

Finance Implications of Intergenerational Transfer of US Farms

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Introduction

Background

The intergenerational transfer of capital assets can be accomplished through a variety of transfer methods. Many of those methods require the use of borrowed funds to finance the transfer. The source of borrowed funds can either be family members or a financial institution. In both instances, the repayment of principal and interest will include repayment risk. Jones (2005) warns inadequate financing, or an inappropriate mix of financing, can be a major contributor to the failure of the intergenerational transfer of capital assets.

According to the 2007 census, the average age of farm operators is 57.1 years and the number of operators 75 and older has increased by 20 percent since 2002 to 243,472. States with the highest percentage of older principal operators are New Mexico, Arizona, Texas, Mississippi, and Oklahoma (USDA 2009).

A major portion of the total dollar amount associated with the capital assets that will be transferred will be farm real estate, which is the largest asset on most farm balance sheets. Also, it is typically the principal source of collateral for farm loans, which enable farm operators to purchase additional farmland and equipment or to finance current operating expenses (Nickerson et al. 2012). The estimated market value of land and buildings, on average, per farm is \$791,138 compared to machinery and equipment which is \$88,357. For many farms, the capital assets are valued much higher. For example, the average value of capital assets for farms primarily growing corn is \$2,012,928 (USDA 2009).

During the next decade, it is estimated that up to 19 percent of capital assets in agriculture will undergo an intergenerational transfer. This is based on information collected in the 2007 census, which indicates 34.0 percent of land is owned by farm operators 65 and over. In addition, 19.3 percent and 18.1 percent of the estimated value of land and buildings and machinery and equipment is owned by operators age 65 and over, respectively (USDA 2009).

Consequently, the amount of funds needed to finance the upcoming transfer of capital assets will be substantial. In order to avoid the potential repayment problems noted by Jones, the likely alternatives used to finance the transfer need to be evaluated and an assessment made of the potential repayment risk associated with each.

Agricultural Economic Environment

The upcoming intergenerational transfer period could occur during a time characterized by lower net farm incomes and higher interest rates than during the previous seven years. Since 2006, U.S. agriculture exports and strong demand for biofuels has increased annual real returns to farm operators to more than \$45,000 per farm, the highest level since 1973. However, returns are not projected to remain at those levels during the next decade. The USDA projects net farm returns above variable costs for corn production to decline from the previous two-year average of \$580 per acre to below \$350 per acre by 2014 (Westcott and Trostle 2013). Declines for other crops are also projected. As a result, USDA projects net farm income in the U.S. to fall 20 to 25 percent below 2013 levels and to remain there over the next decade. Furthermore, the Federal Reserve suggests interest rates could begin to rise during the same period. Some Federal Open Market Committee (FOMC) members have indicated fed funds rates should rise from the current target of 0 to 0.25 percent to 3 percent by 2015 (Henderson and Kauffman 2013).

In addition, net farm incomes have become more volatile since the fall of 2006 than during the previous period. The standard deviation of net farm income from 2000 to 2006 is 15.8 billion dollars compared to 20.3 billion dollars for 2007 to 2013F (USDA 2013). That volatility is due not only to higher, but more volatile, commodity prices but also to production expenses that have increased every year since 2006, with the exception of 2009. Gross farm income levels and total production expenses for the agriculture sector for the 2007-2013F period are presented in Table 1. There is substantial variation across the years for gross farm income, with one year, 2009, experiencing a 9.9 percent decline from the previous year.

On the other side of the net income calculation, total operating expenses continued to increase, with three years during the 2007 to 2013 period experiencing an increase in excess of 5 percent. The result is net farm income variability that can be even more pronounced at the individual farm level than for the sector as a whole.

Table 1. U. S. Agriculture Sector, Gross Farm Income and Total Production Expenses, 2007-2013F

<u>Year</u>	<u>Gross Farm Income</u>	<u>Percent Change</u>	<u>Total Production Expenses</u>	<u>Percent Change</u>
	Billions of Dollars			
2007	319.6	-----	253.7	-----
2008	347.9	8.8	269.5	6.2
2009	313.5	(9.9)	255.9	(5.0)
2010	329.4	5.1	257.0	0.4
2011	377.9	14.7	273.9	6.6
2012F	388.1	2.7	290.0	5.9
2013F	412.5	6.3	302.6	4.3

Source: USDA (2013) Farm income/balance sheet items in constant (2005=100) dollars, 1929 – 2013F

Since principal payments for term debt are paid from net farm income, sensitivity analysis is needed on loan repayment capacity for a comprehensive loan analysis. Increased repayment risk arises because repayment schedules typically span multiple years when

borrowing funds to purchase capital assets (i.e., machinery, equipment, real estate, etc.).

When evaluating repayment sensitivity for funds borrowed from a financial institution, the analysis should include possible operating situations and interest rate scenarios for the upcoming period(s) and the impact of each on farm profitability and repayment capacity. Such an analysis enables lenders for financial institutions to not only be aware of the potential for increased repayment risk but also enables them to be proactive by requiring risk-reducing measures. Although borrowing from family members can also be impacted by changes in operating situations and interest rates, the impact on repayment capacity is often less noticeable due to the flexibility inherent with inter-family lending arrangements.

To further complicate planning for the upcoming period of capital asset transfer is the historical behavior following periods of high net farm incomes. During the initial stages of previous periods of high net farm incomes, farm debt accumulation slowed as farmers used rising net farm incomes to pay debts and finance capital investments. However, those initial periods of high net farm incomes were then followed by the leveraging of U.S. agriculture during the 1910s and 1970s. If history repeats and farmers use debt instead of retained earnings to finance capital purchases during the next decade, another period of leveraging could occur (Henderson and Kauffman 2013). This period would coincide with the upcoming intergenerational transfer of capital assets.

A major challenge for those involved in financing the intergenerational transfer of capital assets in agriculture will be to first determine the impact on repayment risk of possible operating situations and interest rate scenarios. Assessing the magnitude of the risk, determining the likelihood of possible operating situations and interest rate scenarios and taking steps to mitigate

the resulting risk will be key components of future comprehensive loan analyses.

Methods for Transferring Assets

Previous Research

Two common and relatively straightforward transfer methods are through the sale of the assets, with a cash sale financed by a financial institution or an installment sale used to spread the sale proceeds over several years with the older operator using the annual payments for living expenses (Hofstrand and Edwards 2007). The contract for deed or installment land contract is often used when the seller (older generation) is financing the purchase of the property and benefits the buyer (younger generation) if they may not otherwise qualify for a loan or can only put down a relatively low down payment (Kunkel, Peterson, and Mitchell 2009). The contract for deed is also attractive because it is relatively simple to understand, allows for the members involved to specify the terms, and is typically faster to finalize than traditional mortgages.

However, transferring capital assets can be accomplished by using other methods and what is best for one family and operation may not work for others. A study conducted by the State Agriculture Development Committee in New Jersey examined the transfer of ten family farms from each family's older generation to its younger generation (Transferring 2004). They found the most common methods to transfer the land were by setting up a Family Limited Partnership (FLP) to control the farmland and buildings and then gifting the older generation's value in the partnership over time to the younger generations; setting up a family trust and then having the younger family member rent land from it; enrolling in a Farmland Preservation Program which has allowed some operators to sell the farm's development rights and use the income to buy out the older generation or siblings who were not active in the farm's operation; or, hold a mortgage

on his or her share of the farm and pay the older generation until the time of their passing, when that occurred, the mortgages would be considered paid off (Transferring 2004). In recent years the LLC form of business organization has become available as an additional transfer organization.

Methods

As discussed above several transfer methods are available for the intergenerational transfer of capital assets. The transfer methods evaluated in this study include the following:

- Cash sale of capital assets that requires a younger generation to borrow additional funds from a financial institution to finance the purchase. This method shifts all the repayment risk to the younger generation.
- Cash sale of capital assets that requires the younger generation to borrow additional funds, but the debt to finance the purchase is borrowed from family members at below market interest rates. This method would represent the land contract mentioned above and results in a sharing of the repayment risk between the two generations.
- Annual cash payment over a predetermined period to a separate organization such as a Family Limited Partnership, family trust or LLC through a contractual arrangement, while the younger generation continues to rent the capital assets. This method establishes a fixed annual payment for the younger generation, but does not require borrowing additional debt from a financial institution and being subject to interest rate risk. This method would again result in a sharing of the repayment risk between the two generations.

Finance Implications

When repayment capacity is analyzed for an agricultural loan, the analysis is often focused on a projected annual cash flow statement. However, the amount of cash generated by an agricultural business for an upcoming year can be influenced by short-term business practices designed to generate cash but do not reflect the profitability of an agricultural business (i.e., refinancing debt, liquidating capital assets, etc.). Although such practices can satisfy short-term cash flow obligations, the agricultural business must be profitable in the long-term to pay the principal on term debt, so profitability should be included when assessing repayment capacity for capital assets.

The Farm Financial Standards Council (FFSC) recognized the interaction between profitability and repayment capacity and recommended a separate criterion be used to assess repayment capacity. That criterion includes a measure that directly incorporates farm profitability, depreciation allowance, principal payments on term debts and capital leases, non-farm income and withdrawals for family living. Since the term debt and capital lease coverage ratio is a ratio, comparisons can be made across farms, operating situations, interest rate scenarios and to comparative data for the industry.

The term debt and capital lease coverage ratio is calculated as follows:

Net Farm Income from Operations
+ Total non-farm income
+ Depreciation
+ Interest on term debt
+ Interest on capital leases
- Total income tax expense
- <u>Withdrawals for family living</u>
Term Debt and Capital Lease Repayment Capacity

The repayment capacity is then divided by the sum of annual scheduled principal and interest

payments on term debt and capital leases.

As the ratio increases, the ability of the farm or ranch to satisfy term debt and capital lease payments increases. The ratio can be calculated using historical data as well as on a projected basis. A common benchmark used for the term debt and capital lease ratio and a minimum for a business that is expanding or making major capital adjustments is 1.5 (Kohl and Wilson 2004). Of course, a ratio below 1.0 indicates the payments on term debts and capital leases could not be met from the sources used to calculate the ratio.

The ratio is a comprehensive measure since it directly incorporates the profitability of the agricultural business, depreciation allowance that can be used to supplement net farm income to meet principal payments on term debt during low income years, withdrawals for family living and non-farm income. Although it is an improvement when compared to the cash flow statement, it does have a limitation. The coverage ratio is calculated for an accounting period, but it does not address the variability in net farm income that can occur in future years of a loan repayment schedule.

As was seen by reviewing Table 1, net farm income variability for the agriculture sector has become the norm since 2006 rather than the exception. So what may have been determined to be an acceptable coverage ratio at the inception of a term loan may not be acceptable in a future year, because repayment capacity may have deteriorated.

Methodology

The term debt and capital lease coverage ratio recommended by the FFSC will be used in this study to represent repayment risk, because of the comprehensive features of the measure and its wide use across the lending industry. To assess the impact of possible operating situations and

interest rate scenarios, eight potential operating situations and two possible interest rate scenarios will be evaluated. The results will enable financial institution lenders and family members to identify operating situations and interest rate scenarios that could result in a deterioration of the measure and the extent to which that deterioration could occur.

Spreadsheet

The Purdue Financial Analysis Spreadsheet is used in this analysis. It is discussed in detail in *Farm Business Management for the 21st Century: Measuring and Analyzing Farm Financial Performance* (Miller et al. 2012), so only a general overview will be presented in this paper. Guidelines provided by the Farm Financial Standards Council (*Financial Guidelines* 2008) are used in the spreadsheet to prepare the financial statements and calculate financial measures.

Accrual-adjusted Income Statement

Accrual-adjusted net farm income is used in the spreadsheet because the benefits from using data reported on an accrual-adjusted versus a cash basis income statement have been studied and the difference has been judged by many to be unacceptable. The magnitude of the difference was reported in a 2010 article using University of Illinois Farm Business and Farm Management (FBFM) data. The study found the median annual difference between cash net farm income reported on a Schedule F in a Form 1040, U.S. Individual Income Tax Return, and net farm income reported on an accrual-adjusted basis ranged from 52 percent to 63 percent for the period 2002-2006. When a three-year average was used the smallest difference for any of the three-year periods evaluated was 52 percent (Barnard et al., 2010). Therefore, averaging net cash farm incomes over a three-year period does not improve the accuracy of net farm income measured using a cash basis income statement compared to using an accrual-adjusted income statement to

an acceptable level for many financial analysts.

Repayment Capacity Analysis

The spreadsheet is used to calculate the repayment capacity measures recommended by the FFSC. Gross farm revenue and total operating expenses for an operation can be changed in the spreadsheet and the impact on the term debt repayment and capital lease coverage ratio evaluated. Likewise, the same procedure can be used when assessing the impact of a change in interest rates. Changes in gross farm revenues, operating expenses and interest rates will be used to simulate possible changes in the upcoming macroeconomic environment.

Base Case Farm

A case farm is used to assess and compare the intergenerational transfer methods and the impact possible operating situations and interest rate scenarios would have on repayment capacity for the younger generation. The base case farm is used to represent the financial condition and performance of the younger generation operator involved in the transfer of capital assets. The case farm is used to conduct the analysis, but is not intended to represent a typical U.S. farm. Instead, it is used to illustrate the impact of changes in gross farm revenue, operating expenses and interest rates on repayment capacity.

The abbreviated balance sheet, Schedule F of the form 1040, accrual-adjusted income statement and additional input data needed for the base farm are presented in attachment 1, along with the financial measures and ratios for the base case situation. The interest rate charged in the base case situation is 5 percent on all debt, both operating and long-term. Furthermore, it is assumed the capital assets transferred from the older generation to the younger generation are farm real estate, which the younger generation currently cash rents from the older generation at

\$250 per acre.

Consequently, the size of the farming operation for the younger generation remains the same after the transfer as the base case, so additional debt must be paid from the existing revenue-generating capacity.

Characteristics of the base case farm are:

- total farm assets of \$2,132,523,
- total farm debt of \$639,757,
- debt-to-asset percentage of 30.0 percent,
- net farm income of \$270,369,
- current scheduled total annual principal payment is \$71,028,
- withdrawals for family living and taxes is \$115,648, with \$80,000 for family living and \$35,648 for taxes,
- depreciation allowance of \$110,000,
- annual operating loan of \$674,183 is paid at the end of the year and does not show up on the balance sheet,
- zero non-farm income, and
- term debt and capital lease coverage ratio of 2.93.

Hence, both the borrower and an institutional lender would likely feel comfortable with the initial financial condition, profitability and repayment capacity for the base case farm.

Operating Situations

To assess repayment capacity sensitivity for gross farm revenue, the base case amount, \$1,164,898, is decreased by 5 percent, \$1,106,653, and 10 percent, \$1,048,408. These operating situations are labeled situations 1 and 2, respectively. To assess repayment capacity sensitivity resulting from changes in farm operating expenses, total farm operating expenses for the base case, excluding depreciation and interest expenses, \$810,250, is increased by 5 percent, \$850,763, and 10 percent, \$891,275, for situations 3 and 4, respectively. Once operating expenses have been increased by the respective percentages, depreciation and interest expenses

are then added to the resulting numbers to calculate total farm operating expenses for operating situations 3 and 4, \$1,023,694 and \$1,064,207, respectively.

Four additional operating situations are evaluated to represent situations in which changes in gross farm revenue and operating expenses are both detrimental to net farm income for the farm. Those operating situations are represented by a decrease in gross farm revenue of 5 percent combined with operating expense increases of 5 and 10 percent for situations 5 and 6, respectively; and a decrease in gross farm revenue of 10 percent that is combined with operating expense increases of 5 and 10 percent for situations 7 and 8, respectively.

Interest Rate Scenarios

In addition to possible changes in operating situations, the possibility of rising interest rates during the next decade would also have a detrimental impact on repayment capacity. As stated by Henderson and Kauffman, there are indications from some FOMC members fed funds rates could increase from current target levels of 0.0 to 0.25 to 3.0 percent. To represent this increase, the interest rate charged on all funds borrowed from an institutional lender is increased from the base case scenario of 5.0 percent to 7.5 percent.

The interest rate scenario was only evaluated for the first method, which involves borrowing from a financial institution. It is assumed borrowing from family members would likely be at lower interest rates and remedies for late and/or missed payments would be determined among family members.

Results

Method 1, Interest Rate of 5 Percent

Method 1 assumes the older generation transfers ownership of farm real estate to the younger

generation through a one-time purchase that is financed by borrowing funds from a financial institution. The repayment schedule for the purchase would be equal, annual principal payments over 20 years, plus interest. Since the amount of the funds borrowed will impact financial condition and repayment capacity, two size amounts are evaluated, \$319,878 and \$619,757.

Base Case, Debt-to-Asset of 30 Percent

The base case for the example farm has a debt-to asset percent of 30.0. As can be seen in Table 2, the coverage ratio exceeds 1.5 for all operating situations, except situations 7 and 8, with situation 8 falling below 1.0. In that operating situation, gross farm revenue would decrease by 10 percent and operating expenses would increase by 10 percent, the most detrimental situation for the younger generation. Consequently, the base case, with an interest rate of 5 percent, could withstand the adverse effects resulting from all but one of the nine operating situations evaluated and satisfactorily meet term debt and capital lease repayment obligations.

Table 2. Impact of Decreasing Gross Farm Revenue and/or Increasing Total Operating Expenses on the Term Debt and Capital Lease Coverage Ratio, with Interest Rate of 5 Percent

Situation	<u>D/A = 30 Percent</u>	<u>D/A = 39 Percent</u>	<u>D/A = 46 Percent</u>
Base	2.93	2.32	1.87
1	2.35	1.88	1.60
2	1.77	1.44	1.24
3	2.53	2.02	1.71
4	2.12	1.72	1.47
5	1.95	1.58	1.36
6	1.54	1.28	1.12
7	1.37	1.14	1.00
8	0.96	0.84	0.76

- Situation 1 = Decrease Gross Farm Revenue by 5 percent
- Situation 2 = Decrease Gross Farm Revenue by 10 percent
- Situation 3 = Increase Total Operating Expenses by 5 percent
- Situation 4 = Increase Total Operating Expenses by 10 percent
- Situation 5 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 5%
- Situation 6 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 10%
- Situation 7 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 5%

Situation 8 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 10%

Borrowing \$319,878 or Increasing Debt-to-Asset to 39 Percent

The first method evaluated involves transferring ownership of farm real estate to the younger generation through the purchase of those assets. The purchase is financed by borrowing funds from the financial institution used by the younger generation farmer.

The first level of additional borrowing is assumed to be \$319,878, which represents a 50 percent increase in total liabilities for the base case. The purchase could represent the purchase of about 50 acres the younger generation farmer is currently cash renting. The selling price is assumed to be \$6,398 per acre, with the total purchase borrowed and the younger generation farmer pledging other assets as collateral to arrive at an acceptable loan-to-value level. Since the purchase is for farm real estate that is already rented from the older generation for \$250 per acre, there is no increase in the gross revenue from the base case. However, cash rent paid by the younger generation farmer would be reduced by \$12,500 (\$250 per acre times 50 acres). Consequently, the debt-to-asset percent increases to 39.1 percent, which will henceforth be referred to as 39 percent. The changes to the base case include:

- total assets increase from \$2,132,523 to \$2,452,401 and all of the increase is in non-current assets,
- current liabilities increase from \$126,333 to \$142,327, which reflects the principal payment on the additional debt,
- non-current liabilities increase from \$584,452 to \$888,336 or the additional term debt added to the non-current liabilities for the base case, less the first principal payment on the additional debt,
- annual principal payments on term debts increase from \$71,028 to \$87,022, which reflects the amount of the additional annual principal payment,
- cash operating expenses, excluding interest and depreciation, decrease from \$810,250 to \$797,750 due to lower cash rent (50 acres rented at \$250 per acre),
- operating loan amount decreases from \$674,183 to \$661,683 due to elimination of cash rent on 50 acres,

- interest on term debt increases from \$29,223 to \$45,217 due to additional term debt, and
- interest on the operating loan decreases from \$33,709 to \$33,084 due to a lower operating loan as a result of the elimination of cash rent on 50 acres.

As presented in Table 2, the coverage ratio remains above 1.5 for five of the nine operating situations, below 1.5 but above 1.0 for three situations (2, 6 and 7) and below 1.0 for situation 8. Hence, the method increases repayment risk for the younger generation but would still likely be viewed as feasible.

Borrowing \$639,757 or Increasing Debt-to-Asset to 46 Percent

The second level of additional borrowing assumes the younger generation must borrow an additional \$639,757 to purchase the farm real estate, which increases debt-to-asset percent from 30.0 to 46.2 percent, which will be henceforth referred to as 46 percent. This change represents a 100 percent increase in total liabilities from the base case, which could represent the purchase of about 100 acres at a selling price of \$6,398 per acre. As with the prior situation, the total amount is borrowed with other collateral pledged to arrive at an acceptable loan-to-value. The assets are increased by that amount as well as the liabilities. Again, the entire amount is borrowed and is scheduled to be paid using 20 equal, annual principal payments, plus interest.

The changes to the base case include:

- total assets increase from \$2,132,523 to \$2,772,280 and all of the increase is in non-current assets,
- current liabilities increase from \$126,333 to \$158,321, which includes the principal payment for the additional debt,
- non-current liabilities increase from \$584,452 to \$1,192,221, which reflects the additional debt less the first annual principal payment,
- principal payments on term debts increase from \$71,028 to \$103,016, which includes the amount of the additional annual principal payment,
- cash operating expenses, excluding interest and depreciation, decrease from \$810,250 to \$785,250 due to lower cash rent (100 acres at \$250 per acre),
- operating loan amount decreases from \$674,183 to \$649,183 due to the elimination of cash rent on 100 acres,

- interest on term debt increases from \$29,223 to \$61,210 due to additional term debt, and
- interest on the operating loan decreases from \$33,709 to \$32,459 due to a lower operating loan as a result of the elimination of cash rent on 100 acres.

As presented in Table 2, the coverage ratio falls below 1.5 for six of the nine operating situations. Only the base situation, a five percent decrease in gross farm revenue and a 5 percent increase in operating expenses remain above 1.5. In addition, a 10 decrease in gross farm revenue combined with a 10 percent increase in operating expenses would result in a coverage ratio below 1.0. Hence, even in the low interest rate scenario of 5 percent, the repayment capacity is very sensitive to changes in gross farm revenue and operating expenses when the debt-to-asset ratio increases from 30 to 46 percent.

Method 1, Interest Rate of 7.5 Percent

If interest rates increase from 5 to 7.5 percent, the impact on repayment capacity for the base case with a debt-to-asset percent of 30 percent is similar to the 5 percent interest rate scenario. The coverage ratio again falls below 1.0 for only situation 8. However, in this scenario, the number of operating situations in which the coverage ratio falls between 1.0 and 1.5 increases from one to three. However, the coverage ratio experiences a noticeable deterioration when the debt-to-asset percent increases from 30 to 39 and 46 percent.

Borrowing \$319,878 or Debt-to-Asset of 39 Percent

If the purchase of capital assets increases the debt-to-asset percent from 30 to 39 percent, the coverage ratio for 6 of the 9 operating situations falls below 1.5. Furthermore, it falls below 1.0 for all three operating situations that include a 10 percent change in one variable combined with at least a 5 percent change in the other, situations 6, 7, and 8. Also, the coverage ratio for a 10 percent decrease in gross farm income, with a constant operating expense, results in a coverage

ratio of only 1.12 (situation 2).

Table 3. Impact of Decreasing Gross Farm Revenue and/or Increasing Total Operating Expenses on Repayment Capacity on the Term Debt and Capital Lease Coverage Ratio, with Interest Rate of 7.5 Percent

<u>Situation</u>	<u>D/A = 30 Percent</u>	<u>D/A = 39 Percent</u>	<u>D/A = 46 Percent</u>
Base	2.41	1.88	1.56
1	1.91	1.50	1.26
2	1.40	1.12	0.96
3	2.06	1.62	1.36
4	1.71	1.36	1.16
5	1.55	1.24	1.06
6	1.20	0.99	0.86
7	1.05	0.87	0.76
8	0.69	0.61	0.56

Situation 1 = Decrease Gross Farm Revenue by 5 percent

Situation 2 = Decrease Gross Farm Revenue by 10 percent

Situation 3 = Increase Total Operating Expenses by 5 percent

Situation 4 = Increase Total Operating Expenses by 10 percent

Situation 5 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 5%

Situation 6 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 10%

Situation 7 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 5%

Situation 8 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 10%

Borrowing \$639,757 or Debt-to-Asset of 46 Percent

If the purchase of capital assets by the younger generation results in an additional \$639,757 in debt for the existing operation and the interest rate increases from 5 to 7.5 percent, there is a substantial increase in repayment risk. In this interest rate scenario, the coverage ratio is below 1.5 for all of the operating situations, except for the base case. It falls below 1.0 in 4 of the 9 operating situations. Only situations 1, 3, 4 and 5 maintain a coverage ratio between 1.0 and 1.5.

Method 2, Interest Rate of 5 Percent and Family Interest Rate of 2.5 Percent

Method 2 involves the same transfer mechanism as method 1, except the purchase is financed by the older generation. It is assumed the same increases in principal payments on term debt occurs as in method 1, but the interest rate charged on the additional debt of \$319,878 and \$639,757 is

assumed to be one-half the rate charged by the financial institution, or 2.5 percent, since the debt is financed by family members.

Table 4. Impact of Decreasing Gross Farm Revenue and/or Increasing Total Operating Expenses on the Term Debt and Capital Lease Coverage Ratio, with Market Interest Rate of 5 Percent and Family Interest Rate of 2.5 Percent

<u>Situation</u>	<u>D/A = 30 Percent</u>	<u>D/A = 39 Percent</u>	<u>D/A = 46 Percent</u>
Base	2.93	2.57	2.16
1	2.35	2.10	1.76
2	1.77	1.64	1.37
3	2.53	1.93	1.89
4	2.12	1.94	1.63
5	1.95	1.79	1.50
6	1.54	1.47	1.23
7	1.37	1.32	1.11
8	0.96	1.00	0.84

Situation 1 = Decrease Gross Farm Revenue by 5 percent

Situation 2 = Decrease Gross Farm Revenue by 10 percent

Situation 3 = Increase Total Operating Expenses by 5 percent

Situation 4 = Increase Total Operating Expenses by 10 percent

Situation 5 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 5%

Situation 6 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 10%

Situation 7 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 5%

Situation 8 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 10%

Again, the coverage ratio for the base case is above 1.5 for all but two operating situations, 7 and 8, with situation 8 again falling below 1.0. When the debt-to-asset percent increases to 39 percent, the ratio falls below 1.5 for an additional situation, 6. When debt-to-asset percent increases to 46 percent, the coverage ratio falls below 1.5 for four of the operating situations and below 1.0 for situation 8. Consequently, the lower interest rate charged on the additional debt provided by family members resulted in an improvement in the repayment capacity compared to the results found when the interest rate was 5 percent on all debt.

Method 3, Interest Rate of 5 Percent

Method 3 involves the transfer of a fixed, annual amount needed to purchase the capital assets,

which is like a principal payment on term debt but without charging interest. The payment would be paid directly to an entity such as a Family Limited Partnership or family trust. However, it is further assumed title is not initially transferred to the younger generation and cash rent continues to be paid on the acres transferred at the end of 20 years. For this method, it is assumed the same principal payments needed to pay for the \$319,878 and \$639,757 amounts would be needed to purchase the capital assets. However, the principal amounts are paid by the younger generation through an agreed to annual contractual obligation. The return to the older generation is the cash rent that continues to be paid until the contract payments are completed. Again, the acres are already cash rented, so the size and repayment capacity for the operation remains the same as the base case.

For purposes of recording the transfer on the balance sheet, the method is treated in accordance to how the FFSC would record a capital lease. The amount of the asset purchase would be recorded as an asset and the amount of the contract obligation, both current and non-current, would be recorded as liabilities with no accrued interest. The changes to the base case include:

- total assets increase from \$2,132,523 to \$2,452,401 and \$2,772,280 for the purchase amounts of \$319,878 and \$639,757, respectively, all of the increase is in non-current assets,
- current liabilities increase from \$126,333 to \$142,327 and \$158,321 for the purchase amounts of \$319,878 and \$639,757, respectively, which is the annual amounts due on the purchase contract,
- non-current liabilities increase from \$584,452 to \$888,336 and \$1,192,221 for the purchase amounts of \$319,878 and \$639,757, respectively, for the additional contract obligation, less the first annual payment, and
- annual payments on term debts increase from \$71,028 to \$87,022 and \$103,016, respectively, for the annual payment for each amount.

Table 5. Impact of Decreasing Gross Farm Revenue and/or Increasing Total Operating Expenses on the Term Debt and Capital Lease Coverage Ratio, with Interest Rate of 5 Percent on Existing Debt, but no Interest Charged on the Purchase Contract Obligation

<u>Situation</u>	<u>D/A = 30 Percent</u>	<u>D/A = 39 Percent</u>	<u>D/A = 46 Percent</u>
Base	2.93	2.53	2.22
1	2.35	2.03	1.78
2	1.77	1.53	1.34
3	2.53	2.18	1.92
4	2.12	1.83	1.61
5	1.95	1.68	1.48
6	1.54	1.33	1.17
7	1.37	1.18	1.04
8	0.96	0.83	0.73

Situation 1 = Decrease Gross Farm Revenue by 5 percent
 Situation 2 = Decrease Gross Farm Revenue by 10 percent
 Situation 3 = Increase Total Operating Expenses by 5 percent
 Situation 4 = Increase Total Operating Expenses by 10 percent
 Situation 5 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 5%
 Situation 6 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 10%
 Situation 7 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 5%
 Situation 8 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 10%

No interest is paid on the purchase contract obligation, but the annual payments are different for the amounts of the two levels of additional obligations. As presented in Table 5, the only operating situations in which the coverage ratio falls below 1.5 in the base case of 30 percent debt-to-asset are situations 7 and 8, with situation 8 the only one falling below 1.0. For the 39 percent debt-to-asset financial condition, only three operating situations fall below 1.5 (6, 7, and 8) and again only situation 8 is below 1.0. For the 46 percent debt-to-asset, 5 operating situations fall below 1.5, but again only situation 8 is below 1.0.

Comparison of Methods with 39 Percent Debt-to-Asset and 5 Percent Interest Rate

The three methods, with a 39 percent debt-to-asset percent and a 5 percent base interest rate, are compared in Table 6. Ranking the three methods, from least risky to most risky, in terms of

coverage ratio, the second method is the least risky. That method involves the purchase of the assets by the younger generation, but the purchase is financed by the family at one-half the interest rate charged by a financial institution. The third method is only slightly more risky than the second. It involves a fixed annual contractual payment, but at no interest. Instead, the acres continue to be cash rented from the older generation. The most risky of the three methods is the purchase of the capital assets when the purchase is financed by a financial institution and the market interest rate is charged.

Table 6. Comparison of Term Debt and Capital Lease Coverage Ratios for Alternatives with a 39 Percent Debt-to-Asset Percent and a 5 Percent Interest Rate

<u>Situation</u>	<u>Method 1</u>	<u>Method 2</u>	<u>Method 3</u>
Base	2.32	2.57	2.53
1	1.88	2.10	2.03
2	1.44	1.64	1.53
3	2.02	2.25	2.18
4	1.72	1.94	1.83
5	1.58	1.79	1.68
6	1.28	1.47	1.33
7	1.14	1.32	1.18
8	0.84	1.00	0.83

Alternative 1 = Purchase of assets is financed by a financial institution

Alternative 2 = Purchase of assets is financed by family members

Alternative 3 = Transfer of assets is by an annual, fixed contract payment, with zero interest

Situation 1 = Decrease Gross Farm Revenue by 5 percent

Situation 2 = Decrease Gross Farm Revenue by 10 percent

Situation 3 = Increase Total Operating Expenses by 5 percent

Situation 4 = Increase Total Operating Expenses by 10 percent

Situation 5 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 5%

Situation 6 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 10%

Situation 7 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 5%

Situation 8 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 10%

Comparison of Methods with 46 Percent Debt-to-Asset and 5 Percent Interest Rate

The three methods, with 46 percent debt-to-asset percent and a 5 percent base interest rate, are compared in Table 7. In this comparison, methods 2 and 3 are very close, with borrowing from a

financial institution to finance the purchase the most risky alternative.

Table 7. Comparison Term Debt and Capital Lease Coverage Ratios with a 46 Percent Debt-to-Asset Percent and a 5 Percent Interest Rate

<u>Situation</u>	<u>Method 1</u>	<u>Method 2</u>	<u>Method 3</u>
Base	1.87	2.16	2.22
1	1.60	1.76	1.78
2	1.24	1.37	1.34
3	1.71	1.89	1.92
4	1.47	1.63	1.61
5	1.36	1.50	1.48
6	1.12	1.23	1.17
7	1.00	1.11	1.04
8	0.76	0.84	0.73

Alternative 1 = Purchase of assets is financed by a financial institution

Alternative 2 = Purchase of assets is financed by family members

Alternative 3 = Transfer of assets is by an annual, fixed contract payment, with zero interest

Situation 1 = Decrease Gross Farm Revenue by 5 percent

Situation 2 = Decrease Gross Farm Revenue by 10 percent

Situation 3 = Increase Total Operating Expenses by 5 percent

Situation 4 = Increase Total Operating Expenses by 10 percent

Situation 5 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 5%

Situation 6 = Decrease Gross Farm Revenue 5%/Increase Operating Expenses 10%

Situation 7 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 5%

Situation 8 = Decrease Gross Revenue 10%/Increase Total Operating Expenses 10%

Final Comments

The U.S. agricultural industry is faced with an aging population of operators, and in the next decade, close to 20 percent of the national average value of land and buildings, specifically 34 percent of agricultural acres, could be transferred to a younger generation (USDA 2009). The intergenerational transfer of capital assets during the upcoming years will occur using some combination of sale and purchase using debt; outright gifting from older to younger generation; and use of business entity structures such as LLCs, Family Limited Partnerships, corporations and trusts to assure transfer between generations. A significant amount of the necessary intergenerational transfer of assets will require that the younger generation purchase either fee

simple property rights or interest in a business entity structure in order to assure the retirement needs of the retiring generation. In turn, much of this transfer of assets will need to be financed with debt to balance the elder generation's need for cash with the next generation's need to maintain working capital and financial flexibility in their farm business operations.

This transfer will likely occur in an economic environment that will be characterized by lower net farm incomes and higher interest rates than the previous 7-year period, as well as increased volatility in net farm income. The recent downturn in commodity prices, combined with operating expenses that have increased year over year at an average annual rate of 4.3 percent since 2009 will likely result in a deterioration in repayment capacity. A comment expressed by a Farm Credit System loan officer attending a credit school this past summer succinctly sums up the mindset of many seasoned loan officers regarding the current agricultural economic environment. "We are one bumper crop away from being back to where we were prior to the 2006 increase in prices. You throw in a 10-20 percent drop in land prices and we are back to the 1980s."

Although published, projected events for the upcoming decade do not include a decline in farm real estate values, the recent downturn in residential housing prices and the decline in farmland values in the 1980s provide examples of how unexpectedly and abruptly real estate markets can change direction. When such a possibility is considered within the context of an agricultural economic environment that could be characterized by increased repayment risk, financing the intergenerational transfer of capital assets necessitates comprehensive, cautious and pragmatic credit analyses.

The extent to which repayment risk can increase as a result of various changes in operating situations is illustrated in this study by the term debt and capital lease coverage ratio. The magnitude of the deterioration in the ratio as a result of changes in the operating situation is reported for increased levels of leverage and interest rates. Assessing the sensitivity of repayment capacity enables both institutional lenders and family members who lend to the younger generation purchasers of capital assets to be more proactive in taking measures to reduce repayment risk.

In this study, three capital transfer methods were evaluated. Purchasing capital assets with the purchase financed by family members who charge below market interest rates through either a loan or land contract arrangement was found to be less risky than making fixed contractual payments to a separate entity (i.e., LLC, land trust, etc.) over the same payment period. Conversely, purchasing capital assets and financing the purchase using funds borrowed exclusively from a financial institution charging market interest rates was found to be the most risky method. This finding held not only for a debt-to-asset of 46 percent but also for 39 percent. Therefore, a combination of transfer methods will likely be needed to transfer the ownership of capital assets from one generation to the next, while maintaining an acceptable level of repayment risk.

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Attachment 1:

Worksheets for Measuring & Analyzing Farm Financial Performance

Worksheet 1. Input Information

Schedule F Data		20X2	
Taxable Year:			
Cost of livestock sold (Schedule F, line 1d)	A		
Gross income (Schedule F, line 9)	B	\$ 1,164,898	
Depreciation (Schedule F, line 14)	C	\$ 110,000	
Mortgage interest (Schedule F, line 21a)	D	\$ 29,223	
Other interest paid (Schedule F, line 21b)	E	\$ 33,709	
Total expenses (Schedule F, line 33)	F	\$ 983,182	
Balance Sheet		Beginning	Ending
Balance sheet date		12/31/20X1	12/31/20X2
Cash	G	\$ 138,911	M \$ 228,750
Total current farm assets	H	\$ 208,711	N \$ 401,150
Total current farm liabilities	I	\$ 107,583	O \$ 126,333
Prepaid expenses ¹	J	\$ 9,316	P \$ 7,400
Accrued interest	K	\$ 3,505	Q \$ 2,255
Farm accounts payable and other accrued expenses	L	\$ 33,050	R \$ 53,050
Total farm assets			S \$ 2,132,523
Total farm liabilities			T \$ 639,757
Owner equity [S-T]			U \$ 1,492,766
Miscellaneous Data			
Breeding stock sales (Form 4797)	V	\$ 4,803	
Number of operators and employees (annual full-time equivalent)	W	2	
Family living expenses & taxes (all families supported by the farm) ²	X	\$ 115,648	
Net Farm Income			
Gross revenues [A+B+V+(N-M-P)-(H-G-J)]	Y	\$ 1,274,217	
Operating expenses [A+F-C-(D+E)+(R-L)+(J-P)]	Z	\$ 832,166	
EBITDA ³ [Y-Z]	AA	\$ 442,051	
Interest expense [D+E+(Q-K)]	AB	\$ 61,682	
Net farm income from operations ⁴ [AA-AB-C]	AC	\$ 270,369	

¹ If prepaid expenses are changed as part of an analysis, total current assets must be changed by the same amount to properly reflect the changes to net farm income from operations.

² Enter \$0 if all the owner-operator's compensation is included as wages in total expenses in item F above. Enter actual or estimated family living expenses and income taxes if a sole proprietorship. Enter owner withdrawals from the business for family living expenses and income taxes if a partnership or similar entity. This number is used to approximate the value of unpaid family labor and management.

³ Earnings before interest, income tax, depreciation, and amortization expenses.

⁴ Exclude large, unusual and infrequent gains or losses which are not recurring, such as the sale of land. Net farm income from operations is EBITDA - interest expenses - depreciation and is calculated on a pre-income tax basis.

Worksheets for Measuring and Analyzing Farm Financial Performance

Worksheet 2. Financial Position and Performance Ratios¹

	Your Farm	Benchmark	Strong/Weak
Profitability			
Return on Assets $[(AC+AB-X) \div S] * 100$	10.1%	11.4%	Weak
Return on Equity $[(AC-X) \div U] * 100$	10.4%	16.6%	Weak
Operating Profit Margin Ratio $[(AC+AB-X) \div Y] * 100$	17.0%	24.6%	Weak
Liquidity			
Current Ratio [N/O]	3.18	2.30	Strong
Working Capital/Gross Revenues Ratio $[(N-O) \div Y] * 100$	21.6%	38.1%	Weak
Solvency			
Debt-to-Asset Ratio $[T \div S] * 100$	30.0%	42.0%	Strong
Debt-to-Equity Ratio $[T \div U] * 100$	42.9%	73.0%	Strong
Financial Efficiency			
Asset Turnover Ratio $[Y \div S] * 100$	59.8%	46.4%	Strong
Revenue per Full-Time Laborer	\$ 637,109	\$400,000	Strong
Operating Expense Ratio $[Z \div Y] * 100$	65.3%	67.9%	Neutral
Depreciation Expense Ratio $[C \div Y] * 100$	8.6%	5.2%	Weak
Interest Expense Ratio $[AB \div Y] * 100$	4.8%	3.7%	Weak
Net Farm Income Ratio $[AC \div Y] * 100$	21.2%	23.4%	Neutral

¹ Alphabetical items in parentheses or brackets in the left-hand column refer to Worksheet 1.

Worksheets for Measuring and Analyzing Farm Financial Performance

Worksheet 3. Repayment Capacity Ratios and Measures

Capital Debt Repayment Capacity and Margin, and Replacement Margin

Net farm income from operations (Item AC, worksheet 1)	1	\$ 270,369
Off-farm income ¹	2	\$ -
Interest expense on term debt ² (Item AB, worksheet 1, minus operating interest)	3	\$ 29,223
Depreciation (Item C, worksheet 1)	4	\$ 110,000
Family expenses, income taxes, etc. ³	5	\$ 115,648
Capital debt repayment capacity [(1+2+3+4)-5]	6	\$ 293,944
Principal on term debts and capital leases	7	\$ 71,028
Unpaid operating debt from a prior period (carryover loss)	8	\$ -
Capital debt repayment margin [6-(3+7+8)]	9	\$ 193,693
Cash used for capital replacement (or a replacement allowance) ⁴	10	\$ 100,000
Replacement margin [9-10]	11	\$ 93,693
Term Debt and Capital Lease Coverage Ratio [6÷(3+7+8)]	12	293.2%
Replacement Margin Coverage Ratio [6÷(3+7+8+10)]	13	146.8%
Estimated amount of additional term debt the replacement margin calculated above could service?⁵		
Estimated years to repay term debt	14	5
Estimated Interest rate available on new term debt for the term entered on line 14	15	5%
Percent of gross income to retain as a safety margin	16	0%
Cash reserve safety margin [16 X Item Y, Worksheet 1]	17	\$ 20,000
Amortization factor	18	0.23097
Additional term debt the margin would service [(11-17)÷18]	19	\$ 319,052

¹Include gross off-farm income received by family members used to support family living or farming activities.

²Enter amount of interest paid on term debt if different from mortgage interest reported on the tax return.

³The amount on Line X, Worksheet 1.

⁴The amount of cash used for down payments or "boot" when making capital purchases. Do not include cash financed with loans. If the actual amount of cash used for capital replacement is zero or abnormally low use a number that reflects the average amount of cash used for capital replacement over the last five years.

⁵This assumes the calculated replacement margin will recur every year during the repayment period. The actual replacement margin available each year is likely to vary considerably. So, it would not be prudent from a risk management perspective to plan on the full amount on line 11 being available for additional debt service every year. On line 17, a portion of the farm's revenue is retained to provide a margin of safety. The minimum that would be prudent to retain for low risk operations is 5%. The amount retained in order to provide a margin of safety should be increased in more financially risky farm businesses.