

C & D Farms

Thinking about Strategic Direction

By: Michael Langemeier

Executive Summary

After four generations, Joe Meier and C&D Farms are at a crossroads. With his children unwilling to take on the farm and its assets, Joe must decide which of three specialization strategies would be most beneficial to both himself as well as Tom Smith, Joe's head supervisor and potential future owner/operator of C&D Farms.

The first strategy involves eliminating the production of alfalfa and corn silage for his dairy herd and purchasing feed instead, diverting that land to corn and soybean production. The second encompasses liquidating the dairy operation altogether, while the third—in addition to discontinuing dairy—includes renting an additional 500 acres of land to increase corn and soybean production.

While the future is still unclear, at the end of the day, Joe would like to spend more time with his family and less time working with livestock. All three options have their pros and cons, but it's clear that risk reduction strategies will need to be put in place if Joe wants to uphold the farm's profitability.

Thinking about Strategic Direction

Harvest is almost complete and the last cow has been milked on C & D Farms. Farm owner and operator Joe Meier is sitting on his porch watching the sun on the horizon. There never seems to be much time to think about the future, but lately Joe's thoughts have been returning over and over to this very topic. He is proud of his farm's performance during the last several years; however, he often wonders, particularly as of late, whether his diversified operation needs to become more specialized. Many of his neighbors and friends have dropped their livestock operations. The few that have remained in the livestock industry have greatly expanded the size of this part of their operation. Joe is wondering whether he should change strategic directions by specializing in the production of corn and soybeans. This would entail discontinuing forages production and the dairy operation.

Joe recently attended a workshop where the authors discussed using scenarios or alternative strategies to examine changes in an operation. He thinks comparing his current situation (i.e., the base case) with three specialization strategies would be a helpful way to strategically think about diversification and specialization. The three scenarios that Joe has identified to examine include: (1) purchase rather than raise feed for the dairy operation; (2) discontinue the dairy operation and produce corn and soybeans on all of the crop acres; and (3) discontinue the dairy operation, rent an additional 500 acres from a neighbor that is going to retire in the upcoming year, and produce corn and soybeans on all of the crop acres. Obviously, the third scenario will have relatively higher net returns than the second scenario. The second scenario is utilized to measure the direct impact of dropping the dairy herd.

Risk measures were also briefly discussed at the workshop that Joe recently attended. If risk is going to be included in the analysis, he realizes that it is important to use multiple years in the analysis. Thus, comparisons of the base case and the three scenarios will focus on the ten-year averages of value of farm production, net farm income and operating profit margin ratio. Historical data is used to compute the 10-year average performance measures for the base case and the alternatives to the base case. In addition to comparing the averages, risk comparisons are conducted. Standard deviation is a commonly used measure of risk. Given two investments or strategies with the same average, a risk averse individual will prefer the strategy with the lower standard deviation. Some analysts prefer to use a measure of relative variability rather than the standard deviation, which is a measure of absolute variability. The coefficient of variation (CV) measures relative variability and is computed by dividing the standard deviation by the average. Again, given two strategies with the same average, a risk averse individual would prefer the strategy with the lower CV.

History of C & D Farms

Joe's great grandfather, Walter, purchased 120 acres in north central Indiana in 1910. This was the

beginning of C & D Farms. Walter's vision was to build a business that would provide adequate income for his family. An added bonus was a lifestyle that was more serene and even-tempered than what he left behind in Chicago. By the time he died in 1960 at the age of 80, the farm had grown to 250 acres and his son, Paul, Joe's grandfather, was managing the farm successfully. In 1960, the farm had 250 acres of corn, soybeans and hay, as well as 15 sows and 20 dairy cows. The question of Paul, as the oldest son, becoming a farmer was never debated. Paul managed the farm until 1980 when his only son, John, took over the reins. In 1980, the farm had 500 acres of corn, soybeans, corn silage, and hay as well as 30 dairy cows. The swine operation was discontinued in 1975 so that the farm could place more focus on the dairy operation. As with Paul, John always assumed that he would take over the management of the farm upon his father's retirement. John earned a degree from Purdue in animal science and was particularly interested in the dairy operation.

Joe joined the farm operation in 1990 after completing a degree in agricultural economics at Purdue. He considered employment off the farm after graduation, but felt that farming was his true passion. This decision was not as easy as the decisions to farm made by Paul and John, Joe's grandfather and father. In particular, the relatively low returns experienced by the farm in the mid-1980s made Joe's decision to return to the farm difficult. When Joe took over the management of the operation in 2000, it consisted of 750 acres of corn, soybeans, corn silage, and hay; and 150 dairy cows. The farm still has 150 dairy cows. Not increasing the dairy herd was a conscious decision by Joe. He enjoys raising crops, but does not have the same passion for livestock production as his father. Joe still uses his father John as a sounding board; however, due to recent health issues, John is only able to work part-time for the operation.

In 2012, C & D Farms planted 600 acres of corn, 600 acres of soybeans, 150 acres of corn silage and 150 acres of alfalfa. Average per-acre yields during the last 10 years were 145 bushels of corn, 47 bushels of soybeans, 3.6 tons of alfalfa, and 19.8 tons of corn silage. Joe purchased crop insurance for his corn and soybean acres, but not for the forage acres in 2012. Crop insurance would have been available for the corn silage acres. The farm owns 500 acres and rents the rest of the ground close by, mostly from former neighbors who are now retired and living in town. Some of the ground is rented from aunts who live in Chicago and Indianapolis.

Joe raises all of the alfalfa, corn, and corn silage used by the dairy operation. In a typical year, which 2012 was not, only about 55 percent of the corn silage and alfalfa is used by Joe's dairy herd. The rest is sold to neighboring farms. Joe's forage production strategy has always been to raise enough feed for his herd even in low production years. Thus, even in 2012, in which his farm experienced a serious drought, he sold part of his alfalfa and corn silage crops.

Joe (45 years old), with his wife Emily (44 years old), raised three daughters who are now either working in town or pursuing degrees in something other than agriculture. None of the daughters has expressed an interest in coming back to the farm. However, Joe's full-time employee, Tom Smith (35 years old), who plays a key role in supervising the employees that milk the cows, would like to become an owner/operator of a farm in the future. As Joe gets older, he would like to free up more time for vacations and visiting his daughters and their families.

Financial Position and Performance

As a proud agricultural economics graduate, Joe prides himself on his financial record-keeping system. Overall, the farm has been quite profitable during the last 10 years. Tables 1-5 present the balance sheet, income statement, sources and uses of funds statement, the statement of owner's equity and financial ratios for 2012. EBITA, reported in Table 5, is an abbreviation for earnings before interest, taxes and depreciation and amortization. Appendix Tables 1-5 contain definitions as well as the relevant computations for the financial ratios presented in Table 5. All of the variables used in the financial ratio calculations are contained in Tables 1-4 except for principal and interest payments on term debt, and the opportunity cost on owned equity. Principal and interest payments on term debt were \$37,667 and \$29,255, respectively. The opportunity charge on owned equity (\$301,190) was computed by multiplying average owned equity by a long-term interest rate (6.92 percent). This opportunity charge reflects the fact that owned equity could be invested outside the farm if it was not tied up in the farm business.

Despite having a relatively strong cash balance (cash comprises approximately 7 percent of total assets), the current ratio is below 2, a commonly used gauge. Part of the reason for this is the farm's crop marketing strategy. Crops not fed are typically sold in the year produced and thus do not appear on the end of the year balance sheet. At 13 percent, the debt-to-asset ratio is relatively low. The farm purchased land in 2007, as well as several pieces of machinery during the last several years. The machinery was purchased, at least in part, as a tax management response to several profitable years in a row. As evidenced by the strong repayment ratios, the farm can readily service the debt incurred through the recent land and machinery acquisitions.

The operating profit margin and asset turnover ratios were 0.1920 and 0.2819 in 2012. Multiplying these two ratios together yields a rate of return on farm assets of 0.0541 or 5.41 percent. At first glance this may not appear to be a very strong rate of return. However, it is important to note that this rate of return does not include capital gains on land. As noted in Table 4, the value of owned land increased \$482,000 in 2012 alone.

Gross revenue per worker represents a measure of labor productivity. The number of workers includes operators and hired employees. In addition to Joe Meier and Tom Smith, C & D Farms has 2.85 full-time equivalent workers that help with crop and dairy enterprises. Using this information, gross revenue per worker for C & D Farms was \$327,530 in 2012. In general, a value over \$500,000 per worker is satisfactory. However, specialized livestock farms typically have a ratio value below \$500,000.

Before discussing three scenarios related to specialization, it is important to discuss financial performance over a longer period of time. Table 6 presents the 10-year average value of farm production, net farm income, and operating profit margin ratio for the base case (i.e., current enterprise mix) and the alternatives to the base case or scenarios. The average value of farm production and net farm income was \$1,116,286 and \$214,785, respectively. The average operating profit margin ratio from 2003 to 2012 was 0.1724. The annual operating profit margin ratio ranged from 0.0456 in 2005 to 0.2947 in 2011.

Looking to the Future

C & D Farms would like to examine three specialization scenarios or strategies. These strategies are consistent with Joe's desire to spend more time on row-crop production and less time working with livestock, his desire to spend more time with family and the fact that the farm can add at least some acres with little to no increase in labor requirements and machinery. Joe has shared his thoughts with Tom Smith. Though Tom currently spends most of his time with the dairy enterprise, he does not have a strong preference with regard to crop or livestock production.

Scenario #1

The first scenario is to purchase alfalfa and corn silage rather than raising them on the farm. This strategy does not increase specialization as much as the other two scenarios, but it does free up time and allow the farm to produce more corn and soybeans. This strategy also allows the farm to liquidate relatively expensive forage equipment.

The average value of farm production, net farm income, and operating profit ratio for the first scenario is presented in the second column of Table 6. The 10-year average value of farm production is lower for scenario #1 than it was for the base case. However, the ten-year average net farm income and operating profit margin ratio (see the 03-12 lines for these items in table 6) is relatively higher for scenario #1. Moreover, the CVs for these two measures are relatively lower for scenario #1. In summary, scenario #1 shows that it would be possible to purchase alfalfa and corn silage rather than raise these crops. This is due largely to the fact that the specialized equipment used to grow these crops is relatively expensive. A decision to purchase these crops would also need to consider forage quality, which was not addressed in scenario #1. It is assumed that quality forage could be purchased locally. This of course might not be the case.

Scenario #2

The second scenario is to liquidate the dairy herd and the specialized forage equipment. Under this scenario, the farm does not add crop acres. This scenario is primarily used to determine how much income would decline without the dairy herd and the associated forage production.

The average value of farm production, net farm income, and operating profit margin ratio for the second scenario is presented in the third column of Table 6. The 10-year average value of farm production and net farm income (see the 03-12 lines for these items in Table 6) are considerably lower for scenario #2 than they are for the base case. Also, the operating profit margin ratio for this scenario is substantially lower. It is also worth noting that the CVs for income and the operating profit margin ratio are substantially higher for scenario #2 indicating that this scenario is relatively risky. In summary, income and profitability would decline and risk would increase if Joe was to discontinue the dairy operation.

Scenario #3

Joe has recently been approached to rent an additional 500 acres from a neighbor who will retire in the coming year. If he does not liquidate the dairy herd, he is not particularly interested in taking on these acres. However, if he liquidates the dairy herd and the associated forage production, he would be very

interested in adding these acres to his operation. Thus, the third scenario examines the liquidation of the dairy herd and the addition of the 500 acres. Under this scenario, all of the crop ground would be used to grow corn and soybeans.

The value of farm production, net farm income and operating profit margin ratio for scenario #3 is presented in the final column of Table 6. This scenario looks quite a bit better than scenario #2. However, income and profitability are still lower and risk is still higher for this scenario than it is for the base case or scenario #1, which maintains the dairy herd. In particular, the operating profit margin ratio is considerably more variable under scenario #3. The operating profit margin ratio for this scenario ranged from -0.2631 in 2005 to 0.2527 in 2007.

Concluding Comments

Joe Meier has been pondering whether his farm needs to become more specialized. Currently, the farm produces corn, soybeans, alfalfa and corn silage, and has a dairy herd. Specialization could entail purchasing rather than raising alfalfa and corn silage, as well as liquidating the dairy herd and focusing on corn and soybean production. The farm has been relatively profitable over the last 10 years. Analysis results indicate that it would be prudent for Joe to consider purchasing the alfalfa and corn silage needed for the dairy herd rather than raising these crops himself. Discontinuing dairy production would have a negative impact on income and profitability and increase risk, even if Joe was to farm an additional 500 acres. It would take more than 500 additional acres to replace the income lost from the dairy operation. Even if the income lost by discontinuing dairy production was replaced with increased crop production, it might not be feasible to reduce risk to the level of Joe's current operation. This result is not that surprising given the importance of crop and livestock diversification as a risk management strategy.

Now that a brief summary of the average and relative riskiness of several alternative scenarios has been conducted, the next step is to develop a set of pro forma financial statements for the base case and one or more of the scenarios. This could be done using spreadsheets or software, such as FINPACK.

Key Questions

1. Joe's employee, Tom Smith, helps supervise employees involved in the crop and dairy enterprises and would like to one day own and operate a farm. How could Joe bring Tom into the decision making-process and should he?
2. What are some methods to reduce risk (other than diversification) that Joe could use if he eliminates the dairy operation?
3. In addition to the three scenarios Joe identified, are there any others you would suggest he consider? Why?

Table 1. Balance Sheet for C & D Farms.

		Beginning	Ending	Average
ASSETS:				
Cash	(1)	250,000	381,202	315,601
Marketable Securities	(2)	0	0	0
Accounts Receivable	(3)	0	0	0
Fertilizer and Supplies	(4)	28,565	29,006	28,786
Investment in Growing Crops	(5)	0	0	0
Crops Held for Sale and Feed	(6)	85,159	105,696	95,427
Market Livestock	(7)	0	0	0
TOTAL CURRENT ASSETS (Add Lines 1 through 7)	(8)	363,724	515,904	439,814
Breeding Livestock	(9)	209,872	209,872	209,872
Machinery and Equipment	(10)	637,088	657,830	647,459
Buildings	(11)	495,500	466,450	480,975
Investments in Cooperatives	(12)	0	0	0
Land	(13)	3,072,000	3,554,000	3,313,000
TOTAL NONCURRENT ASSETS (Add Lines 9 through 13)	(14)	4,414,460	4,888,152	4,651,306
TOTAL ASSETS (Add Lines 8 and 14)	(15)	4,778,184	5,404,056	5,091,120
LIABILITIES AND OWNER EQUITY:				
Accounts Payable	(16)	0	0	0
Taxes Payable	(17)	0	0	0
Accrued Expenses	(18)	0	0	0
Current Portion: Deferred Taxes	(19)	0	0	0
Notes Due Within One Year	(20)	250,000	250,000	250,000
Current Portion of Term Debt	(21)	37,667	40,166	38,917
Accrued Interest	(22)	15,877	14,628	15,252
TOTAL CURRENT LIABILITIES (Add Lines 16 through 22)	(23)	303,544	304,794	304,169
Noncurrent Portion: Deferred Taxes	(24)	0	0	0
Noncurrent Portion: Notes Payable	(25)	203,006	167,472	185,239
Noncurrent Portion: Real Estate Debt	(26)	251,434	247,080	249,257
TOTAL NONCURRENT LIABILITIES (Add Lines 24 through 26)	(27)	454,440	414,552	434,496
TOTAL LIABILITIES (Add Lines 23 and 27)	(28)	757,984	719,346	738,665
OWNER EQUITY (Subtract Line 28 from Line 15)	(29)	4,020,200	4,684,711	4,352,455
TOTAL LIABILITIES AND OWNER EQUITY (Add Lines 28 and 29)	(30)	4,778,184	5,404,056	5,091,120

Table 2. Income Statement for C & D Farms.**Farm Business Receipts:**

Crop Cash Sales	(1A)	838,149
Ending Crop and Feed Inventory	(1B)	105,696
Beginning Crop and Feed Inventory	(1C)	85,159
Accrual Gross Revenue from Crops (Line 1A + Line 1B - Line 1C)	(1)	858,686
Livestock and Milk Cash Sales	(2A)	624,750
Ending Livestock Inventory	(2B)	209,872
Beginning Livestock Inventory	(2C)	209,872
Accrual Gross Revenue from Livestock and Milk (Line 2A + Line 2B - Line 2C)	(2)	624,750
Gain/Loss on Sale of Breeding Livestock	(3)	0
Agricultural Program Payments	(4)	24,084
Crop Insurance Proceeds	(5)	81,000
Other Farm Income	(6)	0
GROSS REVENUE (Add Lines 1 through 6)	(7)	1,588,520
Livestock Purchases	(8)	70,934
Cost of Purchased Feed/Grain	(9)	82,350
VALUE OF FARM PRODUCTION (Line 7 - Line 8 - Line 9)	(10)	1,435,237

Farm Business Expenses:

Fertilizer	(11)	161,673
Seed	(12)	123,977
Chemicals	(13)	45,911
Dryer Fuel	(14)	12,492
Machinery Fuel	(15)	57,636
Machinery Repairs	(16)	23,160
Hauling	(17)	9,462
Insurance	(18)	21,006
Custom Hire and Rental	(19)	87,908
Miscellaneous	(20)	62,303
Hired Labor	(21)	138,305
Cash Rent	(22)	211,000
TOTAL CASH OPERATING EXPENSES (Add Lines 11 through 22)	(23)	954,831
Expense Inventory Adjustment	(24)	-441
Depreciation	(25)	120,308
TOTAL OPERATING EXPENSES (Line 23 + Line 24 + Line 25)	(26)	1,074,698
Interest	(27)	59,381
TOTAL EXPENSES (Line 26 + Line 27)	(28)	1,134,079
NET FARM INCOME FROM OPERATIONS (Line 10 - Line 28)	(29)	301,158
Gain/Loss on Sale of Capital Assets	(30)	0
NET FARM INCOME (Line 29 + Line 30)	(31)	301,158

Table 3. Sources and Uses of Funds Statement for C & D Farms.

SOURCES OF FUNDS:

Beginning Cash	250,000
Cash Farm Receipts	1,414,700
Decrease in Accounts Receivable	0
Decrease in Investment in Cooperatives	0
Capital Asset Sales	28,000
Increase in Total Liabilities	0
Outside Equity Capital	0
Net Non-Farm Cash Income	0
Total Sources of Funds	1,692,700

USES OF FUNDS:

Farm Cash Operating Expenses	1,014,212
Increase in Accounts Receivable	0
Increase in Investment in Cooperatives	0
Capital Asset Purchases	140,000
Decrease in Total Liabilities	38,639
Equity Capital Withdrawals	0
Family Living Withdrawals	85,012
Income and Self-Employment Taxes	33,635
Ending Cash	381,202
Total Uses of Funds	1,692,700

UNLOCATED FUNDS: 0

Note: If all cash flows (farm and non-farm) are accounted for, unlocated funds will be zero.

Table 4. Statement of Owner's Equity for C & D Farms.

Owner Equity, January 1	4,020,200
Net Farm Income	301,158
Owner Withdrawals from Farm Business	-118,647
Income and Self-Employment Taxes	-33,635
Family Living	-85,012
Change in Farm Assets	482,000
Machinery and Equipment	0
Buildings	0
Land	482,000
Other Capital Contributions to and from Farm Business	0
Owner Equity, December 31	4,684,711

Table 5. Financial Ratios for C & D Farms.

Liquidity

Current Ratio	1.69
Working Capital	211,111
Working Capital to Gross Revenue	0.1329

Solvency

Debt to Asset Ratio	0.1331
Equity to Asset Ratio	0.8669
Debt to Equity Ratio	0.1536

Profitability:

EBITA	480,847
Net Farm Income	301,158
Operating Profit Margin Ratio	0.1920
Rate of Return on Farm Assets	0.0541
Rate of Return on Farm Equity	0.0497

Financial Efficiency:

Asset Turnover Ratio	0.2819
Operating Expense Ratio	0.6650
Depreciation Expense Ratio	0.0838
Interest Expense Ratio	0.0414
Net Farm Income Ratio	0.2098

Repayment Capacity:

Capital Debt Repayment Capacity	362,200
Capital Debt Repayment Margin	295,278
Replacement Margin	183,278
Term-Debt Coverage Ratio	5.41
Replacement Margin Coverage Ratio	2.02

Miscellaneous:

Adjusted Total Expense Ratio	0.8494
Economic Total Expense Ratio	1.0593
Gross Revenue per Worker	327,530

Table 6. Comparisons between Base Case and Three Scenarios.

Measure	Base Case	Scenario #1	Scenario #2	Scenario #3
<u>Value of Farm Production</u>				
12	1,435,237	1,434,300	1,166,379	1,557,179
08-12 Average	1,312,715	1,284,866	976,815	1,304,428
03-12 Average	1,116,286	1,089,354	776,099	1,036,806
03-12 Std. Dev	280,951	279,484	262,664	350,218
03-12 CV	25.17	25.66	33.84	33.78
<u>Net Farm Income</u>				
12	301,158	339,018	268,528	372,591
08-12 Average	272,467	281,042	158,219	228,568
03-12 Average	214,785	221,029	82,878	128,628
03-12 Std. Dev	156,474	156,888	143,465	190,484
03-12 CV	72.85	70.98	174.37	148.09
<u>Operating Profit Margin Ratio</u>				
12	0.1920	0.2181	0.1934	0.2158
08-12 Average	0.1845	0.1943	0.1131	0.1413
03-12 Average	0.1724	0.1803	0.0271	0.0644
03-12 Std. Dev	0.0950	0.0958	0.1824	0.1713
03-12 CV	55.07	53.15	674.09	266.04

Appendix Table 1. Definitions of Liquidity and Solvency Ratios.

Liquidity Measures

Current Ratio = Ending Current Assets ÷ Ending Current Liabilities

Base Case: Current Ratio = 515,904 ÷ 304,794 = 1.69

Working Capital = Ending Current Assets - Ending Current Liabilities

Base Case: Working Capital = 515,904 - 304,794 = 211,111

Working Capital to Gross Revenue = Working Capital ÷ Gross Revenue

Base Case: Working Capital to Gross Revenue = 211,111 ÷ 1,588,520 = 0.1329

Solvency Measures

Debt to Asset Ratio = Ending Total Liabilities ÷ Ending Total Assets

Base Case: Debt to Asset Ratio = 719,346 ÷ 5,404,056 = 0.1331

Equity to Asset Ratio = Ending Owner Equity ÷ Ending Total Assets

Base Case: Equity to Asset Ratio = 4,684,711 ÷ 5,404,056 = 0.8669

Debt to Equity Ratio = Ending Total Liabilities ÷ Ending Owner Equity

Base Case: Debt to Equity Ratio = 719,346 ÷ 4,684,711 = 0.1536

Appendix Table 2. Definitions of Profitability Ratios.

Profitability Measures

Earnings Before Interest, Taxes, and Amortization (EBITA) = Net Farm Income + Interest +
Depreciation

$$\text{Base Case} = 301,158 + 59,381 + 120,308 = 480,847$$

Net Farm Income

$$\text{Base Case: Net Farm Income} = 301,158$$

Operating Profit Margin Ratio = (Net Farm Income + Interest - Unpaid Family and Operator
Labor) ÷ Value of Farm Production

$$\text{Base Case} = (301,158 + 59,381 - 85,012) \div 1,435,237 = 0.1920$$

Rate of Return on Farm Assets = (Net Farm Income + Interest - Unpaid Family and Operator
Labor) ÷ Average Total Assets

$$\text{Base Case: } (301,158 + 59,381 - 85,012) \div 5,091,120 = 0.0541$$

Rate of Return on Farm Equity = (Net Farm Income - Unpaid Family and Operator Labor)
÷ Average Owner Equity

$$\text{Base Case: } (301,158 - 85,012) \div 4,352,455 = 0.0497$$

Appendix Table 3. Definitions of Financial Efficiency Ratios.

Financial Efficiency Measures

Asset Turnover Ratio = Value of Farm Production ÷ Average Total Assets

Base Case: Asset Turnover Ratio = $1,435,237 \div 5,091,120 = 0.2819$

Operating Expense Ratio = (Total Cash Operating Expenses + Expense Inventory Adjustment)

÷ Value of Farm Production

Base Case: Operating Expense Ratio = $(954,831 - 441) \div 1,435,237 = 0.6650$

Depreciation Expense Ratio = Depreciation Expense ÷ Value of Farm Production

Base Case: Depreciation Expense Ratio = $120,308 \div 1,435,237 = 0.0838$

Interest Expense Ratio = Interest Expense ÷ Value of Farm Production

Base Case: Interest Expense Ratio = $59,381 \div 1,435,237 = 0.0414$

Net Farm Income Ratio = Net Farm Income ÷ Value of Farm Production

Base Case: Net Farm Income Ratio = $301,158 \div 1,435,237 = 0.2098$

Appendix Table 4. Definitions of Repayment Capacity Ratios.

Repayment Capacity Measures

Capital Debt Repayment Capacity = Net Farm Income + Depreciation + Interest - Family

Living Withdrawals - Income and Self-Employment Taxes

Base Case: Capital Debt Repayment Capacity = 301,158 + 120,308 + 59,381

- 85,012 - 33,635 = 362,200

Capital Debt Repayment Margin = Capital Debt Repayment Capacity - Prior Year Current

Portion of Term Debt - Interest Expense on Term Debt - Payment on Unpaid

Operating Debt from a Prior Period

Base Case: Capital Debt Repayment Margin = 362,200 - 37,667 - 29,255 - 0 = 295,278

Replacement Margin = Capital Debt Repayment Margin - Capital Asset Purchases

Base Case: Replacement Margin = 295,278 - (140,000 - 28,000) = 183,278

Term-Debt Coverage Ratio = Capital Debt Repayment Capacity ÷ Total Principal and Interest
on Term Debt

Base Case: Term-Debt Coverage Ratio = 362,200 ÷ (37,667 + 29,255) = 5.41

Replacement Margin Coverage Ratio = Capital Debt Repayment Capacity ÷ (Total Principal
and Interest on Term Debt + Payment on Unpaid Operating Debt from a Prior
Period + Capital Asset Purchases)

Base Case = 362,200 ÷ (37,667 + 29,255 + 0 + (140,000 - 28,000)) = 2.02

Appendix Table 5. Definitions of Miscellaneous Ratios.

Miscellaneous Measures

Adjusted Total Expense Ratio = (Total Expense + Unpaid Family and Operator Labor)
÷ Value of Farm Production

Base Case: Adjusted Total Expense Ratio = $(1,134,079 + 85,012) \div 1,435,237 = 0.8494$

Economic Total Expense Ratio = (Total Expense + Unpaid Family and Operator Labor
+ Opportunity Charge on Owner Equity) ÷ Value of Farm Production

Base Case: Economic Total Expense Ratio = $(1,134,079 + 85,012 + 301,190) \div$
 $1,435,237 = 1.0593$

Gross Revenue per Worker = Gross Revenue ÷ Number of Workers

Base Case: Gross Revenue per Worker = $1,588,520 \div 4.85 = 327,530$

This case was developed and written by Michael Langemeier, Professor in the Department of Agricultural Economics at Purdue University, October, 2013.