embark on a career in a specialized profession. Agriculture is no longer the common experience of a large segment of the population. Farming has ceased to be the broad base of the economic heap but it has not lost all its uniqueness. Most types of farming are still characterized by a relatively large number of owner-operated production units in an economy dominated by large corporate entities. It is true that farmers have achieved access to credit that equals that of their city cousins. But much

of the credit flows either through a special set of cooperatives, the Farm Credit System, or comes from the Farmers Home Administration, a special agency of the federal government created in part to meet the needs of beginning farmers. The management tools of urban business are increasingly adopted by farmers. The family farm may be organized into a closely held corporation. Computerized bookkeeping helps farmers make management decisions. But at the same time pride of ownership and family continuity in the business are still important factors in farm business decisions. In contrast to most of the American economy, labor and capital on farms usually come from the same individuals.

Population and Farm Numbers

One of the most obvious changes in agriculture in the last 80 years has been the decline in the farm population and the decrease in the number of farms. In 1920 when the Bureau of the Census first made a separate enumeration of the farm population, about 32 million people or 30 percent of the U. S. population lived on farms. In 1980, about 6.1 million people or 2.7 percent of the total lived on farms.

The total number of farms in Lyon County in Minnesota and Livingston and Jefferson Counties in New York decreased over the same time span, but the pattern of change differed (Table 3). Lyon County followed the nationwide trends, with farm numbers increasing to the mid-1930's and decreasing thereafter. The number of farms in Jefferson and Livingston Counties decreased steadily after 1910.

Table 3. NUMBER OF FARMS IN LYON, LIVINGSTON AND JEFFERSON Counties, Census Data, 1900-1978

Year	Lyon County	Livingston County	Jefferson County
1900	1,632	3,267	6,052
1910	1,682	3,298	5,778
1920	1,816	2,899	5,151
1930	1,849	2,322	4,699
1940	1,976	2,155	4,205
1950	1,945	1,835	3,440
1959	1,762	1,302	2,390
1969	1,361	1,038	1,633
1978	1,191	837	1,319

Source: U. S. Bureau of the Census, Census of Agriculture.

The decrease in the absolute number of farms and farm people is only part of the story. The level of farm activity among those who live on farms has decreased and the number of farms

which provide a major source of income for their operators has decreased even more than the overall number. At one time transportation problems and the lack of job opportunities in rural areas insured that living on a farm was almost synonymous with working on a farm. Today many farm operators and their families earn most of their income from off-farm jobs. Some 44 percent of the 3.3 million farm residents in the workforce were not employed in agriculture and many of those in farming are part-time (Penn, 1981, p. 37). Few farms with less than $40,000 in annual sales can provide an adequate standard of living, if farming is the only source of income. Yet in 1978 some 78 percent of the census farms had under $40,000 in sales. Farms in all sales classes have substantial net family incomes, but people on farms with less than $40,000 in sales earn most of their income off the farm. In 1910 beginning farmers entered an industry that provided the livelihood of a large portion of the population. Today, beginning farmers, who wish to become full-time farmers, are seeking to join a small, elite group and are competing for a relatively small number of viable production units.

Land in Farms

The number of farms in the United States has been diminished by consolidation of farms into larger units and by taking land out of agriculture. Nationwide, the land in farms reached a peak of about 1.2 billion acres in the early 1950's. In 1910 the Census of Agriculture recorded about 0.8 billion acres in farms. In 1980 land in farms had dropped back to about one billion acres. The change however, has not been regionally uniform. Land was being abandoned in the Northeast throughout this period, while land was being brought into production in the West. In Jefferson County land was being taken out of agriculture throughout the first 80 years of this century (Table 4). In Livingston County land in farms began to decline after 1910. In Lyon County the land in farms peaked in 1935.

Much of this regional variation is due to settlement patterns, market conditions and the impact of technology. In 1900 most of Lyon County, Minnesota, land had been in farms for less than a generation, while in Livingston and Jefferson Counties settlement dates back to the Revolutionary War period. In 1900 in Lyon County there had not been enough time or economic incentive to bring into production some of the more difficult land to develop. In the longer settled New York counties land suitable for oxen and horse power had been brought into production during the 19th century. When the more fertile prairie soils of the west were brought into production with good transportation available only the best land in the Northeast could compete. Marginal land was abandoned. In Lyon County, land which has been brought into production since 1900, primarily by draining sloughs and shallow prairie lakes, is not marginal but is probably more productive than the more easily farmed land.

Table 4. LAND IN FARMS
(Lyon, Livingston and Jefferson Counties, 1900-1978)

Year	Lyon County	Livingston County	Jefferson County
		acres	
1900	398,000	374,000	745,000
1910	402,000	390,000	733,000
1920	409,000	353,000	696,000
1930	439,000	333,000	673,000
1935	453,000	337,000	691,000
1940	441,000	330,000	642,000
1950	437,000	327,000	586,000
1959	435,000	288,000	516,000
1960	423,000	249,000	408,000
1978	418,000	247,000	388,000

Source: U. S. Bureau of the Census, Census of Agriculture.

Farm Size

Nationwide the size of farms has increased steadily since the turn of the century, but this generalization masks regional variations. In Lyon County farms decreased in size until the mid-1930's as population grew and more intensive farming practices were adopted (Table 5). The availability of horse-drawn mechanization, a topography on which this technology could be used, and the ways in which farms were put together under the Homestead Act and the railroad land grants, meant that farms originally settled in Lyon County were relatively large.

Table 5. AVERAGE ACRES PER FARM
(United States, Lyon, Livingston and Jefferson Counties, 1900-1978)

Year	United States	Lyon County	Livingston County	Jefferson County
			acres	
1900	147	244	144	123
1910	139	239	118	127
1920	149	225	123	135
1930	157	221	143	143
1940	175	223	153	153
1950	216	225	178	170
1959	303	247	221	216
1969	390	311	240	250
1978	444	344	295	294

Source: U. S. Bureau of the Census, Census of Agriculture.

Finding a Farm

With a reduction in the number of operating farms the absolute number of opportunities for beginning farmers must also decrease. The actual competition however, for entry level farms depends on the number of young people who seek to enter farming and the demand for real estate to expand existing farms. LaDue found that because of declining family size the number of potential farmers has dropped faster than the number of potential farming opportunities, assuming that the relative numbers of farm and nonfarm youth who seek to enter agriculture remains constant. Boehlje and Thomas cited an unpublished Iowa study that found the percentage of farm "positions available" had increased in the late 1970's and early 1980's because of the age distribution of established farmers. A high proportion of established farmers are nearing retirement, thereby possibly freeing farms for new entrants. LaDue found that the chances of a farm youth finding a farming opportunity in the 1940's was about 2 to 5 and that this probability has dropped to about 1 in 3 during the 1970's.

Regionally the chances of finding a farm vary substantially. Lu, Horne and Tweeten found that between 1965 and 1974 beginning farmers in the Northeast and middle Atlantic states generally had the best chance of finding an adequate farm unit, while some of the poorest chances were in the Southeast and northern Great Plains (1970, p. 7). They found that the chances of finding a farm were slightly better in New York than in Minnesota. It is reasonable that the competition for farms would be greater in Minnesota because the greater expected profitability and pressure from established farmers for more cropland. In addition, competition for farms was reduced in New York by the greater availability of off-farm alternatives.

Technology and Capital

There was a time when the main resources needed by a young farmer were a strong back and the willingness to work. Those two assets may still be useful in agriculture, but they are not sufficient for success. Farming today requires specialized knowledge, access to capital, and business acumen.

Table 6. CHANGES IN THE USE OF FARM INPUTS
United States, Selected Years, 1967=100

Year	All inputs	Labor	Real estate	Mechanical power and equipment	Agricultural chemicals
			(1967=100)		
1910	86	321	98	20	5
1920	98	341	102	31	7
1930	101	326	101	39	10
1940	100	293	103	42	13
1950	104	217	105	84	29
1960	101	145	100	97	49
1970	100	89	101	100	115
1978	103	67	98	120	145

Source: USDA, SCS, Changes in Farm Production and Efficiency, 1978.

Relatively less labor is used compared to land and capital than formerly. In 1910 labor and real estate were the primary inputs (Table 6). By 1978 the quantity of labor directly used in agriculture had declined dramatically while real estate for agricultural production remained relatively constant. The same pattern of change in input use holds for Lyon, Livingston and Jefferson Counties. Census figures show that equipment investment and expenditures on fertilizers increased sharply (Tables 7 and 8). Equipment and herbicides reduced the work needed to handle an acre of cropland, while the use of fertilizers and other inputs raised yields.

Table 7. VALUE OF EQUIPMENT ON FARMS IN 1980 DOLLARS
Lyon, Livingston and Jefferson Counties, Selected Years

Year	Lyon County	Livingston County	Jefferson County
1910	$ 5,790,000	$11,900,000	$16,600,000
1930	16,200,000	18,700,000	31,700,000
1945	25,300,000	23,900,000	30,600,000
1969	51,900,000	39,600,000	49,500,000
1978	89,800,000	54,700,000	67,600,000

Source: U. S. Bureau of the Census, Census of Agriculture.

Table 8. AGGREGATE EXPENDITURES FOR FERTILIZER, 1980 DOLLARS
Lyon, Livingston and Jefferson Counties, Selected Years

Year	Lyon County	Livingston County	Jefferson County
1910	$ 369	$ 868,000	$ 371,000
1930	41,400	1,060,000	470,000
1954	1,110,000	2,700,000	859,000
1978	5,890,000	4,870,000	2,420,000

Source: U. S. Bureau of the Census, Census of Agriculture.

With changes in technology came specialization. Farms which in 1910 had 6 or 8 different crops and 4 or 5 species of livestock, commonly concentrated in 1978 on one or two crops and/or one type of livestock. Changes in transportation made it possible to produce the national supply of some commodities in limited areas that are especially adapted to that production. The expense of specialized equipment and its productivity encouraged farmers to use that equipment fully on one or two products. Specialization of farm enterprises occurred in Lyon, Livingston and Jefferson Counties. The "general farm," where no single enterprise produces over 40 percent of the income (Table 9) has virtually disappeared in all three counties. Lyon County farmers have concentrated on cash grain and livestock feeding. In Jefferson County, where dairy has been the dominant farm enterprise throughout this century, dairy operations have been concentrated on fewer farms.

Table 9. FARMS BY CENSUS TYPE CATEGORIES
(Lyon, Livingston and Jefferson Counties, 1930, 1950 and 1978)

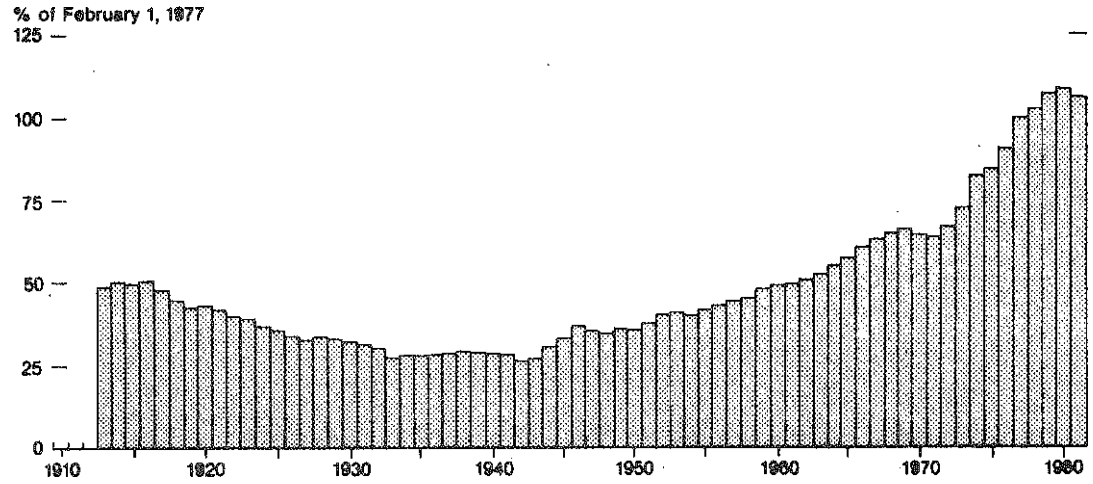
Location and year	General	Cash grain	Fruit and vegetable	Poultry	Dairy	Livestock other than dairy or poultry
	percent of total number					
Lyon County						
1930	29	31	0	1	6	29
1950	22	34	0	1	1	38
1978	4	46	0	1	3	44
Livingston County						
1930	29	1	4	3	34	2
1950	8	11	1	3	45	4
1978	5	18	4	2	28	27
Jefferson County						
1930	6	0	1	2	74	1
1950	1	1	1	2	73	2
1978	3	2	1	1	58	16

Source: U. S. Bureau of the Census, Census of Agriculture.

Capital

Increased farm size, technological innovation and specialization brought with them increased capital requirements. In 1940 the average assets in nominal dollars per American farm were $8,350 (Economic Indicators of the Farm Sector, 1980, p. 125). In 1980 the figure stood at $450,721. Even allowing for inflation, the increase is large. The growth in capital requirements is even greater when the figures for all farmers are adjusted to reflect only the capital of full-time farms (LaDue, 1979, p. 116). Although the capital required for beginning farmers may not have increased as much as the average capital per farm because of the choice of enterprise or because some start with a part-time farm, it is clear that the requirement for beginning farmers is also substantial.

Figure 1. INDEX OF REAL VALUE PER ACRE OF U. S. FARMLAND



Source: USDA, 1981 Handbook of Agricultural Charts.

A major component of the increase in capital per farm has been the steady increase in land values since 1940 (Figure 1). Land values in Lyon, Livingston and Jefferson Counties have tended to follow nationwide trends, though variations have been larger in Lyon County than in the New York counties (Table 10). A dominant force in the farmland market in the last two decades has been farmers seeking additional land (Raup, 1978). Large scale nonfarm businesses are unlikely to sink large amounts of capital into an illiquid asset like farmland. The short term gains are too low, compared to the opportunity cost of capital for such firms. In the competition for farmland ownership, the primary competitor of a beginning farmer is his more established farmer neighbor, who bids up the price of land with motivations that include both the technological need to take advantage of the economies of size and the desire for stability that goes with land ownership.

Table 10. AVERAGE FARMLAND PRICES PER ACRE
Lyon, Livingston and Jefferson Counties, 1900-1978

Year	Lyon County	Livingston County	Jefferson County
1900	$ 25	$ 46	$ 35
1910	49	60	43
1920	158	82	55
1930	80	64	49
1940	54	44	33
1950	118	69	54
1959	184	140	67
1969	249	257	121
1978	921	603	415

Source: U. S. Bureau of the Census, Census of Agriculture.

Credit

To finance increased investment farmers have made debt capital a regular part of their management plans. Debt is not a new phenomenon among farmers. In 1910 the Census of Agriculture reported that nationwide about 34 percent of full owners had mortgages on their farms and the average mortgage was for about 27 percent of the value of the farm real estate. In Minnesota in 1910, some 46 percent of full owner farmers were mortgaged and in New York about 44 percent. In 1930 the Census of Agriculture indicated that 42 percent of full owner farms were mortgaged and the average mortgage was for about 40 percent of the farm real estate value. Nor has the ratio of debt to assets departed much from historical patterns. In 1940 when the USDA first calculated the "Balance Sheet of the Farm Sector," the debt to asset ratio for all of agriculture was 21.4 percent. In 1982 that ratio stood at 16.6 percent (Economic Indicators of the Farm Sector, 1981, p. 121).

The big change has been in farm attitudes toward credit. Debt is no longer seen as a sign of distress. Credit has become a tool that farmers use to increase their earning power. Debt free ownership is still an ideal to achieve but for most this ideal has a relatively low priority. Maximizing income and wealth have become more important than getting out of debt.

The structure of farm debt has changed dramatically. In the past, real estate financing dominated the farm credit picture, reflecting the primary importance of real estate in extensive farming methods and the lenders' practice of emphasizing real estate collateral. Today non-real estate debt accounts for almost half of all farm debt while in 1940 real estate debt was about 66 percent of the total.

Price Level

Changes in prices as they have affected farmers are presented in Table 11. Variability in prices occurred in each time period. The striking change in price level occurred between 1970 and 1980.

Table 11. INDEX NUMBERS OF FARM PRODUCT PRICES & PRODUCTION COSTS United States, 1910-12, 1930-32, 1950-52 and 1979-80

Year	Farm production cost index	All farm product index
	1910-14=100	
1910	95	104
1911	97	94
1912	102	99
1930	156	125
1931	134	87
1932	116	65
1950	264	258
1951	292	302
1952	299	288
1978	808	526
1979	929	602
1980	1,039	615

Source: USDA, Crop Reporting Board, Agricultural Prices, June 1981.

Price instability is an important issue. A limited capacity to bear risk is a major characteristic of highly leveraged beginning farmers (Boehlje and Thomas, 1979, p. 22). Beginning farmers do not have the cushion of accumulated capital or experience to deal with economic instability. The periods of greatest price instability are intentionally not included in this study. From 1920 to 1921 the farm price index dropped from 211 to 124 and from 1973 to 1974 the farm price index rose from 313 to 417. The 1910 to 1912 period is one of roughly stable farm and nonfarm prices (Table 11). The period from 1930 to 1932 is one of declining general price level, with farm prices declining further and faster than the prices of farm purchases. The jump in prices in 1951 is a reflection of the Korean War commodity boom. From 1978 to 1980, both costs and farm prices rose rapidly, with costs rising faster and further than prices of farm products.

Income

During the twentieth century farming has moved from low income status to a par with other occupations. Gross income per farm increased dramatically as farm size grew; farm numbers dropped, and new technology allowed increased production. At the same time farm expenses grew from just over half of gross income in 1910-14 to almost 87 percent of the total in 1980. Capital gains, always important in American farming, became half of total farm income in the 1970's as farm assets were one of the few forms of wealth that appreciated faster than the inflation rate. Improved transportation and other factors have increased the access of farmers to nonfarm jobs. Since 1967 off-farm income has exceeded net farm income in total family income except for the commodity boom year of 1973. From 1934 to the present, per capita disposable income of average farm families from all sources has risen from less than a third of the nonfarm disposable income per family to approximate equality (Table 12).

Table 12. FARM INCOME MEASURES
United States, 1910-14, 1930-34, 1950-52, and 1978-80

Year	Gross income per farm	Net income per farm	Net income as a percent of gross income per farm	Farm family income as percent of nonfarm per capita disposable income all sources
			percent	
1910-14	$ 1,210	$ 620	51.2	N.A.
1930-34	1,236	454	36.7	32.7*
1950	5,861	2,417	41.2	57.7
1951	7,053	2,936	41.6	64.0
1952	7,263	2,878	39.6	59.1
1978	52,358	10,861	20.7	96.1
1979	62,516	13,456	21.5	102.6
1980	61,992	8,180	13.2	81.5

* 1934 only.

Source: USDA, Economic Indicators of the Farm Sector, 1980.

Tenure

In the United States since the 1930's the trend in land tenure has been away from arrangements in which operators have low equity requirements. A higher percentage of farmers own some real estate and fewer are tenants.

In Lyon, Livingston and Jefferson Counties the trends in tenancy and ownership have been similar to national experience. In Lyon County the number of tenants and the land farmed by tenants peaked in the mid-1930's. As is common in areas of highly productive soils, the Lyon County tenancy rate has been consistently above the national average. In Livingston and Jefferson Counties the tenancy rate has been declining steadily throughout this century as relatively low returns to farming in the Northeast has discouraged nonfarmers from owning land. Livingston County has one of the highest tenancy rates in New York, reflecting its better soils and the presence of the Wadsworth family, which has owned and rented out land in the Genesee Valley since the early 19th century. Nationwide and in the three counties considered by this study, there is no evidence of a general trend toward farms owned by nonfarm investors (Table 13).

Table 13. PERCENTAGE OF LAND IN FARMS BY TENURE TYPE*
Lyon, Livingston and Jefferson Counties, 1910, 1930, 1950, 1978

Year and tenure	Lyons County	Livingston County	Jefferson County
		percent	
Tenants			
1910	37	35	43
1930	48	30	33
1950	47	12	15
1978	17	7	2
Part owners			
1930	18	20	8
1950	23	33	18
1978	51	59	48
Full and part owners			
1910	62	56	55
Full owners			
1930	33	46	57
1950	30	54	66
1978	32	34	50

* Only figures for tenants, part owners and full owners are given. The figures for each period and county do not sum to 100 percent because of the omission of farms operated by hired managers. This is particularly noticeable in Livingston County where up to 7 or 8 percent of farms were operated by hired managers during some periods.

INDIVIDUAL FARM RECORD DATA

The individual farm records used in this study were drawn from farm surveys completed in New York in the 1910 and 1930 periods, from cost accounts in Minnesota for the 1910 and 1930 periods and from farm business summaries for both New York and Minnesota in the 1950 and 1978 periods. In each location and time period the unadjusted business size and enterprise choice for the records of young farmers are compared to those characteristics in the average of all farmers in the data set and to the means for the Census of Agriculture.

Jefferson County

1910 - In many ways the data set used for Jefferson County in 1910 is the strongest for the purposes of this study. The data were collected in the spring of 1911 under the direction of G. F. Warren and K. C. Livermore of the Cornell's Department of Farm Management. Warren used the information from this survey in "Some Important Factors for Success in General Farming and in Dairy Farming," in his textbook, Farm Management and in other writings. The original survey forms from the early Cornell research are available at Mann Library, Cornell University.

The data set includes 670 farms in Rodman, Adams, Pamelia, Watertown and Orleans towns. The area is a slice of Jefferson County that runs from Lake Ontario on the north almost to the southern border of the county and is centered on the county seat of Watertown. The survey covers the crop year of 1910, which was considered to extend from the spring of 1910 to the spring of 1911. Inventory values were taken for the beginning and the end of the crop year.

This survey, like the other early labor income surveys, was conducted almost like a census. However, Warren did omit some farms. The primary reasons for exclusion was that a major part of the farm operator's income came from sources other than farming, hence those who worked regularly off the farm, livestock dealers and those who took in boarders were omitted (Warren, 1914, p. 664). Farms with unusual or highly specialized enterprises were also excluded. Truck farms, producers of certified milk and farmers selling large amounts of timber were left out. In addition, Warren omitted some farms on the edges of urban areas where land values were deemed excessive.

The relatively large number of farmers in the survey, the high proportion of young farmers among the survey population and clearly defined tenancy arrangements simplified the choice of observations that are likely to share the characteristics of beginning farmers. The data set includes 123 farmers under the age of 35. Twenty-eight of the young farmers are owner-operators. The 73 young livestock share tenants generally fell into one of two groups on the basis of the terms of their rental agreement. Forty-one livestock share tenants owned no milk cows,

while most of the rest shared the ownership of the dairy herd 50-50 with the landlord. Since dairy was the major enterprise on all the farms, the arrangement requiring the least equity for the tenant was the livestock share agreement in which the landlord owned the milking herd.

1930 - The survey data for 1933 included 85 farms in the town of Orleans in northern Jefferson County. Thirteen of the farmers were under the age of 35. Three of the young farmers were owner-operators. The most common rental arrangement among the young tenants was a livestock share agreement in which the landlord owned all the cows. Five young tenants had such arrangements. No information was provided on how the observations were chosen or who was excluded. These records were used in this study because they were the most comparable materials available for the 1930-32 period.

The young tenants in the survey had smaller farm businesses than the young owners (Table 14). Acreage was smaller and total farm capital was smaller. The young tenants controlled an average of $8,470 in farm capital. The unexpected difference may be related to the depression in some way or it may be an aberation due to the small number of observations. Young owners had an average of 1.3 workers, while the farm of young tenants had an average of 1.7 workers. The primary enterprise was dairy and the average number of cows milked by young owners, young tenants and all the survey farmers was about 19. The mean number of dairy cows per Jefferson County farm in the 1930 census was 12.

1950 - The data for Jefferson County in 1950 were collected by C. A. Bratton of the Cornell Department of Agricultral Economics and summarized in the publication, "Jefferson County Young Farmers Look at Their 1949 Farm Businesses."

The average acreages of these young farmers was 197 acres, some 24 acres more than the owner-operators in the 1934 survey (Table 14) and very close to the census average of all farmers with sales of over $25,000 annually. The nominal value of farm capital in the 1949 study was slightly more than twice as much as the value in the 1934 survey, though the inflation of the 1940's makes direct comparison difficult. These young farmers were close to the nationwide capital average. An average of 1.5 man equivalents of labor were used in these farms annually.

Table 14. ACREAGE, CAPITAL AND GROSS INCOME PER FARM
Jefferson County, New York, Selected Years

Year and tenure[1]	Acreage	Farm capital	Gross income[2]
1911 farm survey			
Young owners	127	$ 7,200	$ 1,400
Young tenants	155	1,020	894
All farms	143	9,000	1,890
1910 census, all farms	127	6,940	NA
1934 farm survey			
Young owners	173	10,100	1,970
Young tenants	156	884	838
All farms	197	11,800	2,140
1930 census, all farms	143	9,990	NA
1949 farm business summary			
Young farmers	197	22,100	7,820
1950 census, all farms	170	NA	4,970
Farms over $2,500 sales	194	NA	6,060
1978 farm business summary			
Young owners	368	211,000	89,900
All summary farms	313	232,000	102,000
1978 census			
All farms	294	NA	45,700
Farms over $2,500 sales	323	NA	54,100

[1] For 1911, 1934 and 1949, the capital and gross income estimates for young farmers are the operator's share, while the all farms estimates are on a whole farm basis. The young owner estimates and the all farms averages are directly comparable, since for the full owner the operator's share is the whole farms. For 1978 all the averages are operator's share. The census data in all periods is on a whole farm basis.

[2] Gross income in the surveys and summaries includes off-farm income. The census gross income estimate is the value of all sale of farm products.

Sources: U. S. Bureau of the Census, Census of Agriculture; G. F. Warren, "Some Important Factors for Success in General and in Dairy Farming", Cornell University Agricultural Experiment Station Bulletin 349, 1914; L. C. Cunningham, "Jefferson County Farm Management Survey, 1933-34," Cornell University, Department of Agricultural Economics and Farm Management, A. E. 75, 1934; C. A. Bratton, "Jefferson County Young Farmers Look at Their 1949 Farm Business," Cornell University, Department of Agricultural Economics, A. E. 730, 1950; C. A. Bratton, "1978 Northern New York Farm Business Summary," Cornell University, Department of Agricultural Economics, A. E. Ext. 79-11, 1979.

1978 - The data used for Jefferson County in 1978 came from the records compiled for the Cornell dairy farm business summary for northern New York. These data were the basis for the publication, "1978 Northern New York Farm Business Summary" by Bratton. Of the 23 Jefferson County farms in the records, 7 were operated by farmers under the age of 35. Since 7 is a small number of observations and neighboring St. Lawrence County has farming conditions similar to Jefferson County, the 9 young farmers from St. Lawrence County were included with those from Jefferson County in 1978. The entire St. Lawrence County data set included 45 farms. All of the young farmers were full owners or part owners. Of the 134 farms in the 1978 northern New York records, only 2 farms rented all their land. Only three of the Jefferson and St. Lawrence County young farmers were full owners, hence information from both full and part owners was used.

The young farmers tended to have larger farm acreages than the average of all farmers in the northern New York summary, but smaller amounts of farm capital and smaller gross incomes.

In general, the data obtained for owner-operators in Jefferson County are good, in spite of the small number of observations and associated problems in the 1930 data set. The data for 1910 are particularly strong since they have an adequate number of observations and were chosen in a way that allows a wide variety of farm enterprises and capitalization choices to be expressed. The 1950 and 1978 information may be biased toward larger, more successful operators because the observations were chosen through contact with extension. In addition, the 1978 data are limited to dairy farmers in a time when dairy farming may not be the only option for young farmers. Information on tenancy in Jefferson County tenants is limited. The 1910 survey included adequate information, but the number of observations in the 1934 survey was small. The 1950 and 1978 data sets contain no information on tenants.

Livingston County

The Livingston County data sets have many of the same strengths and weaknesses of those from Jefferson County. For the period 1910, 1950 and 1978, the Livingston County data were collected by the same people using the same procedure as those for the Jefferson County data. The exception is 1930. A 1928 labor income survey was used which is comparable in terms of representatives and number of observations to the labor income surveys taken in 1910.

1910 - The farm records for the 1910 period were collected in the spring of 1909 under the leadership of G. F. Warren and K. C. Livermore. Warren used these data in writing "Some Important Factors for Success in General and Dairy Farming," Farm Management and other publications. The data set includes 578 observations from the northern Livingston County towns of

Geneseo, Avon, Lima, York and Caledonia. These towns include some of the best farmland in New York State. The collection methods and the accuracy of the survey are similar to those described for the 1911 Jefferson County survey.

Of the 578 operations surveyed 82 were run by farmers under the age of 35. Some 19 of the young farmers were owner-operators. The young tenants used a wide variety of rental arrangements. Since all the farms of young farmers included some livestock enterprises, the livestock share agreements required the least equity of beginning farmers. However, the division of livestock ownership between landlord and tenant in the survey data is not easily categorized. Therefore, the data used for the tenants includes all the observations in which the landlord owned a substantial share of the livestock. Twenty-nine such livestock share tenants were identified.

The farm businesses of the young owner-operators tended to be smaller than the average of all survey farms and only slightly larger than the census average of all farms in the county (Table 15). The farms of young tenants were larger in terms of area and capital than for those of the young owners or the average of all survey farms.

1930 - The farm records data for Livingston County for the 1930 period comes from a farm survey conducted in the spring of 1929 directed by Stanley Warren. The methodology and coverage of the survey were very similar to the 1909 effort. Farmers in the same five towns were surveyed. The data were the basis for Warren's Ph.D. thesis "An Economic Study of Agriculture in Northern Livingston County, New York, 1908, 1918, 1928" and the mimeographs "Factors for Success on Dairy and General Farms in Northern Livingston County" and "How Northern Livingston County Farmers Have Met Changing Conditions in Agriculture."

Out of a total of 514 observations, 64 farms were operated by farmers under the age of 35. Twelve of the young farmers were owner-operators. Of the 36 tenants, 15 had livestock share rental agreements. As was true for the data from the 1909 survey, livestock share agreements in 1928 were not easily categorized. The data used on tenancy is based on the average of the 15 farms with livestock share agreements.

The farm businesses of young farmers tended to have smaller acreages and capital than the average of all survey farms. The young tenants controlled more land than the young owners, but the difference between the farm capital used by the tenants at $15,300 and the capital of young owners at $15,100 is negligible. The whole farm gross income of the young tenants was $3,700, about the same as the gross income of young owners at $3,640.

Table 15. ACREAGE, CAPITAL AND GROSS INCOME PER FARM
Livingston County Farm Records, Selected Years

Year and tenure[1]	Acreage	Farm capital	Gross income[2]
1909 farm survey			
Young owners	120	$ 11,400	$ 1,800
Young tenants	162	2,150	1,340
All farms	148	12,100	2,130
1910 census, all farms	118	8,700	NA
1929 farm survey			
Young owners	135	15,100	3,640
Young tenants	150	2,300	1,850
All farms	166	18,200	4,000
1930 census, all farms	143	12,100	NA
1950 farm survey			
Young farmers	177	17,400	9,210
1950 census			
All farmers	178	NA	7,200
Sales over $2,500	215	NA	8,880
1978 farm summary			
Young owners	256	195,000	82,900
Young tenants	324	106,300	94,900
All central plains summary farms	514	400,000	185,000
All western central plains summary farms	504	381,000	148,000
1978 census			
All farms	295	NA	50,500
Over $2,500 sales	356	NA	64,400

[1] For 1909, 1929 and 1950, the operator's share of capital and gross income is given for young farmers, while the all farm averages are on a whole farm basis. The young owner estimates and the all farms estimates are directly comparable, since for the operator's share for a full owner is the whole farm. The summary averages for 1978 are all operator's share. The census data in all periods is on a whole farm basis.

[2] Gross income in the surveys and summaries includes off farm income. The census gross income estimate is the value of all sale of farm products.

Sources: U. S. Bureau of the Census, Census of Agriculture; G. F. Warren,"Some Important Factors for Success in General and in Dairy Farming", Cornell Univ. Agr. Exp. Sta. Bull. 349, 1914; Stanley Warren, "An Economic Study of Agriculture in Northern Livingston County, New York, 1908-1918-1928," Ph.D. thesis, Cornell Univ., 1931; C. A. Bratton, "Livingston County Young Farmers Balance Their 1950 Farm Accounts," Cornell Univ., Dept. of Agr. Econ., A. E. 776, 1951; Wayne Knoblauch, "1978 Western New York Plain Farm Business Summary," Cornell Univ., Dept. of Agr. Econ., A.E. Ext. 79-16.

1950 - Young farmer records for Livingston County in 1950 were gathered by Bratton in a project similar to the study conducted in 1949 in Jefferson County. Farm records of 8 Livingston County young farmers in 1950 were reported in the publication "Livingston County Young Farmers Look at Their 1950 Farm Accounts" (Bratton). As in the 1949 Jefferson County study, no tenure or age information was directly included, but the farm inventories show that 7 of the 8 owned real estate and Bratton focused the study on those who could by some definition be called young farmers.

The average farm acreage of the young farmers was about equal to the average census acreage for the county. However, the gross income of the young farmers was greater than the census average of farm marketings per farm for the county and the 1950 U.S. average of $5,860 per farm. The average farm capital of the young operators amounted to $17,400 which was less than the U.S. average of $23,400 per farm in 1950. However, this average for the young farmers may underestimate the total capital that they controlled, because some may have been part owners. The operations of these young farmers used an average of 1.4 man equivalents of labor annually.

1978 - The data for Livingston County in 1978 were drawn from the Cornell dairy farm business summary records for the central and western central plains regions of New York. These data are the basis for the publications "1978 Western Central Plain Farm Business Summary" by Wayne Knoblauch and "1978 Central Plain Regions Farm Business Summary" by Robert Milligan and Larry Davis. A group of 60 farms in Erie, Genesee, Livingston, Monroe, Niagara, Orleans, Wyoming, Yates, Seneca, Wayne and Ontario Counties are included in these summaries. Since the Livingston County records include only two farm operations run by young farmers, seven records from young farmers in Wyoming, Genesee, Yates and Seneca Counties were analyzed as well. Of the 60 summary farms in the central and western central plains regions, 11 were operated by young farmers in partnership with older farmers. Of the 9 farms which were operated by young farmers, four were part owners and five worked with only rented land. Both the part owners and the tenants rented cropland on a cash basis. Since no records were available for full owners, the part owner records were taken as an approximation of the enterprise choices and cash flows of full owners.

The farm businesses of young farmers were much smaller than those of others in the summaries. The average acreage of the young farmers was close to the census average for Livingston County but above the general average for all 11 counties at 204 acres. The gross agricultural sales of young farmers was well above the census averages for their counties. The average marketings per farm in the 11 counties was $45,600. If the value of rented estate were included, the farm capital used by these young farmers would be close to the U.S. average in 1978 of $269,000 per farm.

In general, the quality of the data for Livingston County in 1910 and 1930 are strong for a study of this type. The farm surveys have detailed information, they are likely to be representative and they include substantial numbers of young farmers. The farm business summary data are less appropriate. They have fewer observations that fit into traditional tenure patterns and the farmers are self-selected, rather than being selected for a specific purpose by the researcher. The focus of the 1978 records on dairy farmers does not fully reflect the range of opportunities available to young farmers in Livingston County.

Lyon County

The data for Lyon County were drawn from cost account studies done by University of Minnesota faculty members and the records of the Southwest Minnesota Farm Management Association. For the purposes of this study the cost account data are far from ideal. The original data for the Lyon County cost accounts from 1904-1909 have been lost. The Southwest Association records are similar in methodology and purpose to the farm business summary records compiled at Cornell.

1910 - The 1904-1909 cost account data were collected under the direction of Andrew Boss and W. M. Hays in the vicinity of Lynd, a small town southwest of Marshall in central Lyon County. No geographic area is defined for the study, but the distance from the research station at Lynd could not have been great since the methodology required daily farm visits by the researcher. From 1904 to 1909 the study focused on obtaining detailed information from eight farms that were considered typical. This study relies primarily on published data in "The Cost of Producing Minnesota Farm Products, 1908-1912" by F. W. Peck; "The Cost of Minnesota Dairy Products, 1904-1909" by Thomas P. Cooper and "Labor Requirements of Crop Production" by Cooper, Peck and Boss. A reconstruction of farm capital and cash flow conditions from these incomplete data was developed on a comparable basis to records from New York for the same period. The cost account publications give no information on the tenure of the cooperators and little on the average size of their farm businesses. The acreage of cost account farms tended to be much larger than the census acreages for the county (Table 16).

1930 - Farm records for 1930 were drawn from a cost account study done under the leadership of Minnesota Agricultural Economics faculty members. The 24 cost account records were collected in 1930 in Rock and Nobles Counties, south of the Lyon County location of the 1904-1909 study. The cost account analysis was published by G. A. Sallee and G. A. Pond, "Farm Accounting Route in Rock and Nobles Counties, Minnesota, 1920." The original cost account records are available at the University of Minnesota Archives in Minneapolis.

Table16. ACREAGE, CAPITAL AND GROSS INCOME PER FARM
Lyon County Farm Record Data, Selected Years

Year and tenure[1]	Acreage	Farm capital	Gross income[2]
1904-1909 cost account			
All farms	325	$ NA	$ NA
1910 census, all farms	239	13,700	NA
1930 cost account			
All farms	360	44,800	8,090
1930 census, all farms	221	21,200	NA
1950 farm business summary			
Young owners	266	45,200	16,000
Young tenants	263	16,300	17,100
All farms	257	48,300	22,100
1950 census			
All farms	225	NA	9,070
Farms over $2,500 sales	231	NA	9,200
1978 farm business summary			
Young owners	388	326,000	148,000
Young tenants	340	142,000	129,000
All farms	516	396,000	192,000
1978 census			
All farms	344	NA	69,000
Farms over $2,500 sales	360	NA	73,000

[1] All capital and gross income figures are on a whole farm basis except for the estimates for the young tenants in 1950 and 1978.

[2] Gross income in the farm business summaries includes off farm income. The census gross income estimate is the value of all farm marketings.

Sources: U. S. Bureau of the Census, Census of Agriculture; T. P. Cooper, F. W. Peck and Andrew Boss, "Labor Requirements of Crop Production," University of Minnesota Agricultural Experiment Station Bulletin 157, 1916; G. A. Sallee and G. A. Pond, "Farm Accounting Route in Rock and Nobles County, Minnesota, 1930," University of Minnesota Division of Agricultural Economics, Mimeographed Report No. 50, 1931; "Annual Report of the Southwestern Minnesota Farm Management Service, 1950", University of Minnesota, Division of Agricultural Economics, Mimeographed Report No. 190, 1951; "Annual Report of the Southwestern Minnesota Farm Management Association, 1978," University of Minnesota, Department of Agricultural and Applied Economics, Economic Report ER 79-1, 1979.

The participants in the 1930 Rock and Nobles County study were not likely to have been representative of the average farms in their areas. The participating farmers were chosen with the help of the Rock and Noble County extension agents. Keeping daily labor records by 15 minute intervals for a farm family and hired help in addition to the financial reports was no small task and it is likely that the cooperators had some interest in agricultural research and farm management that would set them apart from their neighbors.

The land ownership and rental information in the cost account records indicates that most of the cooperators were either full owners, part owners who paid cash rent, or cash renters. According to the 1930 census about 60 percent of all farmers in Rock and Nobles County were tenants and about two-thirds of the rental agreements were share leases of some type. To use the agricultural ladder analogy, the cost account cooperators were on the top rungs. Because no age information was available and because the cost accounts included no information on the limited equity tenure arrangements that existed in the region, the records were not sorted by age or tenure.

The cost account farm business was larger than average. The census average farm acreage in Nobles County in 1930 was 208 acres and in Rock County 220 acres, while the cost account farms averaged 360 acres. The census shows Nobles and Rock County farms to have more capital invested than Lyon County farms, but the cost account averages are well above the census averages in all three counties.

1950 - In 1950 the farm records for this study came from members of the Southwest Minnesota Farm Business Association. These records were kept under the guidance of the county extension services and the University of Minnesota Division of Agricultural Economics. Cooperating farmers paid a fee for the record keeping and received help in making income tax decisions. The 1950 annual report of the Association was prepared by T. R. Nodland, G. A. Pond and J. A. Tyvand of the University of Minnesota.

Of the 153 farm records kept in 1950, 41 were from farmers under the age of 35. Seven of the young farmers were owner-operators. Among the tenants who completed records, there were 5 livestock share agreements, 6 crop share agreements, 9 cash and crop share arrangements and 4 cash renters. There was only one part owner among the young farmers. Since all of the tenants kept livestock, the arrangement requiring the lowest equity was the one in which the landlord provided some of the livestock capital as well as the real estate. Hence, the 5 livestock share records were used for this study.

In general the members of the Southwest Association had larger farm acreages and greater sales than did the average census farms in the area. The average acreage of all farms in Minnesota economic area 8, which includes all the Southwest Association Counties except Redwood, was 198, while the average acreage of all three groups of summary farms was around 260. The capital of young owners tended to be slightly less than the average of all Southwest Association members. The whole farm capital of young tenants was $58,500, about $10,000 more than the average capital of all the association farms. The farm capital of all three groups exceeded the average capital in the U.S. in 1950 of $23,436 per farm. The average number of workers on all three groups of farms from the Southwest Association records was about 1.5.

1978 - The data for Lyon County in 1978 were also drawn from records kept by members of the Southwest Minnesota Farm Management Association. Some farmers from neighboring counties not officially in the association, including several Lyon County farmers, submitted records in 1978. As in 1950 the record keeping was carried on under the guidance of county extension and the University of Minnesota Department of Agricultural and Applied Economics. The 1978 report was prepared by Delane Welsh, Erlin Weness and Perry Fales.

Among the 185 records summarized by the association in 1978, were 18 farmers under the age of 35. Only one young farmer was a full owner and 13 were part owners. Two of the part owners owned only a farmstead and rented all of their farmland. Four of the 11 that owned some farmland rented for cash, while the other seven had crop share arrangements. Because they owned some of their land and assumed all the production risk on the rented land it is likely that the characteristics of cash renting, part owners are a good approximation of the characteristics of full owners. Hence, the owner information is drawn from the one owner and the four cash renting part owners. The tenant information was drawn from the six farmers who share rented all their farmland, including the two who owned farmsteads.

The average acreage controlled by young farmers in the association was substantially less than the acreage of all association members and was closer to the average acreage of census farms. The mean acreage of all census farms in the 9 association counties was 304 acres. The farm capital of the young farmers also tended to be much less than the average capital of all association members. If the value of rented land is similar to that of the owned land, the whole farm capital of both young owners and young tenants is greater than the U.S. average capital of $269,000 per farm.

In general the 1978 and 1950 data sets drawn from the records of the Southwest Minnesota Farm Business Association are easily adapted for use in this study and are comparable to

the farm business summary data from New York. Of course it would be better for this study if the 1978 and 1950 data sets in both New York and Minnesota contained more observations and the observations were more representative of average farm experience in their areas, but reasonable estimates of the capital and cash flows of young farmers can be established from the Minnesota and New York data.

Summary Observations

The young owner-operators in all the data types had farm businesses closest in size to the census average. In all four time periods the Minnesota location showed larger farm businesses in terms of acreage, gross income and capital. The labor used on the farm of young farmers varied little between places or periods. The techniques used to measure farm labor varies from study to study, but in all cases the workforce of the operations run by young farmers ranged from one to slightly more than 2 workers.

The enterprise choices revealed in the data set indicated that young farmers chose the same enterprises as neighboring farmers, but with some differences in proportions and the level of investment. For instance, in the Livingston County data for 1910 and 1930 tenants took advantage of the greater capital available to them and had larger than average dairy enterprises, while the owner-operators reported growing more intensive crops, such as vegetables and beans, and a greater share of income from low investment livestock, such as poultry and hogs. In 1978 in Lyon County the young owner-operators reported farm enterprises much like those of the average of all farms in the Southwest Association. In contrast, the young tenants relied more heavily on income from hogs than did others.

The number of young farmer observations was most adequate in the farm labor income surveys conducted in Livingston County in 1909 and 1929 and Jefferson County in 1911 (Table 17). The observations from the Southwest Minnesota cost accounts included the entire data sets because no age information was available to guide sorting. The low number of observations in the 1978 period was due to small numbers in the original data sets and the difficulty of finding young farmers with tenure arrangements that fit into the traditional categories of full owner and tenant. The New York data set for the central and western central plains includes more farms with young farmers in partnerships, than farms that are completely operated by young farmers.

Table 17. NUMBER OF FARM RECORDS FOR YOUNG FARMERS BY LOCATION and Tenure, Lyon, Livingston and Jefferson Counties, 1910,1930, 1950,1978

Location	1910	1930	1950	1978
Lyon County, Minnesota				
Owner	8*	24**	7	5
Tenant	None	None	5	6
Livingston County, New York				
Owner	19	12	8	4
Tenant	29	15	None	5
Jefferson County, New York				
Owner	28	3	6	16
Tenant	41	5	None	None

* Tenure and age information unavailable. Data recorded on a whole farm basis.

**Includes both owners and tenants with data recorded on a whole farm basis. Ages unknown.

CHANGES OVER TIME IN STARTING FARMING

The comparative analysis of data for beginning farmers from farm surveys, cost accounts and farm business summary records required two steps. First, the data were adjusted for comparability among data sources. Second, the requirements for starting farming were measured by considering the (1) change in the equity required, (2) the change in the number of man years of labor that such equity represents, (3) the ratio of loan repayment required to the funds available for debt service under most liberal credit conditions, and (4) the change in wealth over a 3-year study period established in each of the four time periods.

Adjusting the Data for Comparisons

The first adjustment for comparability of the different sources of data was made on the basis of the ratio of the average acreage of farms for that tenure type in the Census of Agriculture to the acreage of the beginning farmers for which records were available (Tables 18 and 19).

Table 18. FARM ACREAGE OF BEGINNING FARMER/CENSUS OWNERS 1910, 1930, 1950 and 1978

Location	1910	1930	1950	1978
Lyon County, Minnesota				
Beginning owner	325*	360*	266	388
Census owner	326	197	179	251
Livingston County, New York				
Beginning owner	120	135	177	256
Census owner	100	117	143	181
Jefferson County, New York				
Beginning owner	127	173	197	368
Census owner	109	123	153	234

* Based on records from established farmers. Ages unknown.

Sources: U. S. Bureau of the Census, Census of Agriculture and original farm records.

Table 19. FARM ACREAGE OF BEGINNING FARMER TENANTS AND COMPARABLE Census of Tenants, 1910, 1930, 1950 and 1978

Location	1910 census category "tenants"	1930 census category "tenants"	1950 census category "livestock share tenants"	1978 census category "tenants"
Lyon County, Minnesota				
Beginning tenants	NA	NA	263	340
Census tenants	244	223	248	285
Livingston County, New York				
Beginning tenants	162	150	NA	324
Census tenants	134	164	228	254
Jefferson County, New York				
Beginning tenants	155	156	NA	NA
Census tenants	158	178	220	197

Source: U. S. Bureau of the Census, Census of Agriculture and original farm records.

Capital - It is important in this study to establish some consistent estimates of the capital used by beginning farmers in their overall business operations and an indication of the proportion of that total which they provided from their own equity. Thus an estimate of total capital in the business and the beginning farmer's net worth or equity are important values to establish in making comparisons over time. A number of different analysts have made similar estimates for beginning farmers at different time periods (LaDue; Boehlje and Thomas, Stanton and Nodland; Swanson, Pond and Cavert; Brake and Worth). The capital requirements developed in this study from the available farm record data generally fall in between the estimates made by individuals in other time periods, some lower, some higher but not substantially different when adjustments for price level and size are considered.

When expressed in constant dollars the farm capital[1/] for "representative" young owners in this analysis quadrupled between 1910 and 1978. The estimates for young tenants showed even larger increases (Table 20). For both owners and tenants the biggest part of that increase came between 1950 and 1978. Between 1910 and 1950 the increases in the real value of farm capital on farms operated by young owners were relatively small. Farm capital in Livingston County remained nearly constant. In Jefferson County farm capital used by owners increased by about 30 percent and in Lyon County by 10 percent.

The real value of farm capital controlled or provided by tenants in Lyon County increased by a factor of 5 between 1910 and 1950, in Jefferson County the tenant capital tripled and in Livingston County the tenant capital was up by about 40 percent. In part this increase is magnified because the base in 1910 was so small. For 1910, 1930 and 1950 livestock share tenancy arrangements were used in all three counties. A large part of the growth in tenant capital results from mechanization. In most cases, landlords did not share in equipment costs, so the tenant became responsible for the increased capital needed for tractors and other machinery. The biggest component of the owner-operator's capital was real estate. This real estate, however, was worth less per acre in real terms in 1950 than it was in 1912.

1/ Farm capital here refers to capital investment for property to which the farm operator has title. In most cases there is substantial debt for part of these assets. Equity provided by beginning farmers is shown in Table 22.

Table 20. FARM CAPITAL USED BY YOUNG FARMERS AS OWNERS AND TENANTS Budget Estimates, United States, in 1980 Dollars[1]

Location	1910	1930	1950	1978
		Adjusted to 1980 dollars		
Lyon County, Minnesota				
Owner	$102,000	$129,000	$111,000	$399,000
Tenant	10,000	23,000	50,000	153,000
Livingston County, New York				
Owner	61,000	62,000	57,000	240,000
Tenant	15,000	13,000	24,000	105,000
Jefferson County, New York				
Owner	46,000	56,000	61,000	206,000
Tenant	8,000	9,000	25,000	69,000
United States per farm	48,000	55,000	77,000	378,000

[1] Adjusted by the Producer Price Index.

The comparative real income generated by these representative young farmers have at least tripled between 1950 and 1978 and quadrupled since 1910 (Table 21). Like most other producers, these representative young farmers use an increasing share of their cash flow to purchase inputs; but despite higher costs the real income available for debt service and family living has also increased. Because of the larger amounts of capital used, debt service in the late 1970's consumes a greater share of net family income than formerly.

The adjusted cash flow estimates for 1950 are all a little less than LaDue's estimates for a U.S. average full-time farm's cash flow for 1950-1954 (LaDue, 1979, p. 121). LaDue estimated the nominal value of the cash flow available for family living and debt service at $3,610, while the estimates in the young farmers' budgets were: Lyon County owner, $3,030; Lyon County tenant, $2,400; Livingston County owner, $2,184; Livingston County tenant, $1,250; Jefferson County owner, $2,180 and Jefferson County tenant, $2,030. In 1978 the estimated cash flows in this study for Lyon County owners and tenants exceeds LaDue's U.S. estimate of $24,900 per farm. The cash flows for 1978 in the young farmer budgets are: Lyon County owner, $35,100; Lyon County tenant, $47,600; Livingston County owner, $18,700; Livingston County tenant, $20,300; Jefferson County owner, $16,900 and Jefferson County tenant, $13,300. In 1979 Boehlje and Thomas

estimated that the beginning corn belt hog operation with a capital of about $500,000 would have an income above variable costs of about $32,500. In general the estimates for the budgets developed in this study roughly approximate estimates made independently by other researchers.

Table 21. GROSS INCOME[1] AND CASH FLOW AVAILABLE FOR FAMILY Living and Debt Service Young Farm Budgets and Census Averages

Location	1910	1930	1950	1978
		Adjusted to 1980 dollars		
Lyon County, Minnesota				
Owner gross income	$10,000	$20,000	$25,300	$112,400
Owner cash flow[1]	4,700	8,200	7,100	41,200
Tenant gross income	5,300	13,000	37,700	126,000
Tenant cash flow	2,800	5,200	5,600	55,900
Livingston County, New York				
Owner gross income	9,000	12,100	17,400	68,600
Owner cash flow	5,100	2,500	5,100	21,900
Tenant gross income	6,400	8,000	12,500	87,300
Tenant cash flow	2,800	2,100	2,900	23,800
Jefferson County, New York				
Owner gross income	6,800	10,000	13,800	67,000
Owner cash flow	4,300	6,000	5,100	19,800
Tenant gross income	5,000	6,900	10,900	56,500
Tenant cash flow	3,200	4,700	4,700	15,500
U. S. Census Averages				
Gross income	6,640	5,700	13,700	61,400
Cash flow	4,200	3,100	7,000	25,900

[1] Cash flow available for family living and debt service is gross income minus cash expenses, except interest.

Beginning Farming Equity

The beginning equity of young owners and tenants increased less than the overall capital required for farm operations (Table 22). The tenants' equity requirements however, have increased more than those for owner-operators. The tenants' need for equity has been increased as greater amounts of non-real estate capital are used and as the landlord provides less livestock and equipment. The relative difficulty of acquiring capital for both owners and tenants has been affected somewhat by the liberalization of both real estate and non-real estate credit terms.

Table 22. BEGINNING FARM EQUITY[1] IN YOUNG FARMER BUDGETS
Selected Locations, 1910, 1930, 1950 and 1978

Location	1910	1930	1950	1978
		Adjusted to 1980 dollars[2]		
Lyon County, Minnesota				
Owner	$53,000	$68,000	$60,000	$85,000
Tenant	6,000	14,000	30,000	61,000
Livingston County, New York				
Owner	32,000	33,000	31,000	61,000
Tenant	9,000	8,000	14,000	43,000
Jefferson County, New York				
Owner	24,000	30,000	34,000	51,000
Tenant	5,000	6,000	15,000	27,000

[1] The equity required under most liberal credit conditions.

[2] Adjusted by the all commodity Producer Price Index.

While the consistent use of the most liberal credit terms available in constructing the young farmer budgets produces equity requirements that are somewhat smaller than the estimates made in other young farmer studies, the difference is not great. For the period from 1950-1954, LaDue estimated an average downpayment of $19,681 for a beginning farmer while the representative estimates in this study were: Lyon County, $18,200; Livingston County, $9,530; and Jefferson County, $10,237. LaDue's estimate was based on an average full-time farm that was larger than the young farmer businesses budgeted here. LaDue estimated a non-real estate downpayment of $6,600 for 1950-1954. The equity estimates for the beginning livestock share tenant developed here were: Lyon County, $9,180; Livingston County, $4,380; and Jefferson County, $4,630. Brake and Wirth found that beginning farmers in the period of 1949-1954 had an initial net worth of $11,195. Stanton and Nodland analyzed the records of veterans receiving on-the-farm training in southeast Minnesota from 1947-1951 and found that beginning owner-operators had an equity of about $9,390 and beginning livestock and crop share farmers started with an average equity of $3,295.

The patterns in 1978 were similar. LaDue's downpayment estimate for the United States (1974-1977) of $127,000 for the whole farm was larger than the equity requirement developed in these beginning farmer budgets. However, LaDue's $37,750 downpayment estimate for the non-real estate was smaller than that for the Lyon County tenants' equity requirement of $48,700. It is still larger than the equity estimates for Livingston and Jefferson Counties.

For the period before 1940, Brake and Wirth found that beginning farmers had an initial net worth of $4,840. This equity estimate is much smaller than the Minnesota figure for 1910 and 1930, but roughly equal to the equity estimate for Jefferson and Livingston County for the same time frame.

The number of man years of farm labor required to earn the beginning farm equity of full owners has decreased between 1910 and 1978 in the young farmer budgets calculated for Lyon, Livingston and Jefferson Counties (Table 23). The number of man years required for earning the tenant's equity increased in all three locations between 1910 and 1978. As in LaDue's research, relatively small increases in the length of time required to earn the equity can be observed between 1950 and 1978 for both owners and tenants. If most generous FmHA terms were used, the number of man years of labor would be lower in 1978 and 1950 for both owner and tenant than in previous periods because with the FmHA 100 percent loan available to beginning farmers, no equity would be required.

Table 23. YEARS OF FARM WAGES[1] REQUIRED TO EARN BEGINNING Equity Under Maximum Credit Terms Selected Locations, 1910, 1930, 1950 and 1978

Location	1910	1930	1950	1978
Lyon County, Minnesota				
Owner	21.5	21.1	8.4	10.8
Tenant	2.5	4.3	4.2	7.7
Livingston County, New York				
Owner	14.0	8.3	4.6	8.1
Tenant	4.0	2.0	2.1	5.7
Jefferson County, New York				
Owner	10.6	7.5	4.9	6.9
Tenant	2.0	1.4	2.2	3.7

[1] The average before tax earnings of a farm worker. For 1950 and 1978, the wage is the composite wage rate per hour for the state multiplied by the hours in a work week and by 52. For 1910 and 1930, the wage is the average monthly rate by region multiplied by 12.

Saving enough money from farm wages to start farming was difficult in any of the four periods. If a relatively high savings rate at 25 percent of net income is assumed, the lowest, owner-operator accumulation time would be 18 years in Livingston County in 1950. For tenants in some of the earlier periods, saving the equity to start farming seems more feasible. For

Lyon County in 1910, Livingston County in 1930 and 1950, and Jefferson County in 1910, 1930 and 1950 the accumulation time at a 25 percent savings rate would be between 8 and 10 years. If a prospective farmer started work at age 18, he could have enough saved to start farming as a livestock share tenant by the time he was 28. However, by 1978 tenant equity requirements had grown to the point where a prospective farmer would have to spend a third or a half of his working life to save enough from farm wages to meet minimum equity requirements. This supports the general observation that the agricultural ladder may require some outside source of capital to work in the 1970's. However, the increased access of rural people to nonfarm jobs also means that a prospective farmer may acquire a higher paying nonfarm job or that he may start farming part-time while holding a nonfarm job.

Repayment Ratio

Under the most generous credit terms from institutional lenders the repayment of farm loans is difficult for owner-operators in all periods and places (Table 24). Only in Lyon County in 1978 does the ratio reach unity. However, the ratio of unity does not indicate a healthy farm business, but merely one that could make the payments for that year. Funds available for debt service are calculated on a worst case basis and no provision is made for capital replacement or improvement. Only a ratio substantially below one would indicate a business that could maintain its capital stock and expand. In 1910-1912 and 1978-1980, the repayment ratio was less for tenants than for owners (Table 25). In Jefferson County from 1910-1912, Lyon County 1978-1979 and Livingston County in 1979-1980 the tenant's ratio dips below unity, indicating a relatively strong business position. However, the methodology of this study does not warrant too much emphasis on these ratios. Inaccuracies due to the difference between the data sources and other factors are likely. The difference between a ratio of one and a ratio of 10 may be real, but the difference between a ratio of 2 and a ratio of 3 may well be within one standard error in a statistical sense.

In general, during the periods 1930-1932 and 1950-1952, the young farmer budgets show repayment as being almost impossible either as owner or tenant. Either there is no money available beyond family living cost or the amount of money is very small compared to the debt at the most liberal credit terms. The exceptions are for Lyon County in 1930 and Jefferson County in 1930 and 1931.

Table 24. OWNER'S RATIO OF DEBT PAYMENT TO FUNDS AVAILABLE for Debt Service* (Young Owner Budgets Under Varying Credit Conditions, 1910, 1930, 1950, 1978)

Year and credit terms	Lyon County	Livingston County	Jefferson County
Most liberal terms of institutional farm lenders excluding the Farmers Home Administration			
1910	3.5	1.9	1.9
1911	3.3	1.8	1.6
1912	6.0	2.1	1.6
1930	1.1	no funds	1.1
1931	10.0	no funds	1.8
1932	no funds	no funds	no funds
1950	2.9	15.4	19.6
1951	2.4	5.8	6.3
1952	6.1	no funds	no funds
1978	1.0	1.7	1.6
1979	1.4	1.4	1.4
1980	2.8	1.8	1.9
Most liberal FmHA terms			
1950	4.1	21.0	25.8
1951	3.4	7.5	7.6
1952	6.3	no funds	no funds
1978	1.1	1.8	1.8
1979	1.3	1.5	1.5
1980	2.5	1.8	1.9

* The funds available for debt service are defined as cash income minus family living expenditures. Family living costs are approximated by the annual wage of farm workers in the state.

Table 25. TENANT'S RATIO OF DEBT PAYMENT TO FUNDS AVAILABLE for Debt Service* (Young Tenant Budgets Under Varying Credit Terms)

Year and credit terms	Lyon County	Livingston County	Jefferson County
Most liberal terms of institutional farm lenders excluding the Farmers Home Administration			
1910	1.2	1.7	0.6
1911	1.0	1.2	0.4
1912	1.2	1.5	0.4
1930	1.1	no funds	0.7
1931	no funds	no funds	1.1
1932	no funds	no funds	no funds
1950	10.1	no funds	no funds
1951	2.9	no funds	10.0
1952	22.5	no funds	no funds
1978	0.5	1.0	1.3
1979	0.8	0.7	1.0
1980	1.4	0.8	1.2
Most liberal Farmers Home Administration credit terms			
1950	12.4	no funds	no funds
1951	3.2	no funds	10.8
1952	15.4	no funds	no funds
1978	0.6	1.3	1.6
1979	1.0	0.9	1.3
1980	1.8	1.1	1.7

* The funds available for debt service are defined as cash income minus family living expenditures. Family living costs are approximated by the annual average wage of farm workers in the state.

Ironically the period around 1930 may have been one of the few periods in history when beginning farmers had an advantage over established farmers. Because of deflation, particularly in land values in the 1920's and 1930's, beginning farmers in 1930 had lower capital requirements than those who started in

1919 and 1920. Farm prices in 1930 were not good, but they were much better for a farm business capitalized at 1930 rates than for a farm capitalized at 1920 rates. Livingston County does not reflect this repayment capacity in 1930, because of the low prices for beans and vegetables.

In most cases repayment under the most liberal FmHA terms is shown as more difficult in the young farmer budgets than repayment under the most liberal institutional credit terms. The larger amount of borrowed capital means that corresponding higher annual payments are necessary. Only for owner-operators in Lyon County for 1952, 1979 and 1980 and Livingston and Jefferson Counties for 1980, does the interest rate and long repayment period advantage of the FmHA loan outweigh the increased payments due to the larger debt. Because the difference between commercial and FmHA rates was greater on real estate loans than on non-real estate loans, this advantage shows up only for owner-operators. Because the repayment ratio dips below unity only for the Lyon County tenant budget in 1979 and Livingston County tenant budget in 1979, the young farmer budgets call into question the ability of such a young farmer to effectively use the 100 percent FmHA loans. In addition, 100 percent loans may not be legally possible in all the representative farm cases because of legislated limits on the amount of a loan which can be made to any one farmer.

The Minnesota Farm Security Program guarantees loans and subsidizes interest rates on farm real estate loans. The program was legislated in 1976 and first loans were made in the beginning of 1978. The program will guarantee payment of 90 percent of the loan principal and pays 4 percentage points of the interest. If the interest rate is 8 percent, the buyer pays only 4 percent and the state pays the rest. This interest subsidy must be paid back eventually, but without added interest; hence the actual subsidy is the interest on the interest and the present value of the use of that money. The subsidy must be repayed in one payment ten years after the first subsidy payment, though that period may be lengthened to 20 years by the Minnesota Family Farm Advisory Council, which reviews all program participation requests. Budgeting shows improved repayment positions for young owners in the program.

LaDue calls the ratio of payment required to funds available a "minimum efficiency" ratio and interprets it as a measure of how much more efficient a beginning farmer must be than the average farmer to service his debt (LaDue, 1979, p. 108). The ratio could also be interpreted as a measure of how much help from family or outside sources the young farmer needed in order to be able to make his payments. This help could come from extra savings to reduce payment demands, low interest family loans, inheritances, government programs or other sources. Under either interpretation the ratios for the budgets for Lyon, Livingston and Jefferson Counties young farmers show that repayment was within reach in the 1978 and 1910 periods, while in the 1950 and 1930 periods repayment would have required substantial added efficiency or some kind of help.

Change in Wealth

The change in wealth of the young farmers during the three year study period tended to be positive for 1910-1912 and 1978-1980 and negative for the other two periods (Table 26). The exception is the 1950-1952 period for southwest Minnesota, which showed an increase in wealth because of the rapid appreciation in land values. Change in land values however were not always the primary factor in the changes in wealth. In 1978-1980 in Livingston County the tenants showed a greater increase in net worth than did owners, because the appreciation of New York land values was relatively small, the increase in the value of dairy cows was larger and tenants were in a better position to service their debt than were owner-operators. The use of FmHA's most liberal credit terms tends to produce changes in wealth slightly more positive than with most generous institutional terms because under the 100% loan available from the FmHA no opportunity cost of capital is deducted. The use of the Minnesota Farm Security Program leads to a larger increase in wealth because the interest rate subsidy allows more progress to be made on loan repayments. As in other parts of the study, however, too much emphasis on the changes in wealth is not warranted. Too many errors in judgment and methodological inadequacies may affect the outcomes. Whether or not the value is positive or negative is however likely to be important.

Table 26. THREE YEAR CHANGE IN WEALTH UNDER MAXIMUM CREDIT TERMS
Young Farmer Budgets, 1910, 1930, 1950, 1978

Location	1910-12	1930-32	1950-52	1978-80
	Adjusted to 1980 dollars			
Lyon County, Minnesota				
Owner	$+48,000	$-73,000	$+ 7,000	$+76,000
Tenant	+ 2,000	-15,000	- 9,000	+45,000
Livingston County, New York				
Owner	+ 4,000	-31,000	- 2,000	+26,000
Tenant	+ 2,000	- 8,000	- 7,000	+58,000
Jefferson County, New York				
Owner	+ 5,000	-21,000	- 5,000	+26,000
Tenant	+ 6,000	- 2,000	- 9,000	+26,000

During the periods 1910-1912 and 1978-1980 the changes in wealth budgeted were positive indicating that the young farmers are financially better off 3 years after having started farming. During those periods the appreciation of assets and the repayment of principal has exceeded depreciation and the opportunity cost of capital. For 1930-1932 and 1950-1952 the changes in wealth are negative indicating that the representative beginning farmer may have been financially better off as a farm employee with his equity invested elsewhere and starting farming at some other time.

SUMMARY AND CONCLUSIONS

The basic hypothesis of this study was that the financial problems of starting farming during the period 1978-1980 were not more difficult than they were in earlier periods during this century. This hypothesis is drawn from the repeated assertion that it is much more difficult to start farming now than in the past. This assertion is repeatedly used in public policy discussions of beginning farming and is embodied in the legislation that has been passed in several states between 1976 and 1981. This study focused on the difficulty in starting farming in financial terms because this has been the primary area of policy concern and legislative action. In addition, financial problems are easier to measure than management difficulties or problems in finding a farm faced by a beginning farmer. The primary measure of difficulty used in the study is the number of years of farm wages that would be required to earn the equity needed to start farming with the most liberal institutional credit terms and the ratio of the debt repayment required to the funds available for debt service. Seventy years of farm management research in the U.S. have provided a large body of data on farm financial conditions that allow some basis for making comparisons on the problems of starting farming over that span of years.

The data for this study were drawn from southwest Minnesota cost account records, farm labor income surveys from Livingston and Jefferson Counties, New York, and farm business summaries from both Minnesota and New York. The method used to improve comparability of the data was to multiply the capital and cash flow figures by a factor equal to the ratio of census average farm acreage to the average acreage controlled by the young farmers included in the data sets. This methodology recognized that the data collection procedures used with all three data sources resulted in samples that represent farm size and management levels of varying degrees above average. The ratio is an estimate of the degree to which the observations in the data are above average. Representative farm budgets for beginning farmers were then constructed on the basis of the adjusted average capital and cash flow figures from the young farmers in the cost accounts, surveys and farm business summaries.

The results of the analysis indicate little to contradict the hypothesis that for owner-operators, starting farming was no more difficult in 1978 than it was in 1950, 1930 or 1910. The real value of equity required for a beginning farm had increased, but the number of years in terms of farm wages that were required to earn that equity had decreased for the owner. The repayment ratios indicate that debt service was difficult in all four periods. The repayment ratios in 1978-1980 were about the same as in 1910-1912, while the repayment ratios for the 1930 and 1950 periods indicated that debt service was more difficult than in the 1910 or 1978 periods. The change in wealth position for the young owner budgets was positive for 1910-1912 and 1978-1980, and generally negative for 1930-1932 and 1950-1952. The farmer starting in 1978 seem to have had at least as good a financial position as in any other period considered.

For the young tenant there is more evidence of increased equity accumulation problems. Both the real value of the operator's equity and the number of years of farm wages required to earn that equity have increased. The repayment position and the change in wealth of the tenant, however, follow the same patterns as those of the owner-operator. Repayment position tended to be better in 1910-1912 and 1978-1980, than in 1950-1952 or 1930-1932. The change in wealth was positive for the 1910 and 1978 periods, while it was negative for the 1930 and 1950 periods. For the young tenant the accumulation of equity may have been more difficult in 1978 than it was in 1950, 1930 or 1910, but repayment capacity and the resultant increase in net worth indicate that once he was able to start, the tenant in 1978 was in at least as good a position as young farmers in the 1950, 1930 and 1910 periods. For both the owner and tenant in 1978 and 1950 the use of the most liberal FmHA terms resulted in initial repayment ratios that indicated repayment was more difficult. The 100 percent FmHA loans tended to require debt repayment that was beyond the capacity of representative beginning farm businesses, even with below market interest rates.

Obviously, the results of this study are sensitive to the locations and time periods chosen. Repayment capacity depended on crop yields and market conditions. A major factor in the change in wealth was whether or not the farmer purchased land during a period of real estate appreciation. However, the times and places in this study can be seen as a sample of conditions faced by beginning farmers and in this sample there is little evidence to contradict the null hypothesis, that starting farming in the period around 1980 was not more difficult for owner-operators than in earlier periods in the century.

The conclusion must be tempered by recognizing that the methodology used cannot insure perfect comparability among the data sets and that the method used to compare land tenure arrangement through time may not give a good view of the opportunities available to beginning farmers in 1978. Tenancy in

1978 was a different institution than in 1910 and institutional changes are hard to compare through time. In 1978 a beginning farmer had greater access to credit and more off-farm opportunities to supplement family income.

The implications of this study for public policy on beginning farming can be considered in two ways. One may infer that since there is little evidence that starting farming was financially more difficult in 1978-1980 than it was earlier in the century, that there is no greater need for additional public concern than at any other time. Alternatively, one may conclude that, since starting farming is difficult in all the periods considered, young farmers in 1910-1912, 1930-1932 and 1950-1952 needed assistance as much as they did in 1978-1980 and as family farmers become fewer, aid to each one becomes more important.

If the first line of thought is pursued, areas for further research include study of the effect of increasing complexity of farm management on entry and availability of entry level farm units. Is the assumption of this study that the good manager will be able to find a farm realistic? Can prospective farmers be more effectively educated or are they simply not taking advantage of the management training that is available? Are prospective farmers adequately informed about the management challenges that they will face when entering agriculture?

If the second alternative is pursued, this study suggests that the focus of public programs might be shifted from subsidized credit to helping young farmers obtain non-debt capital. The capacity of young farmers to service debt beyond that allowed currently is questionable. In addition, the emphasis on land ownership of the state programs for beginning farmers may be misplaced. In this study the increased difficulty of tenants in accumulating non-real estate capital from their own work and effort, indicates that major difficulties occur before many young farmers reach the land ownership stage.

Further research might include investigation policy alternatives for providing non-debt capital for young farmers. The New Zealand experience with subsidies to encourage savings by prospective farmers provides suggestions for new hypotheses. The New Zealand Farm Ownership Act of 1974 provides a grant equal to 50 percent of funds saved in a special young farmers accounts. With the growth of capital requirements, can savings still be a significant source of capital? Could a prospective farmer accumulate the needed equity in a reasonable length of time? What kind of accounts should public policy permit? In a time when concern is being expressed about inadequate capital accumulation in the United States, a program to encourage savings might be politically more attractive than programs that subsidize more liberal credit terms.

Another area for possible research is the creation of rental opportunities for young farmers. Support for public ownership of land to lease to young farmers, in programs like the Saskatchewan Land Bank Commission, seems small, but plans to channel private investment funds into farmland might be considered. Instead of discouraging nonfarm investment in farm real estate, such investments could be directed to creating beginning farmer opportunities. In North Dakota a portion of the rental income from land leased to qualified young farmers is exempted from state income taxes. Would a similar federal income tax exemption be an effective way to create farming opportunities? Should states, with laws limiting land ownership by nonfarm corporations and foreign investors, create exemptions if the land is leased to young farmers? Any program to encourage nonfarm investment in farm real estate would need ways of safeguarding the rights of the tenants and of existing farmers. Would a time limit on ownership be appropriate?

Nonfarm investors, such as pension funds, would probably want to sell their holdings periodically to cash in on capital gains. Could public policy encourage the sale of the land to the young farmer who had previously rented it? In short, would it be possible to create a private enterprise version of the Saskatchewan Land Bank which would bring together nonfarmers who want to invest in farmland and prospective farmers who need farm rental opportunities?

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