FARM / RANCH BUSINESS

FINANCIAL ANALYSIS DECISION AID

FIN ANALYSIS

For QuickBooks Pro™

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For QuickBooks Pro™
Decision Aid

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SECTION I

USING THE DECISION AID

Data Requirements and Sources

Determining where the farm or ranch business stands financially is important for planning for a happy financial future in agriculture. This can be accomplished by using this decision aid with data generated by QuickBooks Pro™ and reported in the business balance sheet and the profit and loss report. Analysis data and reporting accommodate both QuickBooks Pro™ reporting and the Farm Financial Standards Council guidelines (FFSC1997.) Business debt and repayment information is required. Limited data is also requested for producers with raised breeding stock if the base value approach is used for breeding stock (see Appendix A).

In summary, to complete the analysis, you need the fiscal year data (tax year, income tax schedules, and the business balance sheet for the beginning and end of the fiscal year). Beginning and ending year inventories of livestock and crop production for sale is required. Having accounts payable, receivable, and prepared accrued expenses is necessary if these adjustments are not included in the QuickBooks Pro™ end of year close out. Loan repayment schedules that can be acquired from the lender will provide data for debt repayment scheduled and interest cost.

The first part of this user manual provides an illustration of the data required and calculations made by the decision aid. Four forms are included, including:

(1) Financial Data from Financial Statements
(2) Repayment Capacity Data and Business Debt Information
(3) Accrual Adjustments for the Fiscal Year not already included in the financial statements.
(4) Raised and Purchased Breeding Cattle Capital Gains and Loss Revenue if the base value approach is used for raised breeding stock

For those producers that do not own cattle or capitalize raised replacement heifers, the fourth form is unnecessary.

The reports generated by the decision aid include:

(1) Farm Financial Standards and Other Financial Position and Performance Measures
(2) Graphs of Key Balance Sheet Values, Solvency, Profitability, and Operating Ratios for the Fiscal Year
(3) The DuPont Equation and Financial Analysis Calculations

The suggested analysis in Section II, procedure and interpretation, should be useful to aid the experienced analyst, as well as help clarify results to producers. The definitions and details behind the analysis explains in detail the performance analysis process utilized by the Farm Financial Standards Council Guidelines and the DuPont equation that furthers facilitates sensitivity analysis. The information can be useful in summarizing financial data; and the limitations must be recognized and explained to the owners/managers of the business. Caution must be made in interpretation of the business performance, if only in the year it is available. Ideally, one should have three years of historical and a projected year of financial statements completed.

In all situations where the business analysis shows financial problems, the business CPA and lender should be asked to complete a more in-depth analysis.

Using the Decision Aid

In order to complete the form or ranch business analysis, the following data will need to be obtained.

For Fiscal or Tax Year of the Analysis:

- Depreciation schedule
- Loan payment schedules
- Financial statements that have been prepared for the fiscal year business analysis or the lender. Anything is helpful for a starting point. Statements would include:
  - Beginning and ending fiscal year balance sheet (ending is next year's beginning)
  - Income statement, if available

- If only cash accounting is accomplished then ending and beginning inventories for cattle grain or other commodities and feed are needed. If there were major differences between beginning and ending inventories of fuel, vet supplies, fertilizer, seed, or other high cost items, record these inventories.
- Prepaid expenses, accrued taxes, interest, or accounts payable.

Form 1 – Financial Data from Tax Forms and Financial Statements

This form summarizes the data from the QuickBooks Pro Profit and Losses and the business balance sheet. Check the glossary for definitions if the data requested is not clearly understood. Also, check carefully the "balance sheet" valuation of assets. The most conservative valuation is book value or purchase cost minus accumulated depreciation. This information for depreciable assets is on the business depreciation schedule.

Using Accrual Financial Data

The decision aid can be used to calculate performance measuring from accrual adjusted financial statement data. Since gross revenue and operating expenses include the accrual adjustments, Form 3 and Form 4 are not necessary when using the decision aid with accrual data as these adjustments are already in revenue and expenses. Form 2 should be used to record the necessary repayment capacity calculation data.

Form 2 – Repayment Capacity Data and Business Debt Information

Data on term debt will have to be acquired from the lender for each loan. Be sure to separate interest payments from principal payments for each loan. Recall that term debt is for loans of more than one-year duration. Short-term credit, such as operating loans or credit cards, is accrued to be paid in the year rather than amortized over a period of years. If there is unpaid operating debt from prior periods, be sure and record the amount in the "Payment of Unpaid Operating Debt from Prior Periods."

Form 3 – Accrual Adjustments for the Fiscal Year

Most farms and ranches report to the IRS on a cash basis. The cash based taxable income is not a measure of "profitability" or return to business equity. Use this form if the accrual adjustments have not been made in the QuickBooks Pro statements.

Your Financial Situation Reports

Table 1 presents the Farm Financial Standards recommended criteria and associated record values. These values are calculated from the data input into the form for the identified fiscal year. The deviations from the FFSC standards to address management accounting needs are noted. The main difference being that owner labor and management compensation is included in operating costs. In the FFSC this is treated as a "withdrawal".

In addition, select other performance measures are calculated to give greater insight into the business financial practices and performance. The benchmarks provide some guidance to how the business compares and if a higher positive or negative value would show a stronger or weaker position. Interpretation of these values should follow the recommendation printed in the section of the manual that follows.

Table 2 shows the application of the DuPont equation and allows the analysis of the affects of change in key measures. Questions can be addressed like: What would be the change in ROA if costs could be cut 10%? What would be the ROA if government payments were eliminated?

DuPont Equation and Financial Analysis Calculation

The DuPont equation facilitates the evaluation of the effect of financial change on the return on assets (ROA) and return on equity (ROE) of the business.

ROE is the ultimate measure of business performance. The DuPont financial equation links the key components of financial performance and facilitates "what if" analysis and communications. The DuPont equation in summary is as follows:

$$\underset{\text{turnover}}{\textit{asset}} \quad x \quad \frac{\textit{operating margin}}{\textit{gross revenue}} \quad = \quad \textit{ROA}$$

Asset turnover is gross revenue divided by total average assets. The operating margin divided by gross revenue is also called the operating margin ratio. Multiplying by 100 expresses the value as a percent return on assets. There are two major determinants of the Return on Assets – assets or investment and operating margin. Changing investment turnover is influenced by the effectiveness of investment (reducing excess investment in vehicles and machinery for example). Of course, cost efficient production and marketing improves the operating margin generated from revenue, which improves the operating margin to gross revenue ratio or operating margin ratio.

The components of the DuPont equation can be extended to analyze the return to business equity (ROE) capturing the effects of debt (leverage, asset relation to equity) and its cost of business performance. This would include (1) ROA, (2) an interest cost adjustment, and (3) leverage or the use of debt financing. The print out of the analysis, Table 2, illustrates the calculations.

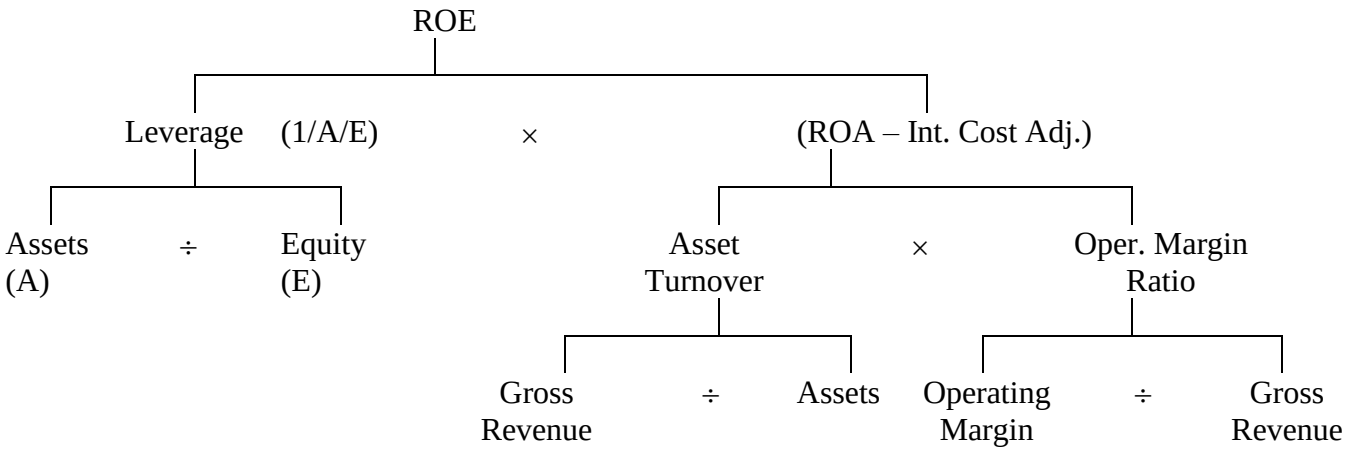
Financial factors that are allowed to vary are agriculture program payments, gross revenues, and total operating expenses, including the owner-operator management and labor returns from the business and interest expense.

Other measure calculated is the leverage situation index, which tells if "debt" is profitable for the business and whether the cost of debt is less than it is earnings. This is a guide to the benefits of increasing leverage. Frequently, farmers and ranchers cannot justify the use of debt because of the low returns relative to cost of capital.

Once accrual adjusted financial statements are completed using the guidelines of the Farm Financial Standards Guidelines, the necessary data is available to use the DuPont equation. Completing the analysis helps understand relationships behind ROA and ROE, but also facilitates "what if" analysis communication on the impact of changes on performance measures. For example, what would be the impact of improved marketing that could increase your revenue 10%, and, likewise, a cut of 10% in production costs? Using the analysis not only helps communicate results, but also provides for sensitivity analysis for planning purposes.

Review of Relationships

DuPont Equation Components



First Level

ROE = (ROA – Interest Cost Adjustment) × Leverage

Increase return on equity (ROE) by increasing the overall return on assets (ROA) or by increasing your leverage (one divided the ratio of assets to equity).

Second Level

Leverage Ratio = (1/Assets ÷ Equity)

As your debt increases relative to equity, so does business leverage.

ROA = Asset Turnover × Operating Margin Ratio

Increase return on assets by turning those assets into more gross revenue or by increasing the amount of money made on each sale.

Third Level

Asset Turnover = Gross Revenue ÷ Average Assets

Asset turnover is the amount of money taken in on sales relative to assets. As asset turnover increase, the more efficient the business is at turning assets into revenue.

Operating Margin Ratio = Operating Margin ÷ Gross Revenue

Operating margin ratio is the operating margin divided by the amount of gross revenue. As the operating margin ratio becomes larger, the lower the overall costs will be as they relate to gross revenue generated.

Financial Trend

Ideally, a financial analysis would include three years of historical position and performance information plus a projected year. Trend analysis strengthens conclusions that can be drawn from the analysis.

The Fin trend program manages individual analysis data and allows a projection of one year. The user can choose to only print and graph actual data if a projection is not completed.

The same performance measures are presented in the trend report, and graphs are presented for select measures including:

- Solvency
- Profitability – ROA and ROE
- Net Income After Tax
- Operating Ratio – Operating Expense
- Change in Equity
- Leverage Situation Index (ROE/ROA)

Interpretation of critical measures is presented in Sections II and III.

SECTION II

FARM / RANCH
FINANCIAL STATEMENT ANALYSIS

Analyzing the statements requires an understanding of format, financial terminology, criteria, and measures used. Statement analysis helps identify the business's strengths and weaknesses and develops strategies for the future. Increasingly, agriculture has been developing standardized financial databases containing benchmarks for comparisons between operations that help identify areas for change. However, the best information is obtained from a track record of the business's performance. This paper summarizes the steps in financial statement analysis, focusing on understanding, and uses measures and definitions. The aim is to improve understanding of financial statement analysis, as well as to improve communication on the business performance with their accountants, lenders, family members, and owners.

Financial statement analysis begins with accurate financial data presented in a standardized format, which is understood by the analyst. Knowledge of the business organization and goals of the owners are also valuable in understanding and completing the diagnostic interpretation of the statements. When historical, current, and projected financial statements are completed and key ratios calculated, the business financial position and performance can be interpreted. The formats of managerial statements and the criteria and measures used to analyze these statements follow the guidelines developed by the National Farm Financial Standards Council.

Managerial financial statements include: the beginning and ending balance sheets, the accrual adjusted income statement, the statement of cash flows, and the statement of owner equity. The balance sheet reports the financial position of the business on a specific date, including the business's assets, liabilities, and equity. The income statement is a means by which a business summarizes income and expenses for a certain time period, which measures the profit for a business. The statement of cash flows reports the cash inflows, cash outflows, and net change in the cash of the business from operating inventory and financing activities in a manner that reconciles the beginning and ending cash balances. The statement of owner equity reconciles the beginning and ending owner equity.

Steps in Financial Statement Analysis

The steps in a financial statement analysis are as follows:

1. Determine the objectives of the analysis.
2. Describe the business organization.
3. Prepare financial statements for each business entity and a consolidated statement.
4. Calculate financial ratios and prepare a historical and projected summary.
5. Compare results to comparable businesses if benchmarks are available.

6. Summarize findings with good ratios to help recall specific information when reviewing the analysis at a later date. Strengths and weaknesses should be expressed in a clear, concise manner with proper signals to the reader of limitations of the analysis.

The key financial performance measures are summarized with their interpretation on the page that follows. A financial evaluation cannot be completed without financial statements. What the financial statements measure is stated in the Farm Financial Standards Council Guidelines as follows:

> "Financial analysis of an agricultural business must focus on both its present position (called financial position), the results of operations, and past financial decisions (called financial performance).
>
> *Financial position* refers to the total resources controlled by a business and total claims against those resources at a single point in time. Measures of financial position provide an indication of the capacity of the business to withstand risk from future farming and ranching operations and provide a benchmark against which to measure the results of future business decisions.
>
> *Financial performance* refers to the results of production and financial decisions over one or more periods of time. Measures of financial performance include the impact of external forces that are beyond anyone's control (drought, grain embargoes, etc.), and the results of operating and finance decisions made in the ordinary course of business."

Criteria chosen for analysis by the FFSC includes profitability, liquidity, solvency, and financial offering.

Financial Analysis: The First Quick Overview

Financial statement analysis requires learning the terminology and practice to gain an understanding of what the statements really say. This short paper will demonstrate the basic steps to follow for the initial overview.

The first step of analysis is to obtain a completed set of financial statements for the farm / ranch operation that is being considered. With statements in hand, it is then possible to calculate the financial ratios for the operation. These ratios will provide important clues that lead to a greater understanding of financial health. The Farm Financial Standards Council has published guidelines concerning recommended measures and how they should be calculated. The use of the guidelines is strongly encouraged to insure accuracy and consistency of the financial measures.

Key Financial Performance Measures			
	MEASURE	INTERPRETATION**	BENCHMARK
Profitability			Goal
Return on Assets	The net income generated by all assets, after labor has been compensated, but before interest payments, divided by total assets.	An index measurement of profitability that indicates the profitability per dollar of assets, thus allowing comparisons over different size firms and different types of businesses/investment.	5% to 8%
Return on Equity	The net income after all labor and interest charges. That is, the residual return to the owner's investment divided by the equity investment.	An index measurement of the return the owner of the business receives on his/her money invested. Can be compared to rates of return in other investment opportunities such as stocks, bonds, or saving accounts. The rate of return on equity needs to be larger than the rate of return on assets for borrowing to be advantageous to the business.	6% to 16%
Operating Margin Ratio	Calculated as operating margin divided by gross revenues.	The proportion of earnings or revenues that is operating margin and thus available to compensate debt and equity capital. Indicates the operating margins and reflects the ability to generate revenues and control costs in such a way as to generate a profit.	>1*
Liquidity			
Current Ratio	Calculated as current assets (inventories, cash, accounts receivable, etc.) Divided by current liabilities (operating loan payments, accounts payable, unpaid taxes due, this year's payments on term loans, accrued interest and rent, etc.).	A basic indicator of short-term debt servicing and/or cash flow capacity. It indicates the extent to which current assets, when liquidated, will cover current obligations. It does not predict the time of cash flows during the year or the adequacy off future fund inflows in relation to outflows.	>1*
Solvency			
Equity-to-Asset Ratio	Total equity divided by total assets.	The basic leverage of business (i.e., what proportion of total farm assets is owned). Measures the ability of the business to repay all financial obligations if all assets were sold.	70%
Financial Efficiency			
Asset Turnover Ratio	Gross revenues divided by total assets.	Reflects how efficiently farm assets generate revenues, indicates the volume of business generated by the asset base (i.e., the flow of revenue through the asset pipeline). Can show wide variation depending on the proportion of owned land or other assets.	40%
Operating Expense Ratio	Total operating expenses minus depreciation divided by gross revenue.	The proportion of total revenues that are absorbed by operating expenses.	<65%
Depreciation Expense	Depreciation expense divided by gross revenue.	The proportion of total revenues that are absorbed by depreciation expense.	<12%
Interest Expense Ratio	Total Farm/Ranch interest expense divided by gross revenue.	The proportion of total revenues that are absorbed by interest expense.	<12%
Net Income Ratio	Net farm/ranch income divided by gross revenue.	The proportion of total revenue that remains as net income after all expenses are paid.	>10%

* Very enterprise specific. **Source of interpretation, Boehlji, et al.

After this is completed, take a step back, examine the information, and decide if the numbers make sense. Farm / ranch managers and owners will be familiar enough with the operation to realize if any particular piece of information does not conform with expected outcomes. At this point, a deeper analysis of the operation is necessary to determine the underlying causes of any discrepancies.

The questions as to what financial measures should be examined first are dependent on the purpose of the business and the debt situation. The analyst should first focus on a few financial measures that are key to his or her particular business situation. Table 1 presents the four situations that are examined here. The key variables addressed are the production capacity of the farm / ranch, and the debt load carried by the operation. Also listed in the table are the key measures and where they can be found in the financial statements.

With this chart as a guide, the analyst can quickly concentrate on measures that hold a great deal of importance for the operation. In the case of the full-time producer with minor debt obligations (less than 10% debt to equity), the focus of the initial analysis would be the return on assets (ROA) and the change in equity from year to year. See the calculation in Section III. With a major debt load, the full time producer would be interested in return on assets and his repayment capacity. Two measures are presented in the Farm Financial Guidelines that pertain to repayment capacity: term debt and capital lease coverage ratio and capital replacement and term debt repayment margin. Both of these measures, along with return on assets, are defined in Section III.

Table 1
Farm / Ranch Production Capacity, Debt Load, Key Measures,
And Location in the Financial Statements

Production Capacity	Debt Load	Key Measure(s)	Location of Data in Statements
Full-Time	Minor	Return on Assets Change in Equity	Balance Sheet Income Statement
Full-Time	Major	Return on Assets Repayment Capacity	Balance Sheet Income Statement Cash Flows
Part-Time	Minor	Change in Equity	Balance Sheet
Part-Time	Major	Repayment Capacity	Income Statement Cash Flows

For the part-time operator with a minor debt load (farm / ranch debt and personal debt), the focus is the historical change in equity. In the case of major debt load, repayment capacity is examined. In both of these cases, interest in the profitability measure has less importance because non-farm income is more important in terms of repayment capacity and income generation.

In order for the business to maintain equity or grow, it must have a positive return on assets (ROA). If the returns are not distributed out of the business, equity will increase. Agricultural returns are low in general, so a 5-8% return on assets is favorable. One would like to achieve a level of return comparable to the cost of borrowed capital. Equity increase is a very good indicator of the financial performance of the business.

After careful consideration of the ratios for the particular situation, the manager or owner can then branch out to a more detailed analysis of the operation. Both financial and non-financial performance measures need to be reviewed. At this point, more complex questions regarding analysis, accounting, or record keeping issues may arise. By focusing on specific financial measures, this gives the analyst a good starting point for looking at the farm / ranch business. After this first pass, he or she can then move onto more complex issues.

More in depth financial analysis issues are now addressed; however, first one must consider two important issues are savings and consumption and confidentially of financial data.

Savings and Consumption Margin

The ability of a business to support family living, any capital distribution, and savings for business growth can be measured by the savings and consumption margin. Without non-ranch earnings and change due to valuation equity, this margin can also be a good indicator of the financial sustainability of the business. This margin is for savings retained in the business or taken out of the business (after tax) through distributions for family living and other uses. It is important for ranch owners to be realistic about the saving and consumption margin generated by ranches. With low commodity prices and high costs, which result in low returns on investments, it requires a tremendous amount of equity to sustain a family operation. Absentee landowners can use the savings and consumption margin as an indicator of what they can expect from their operation and sustain the business equity.

Measuring Financial Performance And Risk Bearing Ability

Financial Risk

Business profits are the returns to taking risks. One of the functions of financial statements is to measure the profits from taking risk. Another important function is to provide indicators of the business performance and risk bearing ability. The risk bearing ability is reflected in several measures including:

1. Profitability measured by return on assets (ROA), return on equity (ROE), and change in equity.

2. The business solvency reflected in the equity to asset ratio.

3. The earning on debt relative to its cost that is measured in the relationship of return on equity divided by return on assets or ROE/ROA.

4. Repayment capacity measured by the term debt coverage ratio.

5. Cash flow and profit breakevens for commodities.

The balance sheet shows the size of the business and the amount of equity that, in addition to the solvency and repayment capacity, provides an idea of just what can happen if parts of the business fail to perform for various reasons. Historical financial statements and the magnitude of year-to-year variation will reflect the inherent price and the production risk the business has faced in the past, which is information to think about for the future. Also, knowledge of production efficiency and product cost of production can provide insights into the competitiveness of the business or its potential for improvement.

Reflecting on Financial Risk

Profitability is the key to sustaining business equity and the ability to accumulate equity to cover bad times. Profitability is measured after withdrawals for unpaid family labor and management. The lower the profits, as measured by ROA, ROE, operating margin ratio, and net farm/ranch income, the less margin there is to build equity or sustain losses without causing the business to go insolvent.

An important component of profitability is the level of compensation for owner operator labor and management, and in some cases, distribution of the business. If one combines the net income, the change in asset valuation, and the contributed capital to calculate the savings and consumption margin, it becomes pretty clear what the business can support and sustain in equity. Many farm and ranch businesses are too small in terms of equity and earnings to support a family. Family members and owners need to be informed as to the capacity of the business to provide for living and saving which will also help to judge the risk bearing ability and the lifestyle the business can provide for.

Solvency

The larger the portion of the farm/ranch that is owned (equity), the greater the ability to absorb losses and bear risk. The creditors have first rights to assets of the business if it fails, so owners need to know what losses can be incurred and not put the business in jeopardy. One of the FFS criteria that measures solvency is the equity to asset or percent equity ratio. This is calculated as follows: (Assets - Liabilities)/Assets. Owners should be very cautious of pushing debt to where crop or livestock production failure or a decline in prices would push ownership to less than 70-80% equity.

Leverage Situation Ratio

The amount of debt a business can carry depends on the cost of debt relative to earnings. It is measured in terms of the leverage situation ratio or ROE/ROA. If the ratio is positive and greater than one, the return on debt is greater than its cost. The use of debt is beneficial to the business's net income. The contrary can be said when cost of debt is greater than its return. As noted, agriculture in general is a low ROA business. This does not mean that there are no profitable investments, this mean that they have to be sought and managed to generate returns greater than costs.

From observing the ROA formula, you will note the interest cost is added back to net income from operations. This is because interest represents a return to the assets owned by the lender, or debt capital. All net returns are divided by all assets irrespective of what the equity is for the business. This has an effect of neutralizing the effects of solvency on the calculation of ROA. In the case of ROE, it is calculated after paying the lender interest, so interest is left in expenses to calculate net income to equity. If ROE is greater than ROA, it means the cost of debt is less than the returns, which leaves more net income to equity, thus a higher return to equity than capital cost. Just recall that a favorable business situation is where return on equity is greater than return on assets and cost of capital, ROE > ROA > COD (COD is the cost of debt).

Repayment Capacity

Since much of a business risk bearing ability is associated with the use of debt to cover short falls in earnings or to expand the income generating capacity of the business, the debt level and repayment capacity is a very important measure to monitor when thinking about financial risk. The repayment capacity, measured by the term debt repayment ratio, measures the ability of the business to cover all term debt and lease payments (interest, principal, and capital leases). This ratio considers both the farm/ranch business, as well as the contributions non-farm/ranch earnings could contribute to meeting obligations. Monitoring this capacity over time will reflect changes in the business, which again can help establish a basis for future planning.

Accurate accrual adjusted financial statements will tell the story about the business. Proforma statements show what can be expected, in light of anticipation. A "what if" analysis can show potentials under different expectations. Informed decision-makers can reduce the risk of the business and keep lenders informed.

Financial Sustainability

Financial sustainability of a business is measured by the ability of the business to maintain equity over time. The ability to maintain or increase equity is determined by the ability of the business to generate a net after tax positive income and cover withdrawals for owner operator labor and management or other distributions from the business. The reason withdrawals and distributions are important in evaluation of business sustainability is because frequently the farm/ranch business must provide income for living withdrawals. A farm/ranch business equity

can be sustained by contributions from other business activities or salary earnings. However, to measure sustainability of the business, it is advisable to first evaluate the farm/ranch business then considers the non-business contribution.

Measuring the financial sustainability of a business does not require any new methodology since the business accrual adjusted financial statements clearly show historical financial sustainability. The Farm Financial Standards methodology provides the guidelines for measuring equity change through the use of the balance sheet and accrual adjusted income statement. Projected financial statements can provide information to evaluate future sustainability. Projections are always limited by the ability to forecast future productivity and commodity prices.

Equity Requirement to Support Debt

The low rate of return on farm and ranch assets creates a major debt service challenge for agricultural borrowers. When producers make an investment, the returns generated should be greater than the cost (interest rate). USDA data from 1990 shows that the average return on equity in U.S. agriculture was 2.8%, which is far less than the 9 to 11% interest rate on farm or ranch debt. In order to pay the cost of capital, the producer must use return from equity or other sources of income to pay the deficit between cost and earnings.

A few numbers can demonstrate this reality.

Borrowed Capital Cost		10%
Earnings on Added Investment		4%
Short Fall on Covering Borrowed Capital Cost		6%
Earnings on Equity		3%
Equity to Cover Cost	6% / 3% =	$ 2

The maximum amount of debt that a business can carry and pay the cost of debt is determined by the rate of return on the added debt, the cost of debt (interest cost), and the rate of return on the equity capital from current income and appreciation in the value of business assets that can make up the short fall between return and cost of debt. Using the data above, the $2 of equity that earns 3% is required to make up the 6% short fall in earnings of the capital borrowed, a 10% interest, and earnings of 4%. For every dollar of debt, there must be two dollars of equity. The maximum debt to asset rate would be one to three, or 33%, or equity to asset ratio of 66%.

The reality of this situation is also demonstrated in the relation between the cost of capital versus from earnings and appreciation earnings. This can be determined by dividing the return on equity by the return on assets to calculate the leverage situation index (ROE / ROA for the U.S. agriculture in 1990 was 0.77).[1] With this ratio of less than one, it means the cost of capital

[1]Data Source: Rural Economics Division, Economic Research Service, A Farm Business Economics Report, 1994", U.S. Department of Agriculture, ECI-1995, Washington D.C.

is greater than the return on capital. The explanation of this is found by looking at the formulas that calculate ROE and ROA.

$$\textit{ROE and Appreciation} = \frac{\textit{net farm current income + appreciation in asset value}}{\textit{average beginning and ending equity or (assets – liabilities)}}$$

$$\textit{ROA and Appreciation} = \frac{\textit{net farm current income + interest income + appreciation in assets}}{\textit{average total assets}}$$

When you calculate ROE, the interest cost is included because it is the cost of the borrowed capital. The interest expense is added back to net income when calculating ROA because the interest expense is the actual return to the assets borrowed. When ROE is greater than ROA, the returns are greater than the interest cost.

When calculating the Farm Financial Standards measures of ROA and ROE, the appreciation of assets is not included. Here the appreciation is included here to demonstrate the maximum potential debt the business can carry. Appreciation can only be captured if the assets are sold.

Cash Flow

During periods of low commodity prices, meeting cash flow requirements can be a serious problem. The **statement of cash flow** summarizes the business cash flow into the following areas.

Cash Flow from Operations, Investing, and Financing

This information shows where cash flows are generated and where they are used.

It is highly recommended that in periods of tight cash flow that a monthly cash flow budget be developed. This projection should reflect the cash flow consequence of the production, marketing, and financing plan.

The projected cash flow should compare projected to actual cash flow to help manage cash flows and improve projection planning.

Short Term Repayment Capacity

The repayment capacity is useful for business analysis. Also, the business should be evaluated in terms of short-term liquidity using the current ratio or working capital. If potential problems in meeting short-term obligations are observed, a monthly projected cash flow should be developed which combines a production, marketing, and financial management plan.

Breakeven Cash Flow and Profit Price

Developing marketing plans that incorporate the financial statement information analysis can identify risk potentials, as well as assist in determining when pricing opportunities will cover cash flow and profit targets.

Cash flow breakeven would involve determining cash operating expenses, interest payments, family living withdrawals, income, social security taxes, and principal payments.

The cash flow requirements would then be allocated between enterprises and allocated cash requirements divided by the amount of the commodity produced.

A similar approach would be used in determining a profit breakeven approach. However, the profit analysis includes depreciation, but not principal payments. Principal payments are not costs, but actually represent a reduction in liabilities or increase in equity.

Operating Ratios

For ongoing farms and ranches, the operating ratios are extremely valuable in measuring efficiency. Operating ratio will differ a great deal between types of operations and enterprise. It is important when having benchmark data to compare similar operations.

Net income margins improve as cost effective production improves, as will ROA and ROE. Efficient use of capital resources increases the turnover ratio; thus, the capital requirements for dollars of revenue generated are reduced. Farm and ranch accounting systems need to be organized to do enterprise and "cost center" accounting to measure unit cost of production for each product produced.

Total operating expenses includes the total cash expense plus that accrual adjustments and depreciation.

Review of ratios provides an understanding of why high operating cost businesses do not have margins for net income. Excess machinery and vehicles will result in high depreciation. Excess high cost debt raises interest cost, and, again, little is left for net to capital.

The best uses of these ratios are over time with the same business to monitor improvement or determination of Net Farm/Ranch Income.

A great deal of data is required to extradite good bench mark data to serve as a guide to judge these performance maneuvers, as they will differ between different enterprises and production systems. Producers are encouraged to participate in efforts that are developing benchmark databases to attain comparative information. Commodity groups are taking leadership in this area.

SECTION III

RECOMMENDED FARM FINANCIAL STANDARDS AND PERFORMANCE MEASURES

In the late 1980s, the Agricultural Bankers Division of the American Bankers Association put into motion a project to standardize financial reporting and record keeping in response to the farm financial crisis. This organization, now known as the Farm Financial Standards Council (FFSC), was made possible by the coming together of a national group of academicians, lenders, accountants, consultants, and regulators. The FFSC first published its recommendations in 1991, and the volunteer organization continues to work to refine and enhance the Farm Financial Standards (FFS) guidelines. The latest was published in 1997. The FFSC continues to work with commodity groups to adjust guidelines to address management accounting needs. One of the focuses is on total unit cost (TUC). One deviation used here is including compensation for owner operator labor and management compensation in operating expenses. In the 1997 guidelines this was for a sole proprietorship this compensation was treated as a cash withdrawal. TUC are not comparable between business organizations if owner compensation is not included in operating expenses.

The purpose of this section of the manual is to present the data requirements and formulas necessary to calculate the FFS chosen measures once the financial statements are assembled. The specific financial statements required to generate this data for the fiscal year include: (1) beginning and ending year balance sheets, (2) an accrual adjusted income statement, (3) statement of cash flows, and (4) schedules of loan and lease payments.

The financial position and performance measures recommended by the FFSC are as follows:

Liquidity

1. Current Ratio
2. Working Capital

Solvency

3. Debt/Asset Ratio
4. Equity/Asset Ratio
5. Debt/Equity Ratio

Profitability

6. Rate of Return on Farm Assets
7. Rate of Return on Farm Equity
8. Operating Margin Ratio
9. Net Farm/Ranch Income

Repayment Capacity

10. Term Debts and Capital Lease Coverage Ratio
11. Capital Replacement and Term Debt Repayment Margin

Financial Efficiency

12. Asset Turnover Ratio
13. Operational Ratios
    (a) Operating Expense Ratio
    (b) Depreciation Expense Ratio
    (c) Interest Expense Ratio
    (d) Net Farm Income from Operations Ratio

Conclusion

Financial measures are not a substitute for informed judgment. Financial measures are simply a convenient way to evaluate large amounts of financial information and enable the user to compare the financial position and financial performance of an individual firm over time and to other firms within an industry.

Advice for users of financial measures:

1. Financial measures help in asking the right questions, but they do not provide answers.

2. Judgment and common sense should be linked to *informed* application of formulae.

3. Be selective in the choice of financial measures. Different measures are appropriate in different industries or enterprises.

4. A benchmark is needed to assess a firm's financial performance and financial position. It is useful to compare financial measures with the firm's own measures from earlier years. While it is also useful to compare a firm's measures against other firms in the same industry group, be sure to compare "apples to apples" and "oranges to oranges."

5. Financial measures derived from incomplete or poorly prepared financial statements (balance sheets and income statements) are usually misleading and will frequently lead to bad business decisions by the owner and bad credit decisions by the lender.

Recommendations

Where appropriate, the following financial measures are recommended for use by agricultural producers, agribusinesses, and financial institutions. These financial measures adequately measure financial position and financial performance. Explanations of individual measures are presented to aid in understanding the use and limitations of the measures. All financial measures need not be calculated for every situation--the situation may not call for all financial measures, and the accounting information may not be available to calculate all financial measures. Finally, this list of financial measures is not exhaustive; and the user may calculate additional measures, if the information is accurate and the ratios provide more insight.

Formulas Recommended Farm Financial Standards Measures Are as Follows:

Formulas pertain only to the farm/ranch business and do not include non-business assets, liabilities, or income except when considering repayment capacity.

	Financial Statement(s) Providing Information to Calculate the Ratio
Liquidity	
1. *Current Ratio:*	
Total current farm/ranch assets / Total current farm/ranch liabilities	**Balance Sheet**
2. *Working Capital:*	
Total current farm/ranch assets - Total current farm/ranch liabilities	**Balance Sheet**
Solvency	
3. *Debt/Asset Ratio:*	
Total farm/ranch liabilities / Total farm/ranch assets	**Balance Sheet**
4. *Equity/Asset Ratio:*	
Total farm/ranch equity / Total farm/ranch assets	**Balance Sheet**
5. *Debt/Equity Ratio:*	
Total farm/ranch liabilities / Total farm/ranch equity	**Balance Sheet**
Profitability	**Balance Sheet and Income Statement**
6. *Rate of Return on Farm/Ranch Assets:* (Net farm/ranch income from operations* + Farm/ranch interest expense) / Average total farm/ranch assets	
7. *Rate or Return on Farm/Ranch Equity:* Net farm/ranch income from operations* / Average total farm/ranch equity	**Balance Sheet and Income Statement**

* At the Fin Analysis for QuickBooks Pro spreadsheet, *Net Farm Income from Operations and Financing* is being used instead of *Net Income From Operations*.

	Financial Statement(s) Needed
8. *Operating Margin Ratio:* (Net farm/ranch income from operations + Farm/ranch interest expense) Gross revenues	**Income Statement and Cash Flows**
9. *Net Farm/Ranch Income:* Net farm/ranch income (NFI) is calculated by matching revenues with expenses incurred to create those revenues, plus the gain or loss on the sale of farm/ranch capital assets.	**Income Statement**
Repayment capacity 10. *Term Debt and Capital Lease Coverage Ratio:* (Net farm/ranch income from operation* + Total non-farm/non-ranch income + Depreciation/amortization expense + Interest on term debt + Interest on capital leases - Total income Tax expense) (Annual scheduled principal and interest payments on term debt + Annual scheduled principal and interest payments on capital leases)	**Income Statement and Cash Flows**
11. *Capital Replacement and Term Debt Repayment Margin:* (Net farm/ranch income from operations* + Total non-farm/non-ranch income + Depreciation/amortization expense - Payment on unpaid operating debt from a prior period - Total income tax expense - Principal payments on current portion of term debt - Principal payments on current portion of capital leases - Total annual payments on personal liabilities (if not included in withdrawals)) = Capital Replacement and Term Debt Repayment Margin	**Income Statement and Cash Flows**

* At the Fin Analysis for QuickBooks Pro spreadsheet, *Net Farm Income from Operations and Financing* is being used instead of *Net Income From Operations*.

	Financial Statement(s) Needed
Financial efficiency	
12. *Asset Turnover Ratio:* Gross revenues / Average total farm/ranch assets	**Income Statement and Balance Sheet**
Operational Ratios:	
13. *Operating Expense Ratio*:* (Total operating expenses - interest expense - Depreciation/amortization expense) / Gross revenues	**Income Statement**
14. *Depreciation Expense Ratio:* Depreciation/amortization expense / Gross revenues	**Income Statement**
15. *Interest Expense Ratio:* Total farm/ranch interest expense / Gross revenues	**Income Statement**
16. *Net Farm/Ranch Income From Operations Ratio:* Net farm/ranch income from operations** / Gross Revenue	**Income Statement**
Non FFSC Measures	
Change In Equity =	**Balance Sheet**
Leverage Situation = (ROE/ROA)	**Income Statement and Balance Sheet**
Consumption and Saving Margin (Net Income after income tax and extra ordinary item + change in equity due to valuation equity + change in equity due to contributed capital)	**Income Statement And Balance Sheet**

* At the Fin Analysis for QuickBooks Pro spreadsheet, *Total Operating Expense Including Cost of Goods Sold* is being used instead (*Total Operating Expense – interest expense).*

** At the Fin Analysis for QuickBooks Pro spreadsheet, *Net Farm Income after Operation and Financing Cost* is being used instead of *Net Income From Operations*.

CURRENT RATIO

Interpretation: This ratio (usually expressed as XX:1) indicates the extent to which current farm assets, if liquidated, would cover current farm liabilities. As the current ration becomes higher, the liquidity will be greater.

Limitations:

1. Deferred taxes on the assets should be included as liabilities whenever the market value approach is used to value farm assets.

2. The ratio is a static or "stock" concept of the financial resources available at a given point in time to meet the obligations at that time. It does not measure or predict the timing of future fund flows, nor does it measure the adequacy of future fund inflows in relation to outflows.

3. The ratio ignores committed lines of credit as financial resources available to assure timely payment of obligations.

4. The ratio does not recognize that many current farm assets could not be liquidated instantly, but at the same time, many current farm liabilities are not due instantly. By convention, both current farm assets and current farm liabilities are based on a one-year time horizon.

5. The value of the ratio will be affected by the value placed on current farm assets.

6. There is no indication of the quality of the current assets and if they can be sold for the amount shown on the balance sheet.

7. The desired level for the ratio will vary by the type of business enterprise (i.e., a dairy with a monthly income, a fruit and vegetable farm with inventory levels that vary by season and with term debt obligations, a cash grain operation, etc.).

8. The value of the ratio can vary throughout the production cycle (i.e., planting versus harvest for feed grains, livestock farms with stored grain, etc.).

WORKING CAPITAL

Interpretation: Working capital is a theoretical measure of the amount of funds available to purchase inputs and inventory items after the sale of current farm assets and payment of all current farm liabilities. The amount of working capital considered adequate must be related to the size of the farm business.

Limitations:

1. Deferred taxes on the assets should be included as liabilities whenever the market value approach is used to value farm assets.

2. The measure is an absolute amount, so it is difficult to compare the measure across farm businesses. It is impossible to establish one standard for all farm businesses.

3. The measure is a static or "stock" concept of the financial resources available at a given point in time to meet the obligations at that time. It does not measure and predict the timing of future fund flows, nor does it measure the adequacy of future fund inflows in relation to outflows.

4. The measure ignores committed lines of credit as financial resources available to purchase inputs and inventories.

5. The measure does not recognize that many current farm assets could not be liquidated instantly, but at the same time, many current farm liabilities are not due instantly. By convention, both current farm assets and current farm liabilities are based on a one-year time horizon.

6. The value of the measure will be affected by the value placed on current farm assets.

7. There is no indication of the quality of the current farm assets and whether those assets can be sold for the amount shown on the balance sheet.

8. The desired level for the measure will vary by the type of business enterprise (i.e., a dairy with a monthly income, a fruit and vegetable farm with inventory levels that vary by season and with term debt obligations, a cash grain operation, etc.).

DEBT/ASSET RATIO[2]

Interpretation: This ratio measures financial position. The debt/asset ratio compares total farm debt obligations owed against the value of total farm assets. This ratio expresses what proportion of total farm assets is owed to creditors. In other words, it is the creditors' claims against the assets of a business. This ratio is one way to express the risk exposure of the farm business. It can be calculated using either the cost or market value approach to value farm assets. If the market value approach is used to value farm assets, then deferred taxes on the assets should be included as liabilities. This ratio is most meaningful for comparisons between farms when the market value approach is used to value farm assets. However, due to the impact of fluctuations in market values of farm assets, it is most meaningful for comparisons between accounting periods for an individual farm operation when the cost approach is used to value farm assets. The higher the ratio, the more risk exposure of the farm business.

Limitations:

1. The ratio is greatly influenced by the value placed on the farm assets. If current market value is used but no potential tax liability is recognized, a higher level of "comfort" might exist than should actually exist. Book value, which is usually depreciated historical cost, may not be appropriate for analysis purposes. Finally, liquidation value may not be the appropriate value for analysis of a viable, ongoing business.

2. A reasonable standard for the ratio varies from one type of enterprise to another and from one borrower to another. There is no single standard, which is ideal for all types of farm businesses. The range of acceptable values will vary, depending on the income variability, the proportion of owned land (or other assets) used in the farming operation, the risks associated with normal production, and fluctuations in farm asset values that may occur due to changing demand for agricultural assets.

[2] The three solvency ratios recommended in this report (debt/asset, equity/asset, and debt/equity) are algebraically related to one another and are not separate indicators of the solvency position of a farm. All three ratios are included in the report because one is not preferred over the others by the members of the FFSTF.

EQUITY/ASSET RATIO[3]

Interpretation: This ratio measures financial position. Specifically, it measures the proportion of total farm assets financed by the owner's equity capital. In other words, it is the owner's claims against the assets of a business. This ratio can be calculated using either the cost or market value approach to value farm assets. If the market value approach is used to value farm assets, then deferred taxes on the assets should be included as liabilities. This ratio is most meaningful for comparisons between farms when the market value approach is used to value farm assets. However, due to the impact of fluctuations in market values of farm assets, it is most meaningful for comparisons between accounting periods for an individual farm operation when the cost approach is used to value farm assets. The higher the value of the ratio, the more total capital supplied by the owner(s) and less by the creditors.

Limitations:

1. The ratio is greatly influenced by the value placed on farm assets. If a current market value is used but no potential tax liability is recognized, a higher level of "comfort" might exist than should actually exist. Book value, which is usually depreciated historical cost, may not accurately represent the true value of the farm assets, nor be appropriate for analysis purposes. Finally, liquidation value may not be the appropriate value for analysis of a viable, ongoing business.

2. A reasonable standard for the ratio varies from one type of enterprise to another and from one borrower to another. There is no single standard that is ideal for all types of farm businesses. The range of acceptable values will vary depending on the income variability, the proportion of owned land (or other assets) used in the farming operation, the risks associated with normal production, and the fluctuations in farm asset values that may occur due to changing demand for agricultural assets.

[3] The three solvency ratios recommended in this report (debt/asset, equity/asset, and debt/equity) are algebraically related to one another and are not separate indicators of the solvency position of a farm. All three ratios are included in the report because one is not preferred over the others by the members of the FFSTF.

DEBT/EQUITY RATIO[4, 5]

Interpretation: This ratio measures financial position and reflects the extent to which farm debt capital is being combined with farm equity capital. It can be calculated using either the cost or market value approach to value farm assets. If the market value approach is used to value farm assets, then deferred taxes on the assets should be included as liabilities. This ratio is most meaningful for comparisons between farms when the market value approach is used to value farm assets. However, due to the impact of fluctuations in market values of farm assets, it is most meaningful for comparisons between accounting periods for an individual farm operation when the cost approach is used to value farm assets. The higher the value of the ratio, the more total capital supplied by the creditors and less by the owner(s).

Limitations:

1. The ratio is greatly influenced by the value placed on farm assets. If a current market value is used but no potential tax liability is recognized, a higher level of "comfort" might exist than should actually exist. Book value, which is usually depreciated historical cost, may not accurately represent the true value of the farm assets nor be appropriate for analysis purposes. Finally, liquidation value may not be the appropriate value for analysis of a viable, ongoing business.

2. A reasonable standard for the ratio varies from one type of enterprise to another and from one borrower to another. There is no single standard that is ideal for all types of farm businesses. The range of acceptable values will vary depending on the income variability, the proportion of owned land (or other assets) used in the farming operation, the risks associated with normal production, and the fluctuations in farm asset values that may occur due to changing demand for agricultural assets.

[4] The three solvency ratios recommended in this report (debt/asset, equity/asset, and debt/equity) are algebraically related to one another and are not separate indicators of the solvency position of a farm. All three ratios are included in the report because one is not preferred over the others by the members of the FFSTF.

[5] Robert Morris Associates, in *Annual Statement Studies*, uses the term "debt/worth" when expressing the relationship between capital contributed by creditors and that contributed by owners. Debt/worth is computed as follows: total liabilities divided by tangible net worth.

RATE OF RETURN ON FARM ASSETS [6, 7, 8]

Interpretation: This ratio measures the rate of return on farm assets, and is often used as an overall index of profitability. This ratio is most meaningful for comparisons between farms when the market value approach is used to value farm assets. However, due to the impact of fluctuation in market values of farm assets, it is most meaningful for comparisons between accounting periods for an individual farm operation when the cost approach is used to value farm assets. As the rate of return on farm assets rises, the more profitable the farming operation.

Limitations:

1. Withdrawals for family living are often used as a proxy for the return to unpaid operator and family labor and management. Sometimes, the amount is estimated, so it may be higher or lower than the opportunity cost of those two factors of production when estimated in the marketplace.

2. The rate of return on farm assets may seem low when compared to non-farm investments such as stocks and bonds. It should be recognized that neither realized nor unrealized capital gains on farm real estate and other assets are included as income.

3. The method used to value farm assets can affect the value of this ratio.

4. Net farm income from operations is calculated on a pre-tax basis.

5. Assets and income unrelated to the farm business should be excluded from the ratio, or care must be exercised to recognize their impact.

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[6] This ratio can also be calculated using NFI. However, one must use caution in this approach because a gain/loss from the sale of a farm capital asset, particularly farm real estate, can distort the result. In both approaches, the ratio is most meaningful for comparisons when calculated on a before-tax basis, allowing farms to be compared independent of taxes. This approach is recommended because the amount of tax owed for a particular year may be affected by losses from other years (e.g., net operating loss carryback and carryover, treatment of a net capital loss, etc.), special tax laws (e.g., investment tax credit) and the difficulty of separating taxes on farm and non-farm earnings for sole proprietors with non-farm income.

[7] Many farm operations are organized as sole proprietorships, and do not pay compensation to the operator and family members for labor and management. A charge for unpaid operator and family labor and management must be subtracted to calculate the return to farm assets. For an economic analysis, the charge would be the opportunity cost for those factors of production. For a financial analysis, as discussed in this report, there are two approaches available depending on the purpose of the analysis. The recommended approach is to use the amount removed from the business by the operator and family members--withdrawals for family living. An alternative approach is sometimes used to prepare a comparative record summary. That approach is to calculate a charge based on either input usage or a measure of output. When that approach is used it should be noted and explained. Finally, the adjustment discussed above is not needed for a farm business organized as a corporation, since the operator and family members would receive compensation from the business.

[8] The return on farm assets should be associated with the investment that is available to the farm business over the period used to measure the return. The most practical method of averaging the investment for a farm business is to add the investment at the beginning of the year to that at the end of the year and divide the total by two. A more accurate, but less practical, method is to average month-end balances as follows: add the month-end investment balances and the beginning of the year investment balance, then divide the total by thirteen.

6. The value of the ratio can vary with the structural characteristics of the farm business, especially with the proportion of owned land (or other assets) used in the farming operation.

RATE OF RETURN ON FARM EQUITY[9, 10, 11]

Interpretation: This ratio measures the rate of return on equity capital employed in the farm business. It is most meaningful for comparisons between farms when the market value approach is used to value farm assets, and deferred taxes on these assets are included as liabilities. However, due to the impact of fluctuations in market values of farm assets, it is most meaningful for comparisons between accounting periods of an individual farm operation when the cost approach is used to value farm assets. As the rate of return on farm equity rises, the more profitable the farming operation.

Limitations:

1. Withdrawals for family living are often used as a proxy for the return to unpaid operator and family labor and management. Sometimes, the amount is estimated, so it may be higher or lower than the opportunity cost of those two factors of production when estimated in the marketplace.

2. The rate of return may seem low when compared to non-farm investments such as stocks and bonds. It should be recognized that neither realized nor unrealized capital gains on farm real estate and other assets are included as income.

3. The method used to value farm assets can affect the value of this ratio.

4. Caution should be used when interpreting this ratio. A high ratio, normally associated with a profitable farm business, may also indicate an undercapitalized or highly leveraged farm business. A low ratio, which normally indicates an unprofitable farm business, may also indicate a more conservative, high equity farm business. This measure, like many of

[9] This ratio can also be calculated using NFI. However, one must use caution in this approach because a gain/loss from the sale of a farm capital asset, particularly farm real estate, can distort the result. In both approaches, the ratio is most meaningful for comparisons when calculated on a before-tax basis, allowing farms to be compared independent of taxes. This approach is recommended because the amount of tax owed for a particular year may be affected by losses from other years (e.g., net operating loss carryback and carryover, treatment of a net capital loss, etc.), special tax laws (e.g., investment tax credit) and the difficulty of separating taxes on farm and non-farm earnings for sole proprietors with non-farm income.

[10] Many farm operations are organized as sole proprietorships, and do not pay compensation to the operator and family members for labor and management. A charge for unpaid operator and family labor and management must be subtracted to calculate the return to farm assets. For an economic analysis, the charge would be the opportunity cost for those factors of production. For a financial analysis, as discussed in this report, there are two approaches available depending on the purpose of the analysis. The recommended approach is to use the amount removed from the business by the operator and family members--withdrawals for family living. An alternative approach is sometimes used to prepare a comparative record summary. That approach is to calculate a charge based on either input usage or a measure of output. When that approach is used it should be noted and explained. Finally, the adjustment discussed above is not needed for a farm business organized as a corporation, since the operator and family members would receive compensation from the business.

[11] The return on equity should be associated with the average owner's equity that was available to the farm business over the period used to measure the return. The most practical method of averaging equity is to add the owner's equity at the beginning of the year to that at the end of the year and divide the total by two. A more accurate, but less practical, method is to average month-end balances as follows: add month-end equity balances and the beginning of the year investment balance, then divide the total by thirteen.

the other ratios, should be used in conjunction with other ratios when analyzing a farm business.

5. Net farm income from operations is calculated on a pre-tax basis.

6. Assets, liabilities, and income unrelated to the farm business should be excluded from the ratio, or care must be exercised to recognize their impact.

7. The value of the ratio can vary with the structural characteristics of the farm business, especially with the proportion of owned land (or other assets) used in the farming operation.

OPERATING MARGIN RATIO[12, 13]

Interpretation: This ratio measures financial efficiency in terms of return per dollar of gross revenue. A farm business has two ways to increase profits--either by increasing the revenue per unit produced or by increasing the volume of production (if the business is profitable). A relationship exists between the rate of return on assets, the asset turnover ratio, and the operating profit margin ratio. If the asset turnover ratio is multiplied by the operating margin ratio, the result is the rate of return on assets.

Limitations:

1. If net farm income from operations is not measured by matching, at least approximately, revenues and expenses incurred to create those revenues, then it can be grossly overstated or understated.

2. Withdrawals for family living are often used as a proxy for the return to unpaid operator and family labor and management. Sometimes the amount is estimated, so it may be higher or lower than the opportunity cost of those two factors of production when estimated in the marketplace.

3. Net farm income from operations is calculated on a pre-tax basis.

[12] This ratio can also be calculated using NFI. However, one must use caution in this approach because a gain/loss from the sale of a farm capital asset, particularly farm real estate, can distort the result. In both approaches, the ratio is most meaningful for comparisons when calculated on a before-tax basis, allowing farms to be compared independent of taxes. This approach is recommended because the amount of tax owed for a particular year may be affected by losses from other years (e.g., net operating loss carryback and carryover, treatment of a net capital loss, etc.), special tax laws (e.g., investment tax credit) and the difficulty of separating taxes on farm and non-farm earnings for sole proprietors with non-farm income.

[13] Many farm operations are organized as sole proprietorships, and do not pay compensation to the operator and family members for labor and management. A charge for unpaid operator and family labor and management must be subtracted to calculate the return to farm assets. For an economic analysis, the charge would be the opportunity cost for those factors of production. For a financial analysis, as discussed in this report, there are two approaches available depending on the purpose of the analysis. The recommended approach is to use the amount removed from the business by the operator and family members--withdrawals for family living. An alternative approach is sometimes used to prepare a comparative record summary. That approach is to calculate a charge based on either input usage or a measure of output. When that approach is used it should be noted and explained. Finally, the adjustment discussed above is not needed for a farm business organized as a corporation, since the operator and family members would receive compensation from the business.

Interpretation: NFI is the return to owner's equity

Limitations:

1. The measure is an absolute amount, so it is difficult to compare across farm businesses. It is also impossible to establish one standard for all farm businesses.

2. The measure provides for a close approximation of matching revenues with the expenses incurred to create those revenues. If the income statement is prepared using single-entry or cash-basis accounting; both beginning and ending balance sheets are needed to make the necessary adjustments for changes in inventories, accounts receivable, accounts payable, prepaid expenses and accrued expenses.

3. NFI is calculated on a pre-tax basis.

TERM DEBT AND CAPITAL LEASE COVERAGE RATIO[14]

Interpretation: The ratio provides a measure of the ability of the borrower to cover all term debt and capital lease payments. The greater the ratio, over 1:1, the greater the margin to cover the payments.

Limitations:

1. Even though the business may generate sufficient earnings (after matching revenues with expenses incurred to create those revenues) to cover all term debt and capital lease payments, there may not be sufficient cash generated to actually make the payments on a timely basis. The liquidation, or build-up of inventories, can make the interpretation of the ratio incorrect in the short run. Also, there is no provision in this ratio for the replacement of capital farm assets.

2. If the repayment schedules for large amounts of term debt have interest-only periods in the early years of amortization (frequently one to three years for major construction of new production facilities), the principal payments for term debt may be understated.

3. If revenues are not matched with the expenses incurred to create the revenues, the ratio may be greatly overstated or understated.

4. The stability of non-farm/ranch income may vary from borrower to borrower, depending on type of employment.

5. The appropriate value for this ratio will vary, depending on the production and price variability associated with the farm/ranch enterprise(s), the degree of diversification for farm/ranch and non-farm/ranch enterprises, and the financial and risk management abilities of the farmer.

[14] Amortization is defined as the gradual reduction in the book value of intangible assets having a limited live by allocating the original cost over the life of the assets.

CAPITAL REPLACEMENT AND TERM DEBT REPAYMENT MARGIN

Interpretation: This measure enables borrowers and lenders to evaluate the ability of the farm proprietor to generate funds necessary to repay debts with maturity dates longer than one year and to replace capital assets. It also enables users to evaluate the ability to acquire capital or service additional debt and to evaluate the risk margin for capital replacement and debt service. This measure assumes that credit obtained for current-year operating expenses will be repaid in one year as a result of the normal conversion of farm production to cash. Unpaid operating debt from a prior period should exclude lines of credit and debt for livestock purchased in that period for sale in the current period (if part of the normal course of business).

Limitations:

1. The measure is an absolute amount, so it is difficult to compare the measure between farm businesses. It is impossible to establish one standard for all farm businesses.

2. If net farm income from operations* is not measured by a least approximately matching revenues and the expenses incurred to create those revenues, then net farm income from operations can be grossly overstated or understated.

3. If the repayment schedules for large amounts of term debt have interest-only periods in the early years of amortization (frequently one to three years for the major construction of new production facilities), the principal payments for term debt may be understated.

4. The true economic relationship between "depreciation" and "cash payments for capital purchases" must be recognized. Some farm businesses must spend an amount equal to or in excess of the annual depreciation charge just to remain efficient and to keep buildings, machinery, and equipment up to current technological standards. Other farm businesses can enjoy tax deduction of depreciation, but need not replace buildings, machinery, and equipment except after long periods of extended use.

5. The liquidation or build-up of inventories can make the interpretation of this measure incorrect in the short run, because net farm income from operations* is calculated using an accrual-adjusted income statement. There may or may not be sufficient cash available to make payment(s) on a timely basis, due to changes in inventories. Thus, this measure should be used in conjunction with a projected cash flow statement.

* At the Fin Analysis for QuickBooks Pro spreadsheet, *Net Farm/Ranch Income after Operation and Financing Cost* is being used instead of *Net Income From Operations*.

6. The appropriate margin will vary from farm/ranch to farm/ranch depending on the production and price variability associated with the enterprise(s), the degree of diversification for farm/ranch and non-farm/ranch enterprises, and the financial and risk management abilities of the farmer.

7. The stability of the non-farm/ranch income may vary from borrower to borrower, depending on type of employment.

ASSET TURNOVER RATIO[15, 16, 17]

Interpretation: The asset turnover ratio is a measure of how efficiently farm assets are being used to generate revenue. A farm business has two ways to increase profits--either by increasing the revenue per unit produced or by increasing the volume of production (if the business is profitable). Consequently, the same asset valuation approach should be used to calculate the asset turnover ratio as is used to calculate the rate of return on farm assets. The higher the ratio, the more efficiently assets are being used to generate revenue.

Limitations:

1. The usefulness of this ratio is heavily influenced by the value placed on the assets.

2. Gross revenues cover an accounting period while the average for farm assets generally represents only two points within that accounting period.

3. This ratio typically shows wide variations depending on the type of farm enterprise and the proportion of owned land (or other assets) used in the farming operation.

4. Assets unrelated to the farm business should be excluded from the denominator, or care must be exercised to recognize the impact of non-farm business related assets.

[15] This ratio can be calculated by using value of farm production rather than gross revenues. When the asset turnover ratio is calculated with value of farm production it would be computed: value of farm production plus average total farm assets.

[16] The asset turnover ratio should be associated with the investment that was available to the farm business over the period used to measure the return. The most practical method of averaging the investment for a farm business is to add the investment at the beginning of the year to that at the end of the year and divide the total by two. A more accurate, but less practical, method is to average month-end balances as follows: add the month-end investment balances and the beginning of the year investment balance, then divide the total by thirteen.

[17] Robert Morris Associates, in *Annual Statement Studies*, uses the ratio "net sales/total assets" to measure a firm's ability to generate sales in relation to total assets. Net sales/total assets is computed as follows: net sales divided by total assets.

OPERATIONAL RATIOS

Interpretation: Four ratios reflect the relationship of expense and income categories to gross revenues. The sum of the first three expresses total farm/ranch expenses per dollar of gross revenue.

OPERATING EXPENSE RATIO*, [18]

DEPRECIATION EXPENSE RATIO

INTEREST EXPENSE RATIO

NET FARM/RANCH INCOME FROM OPERATIONS RATIO[19]

Limitations:

1. These ratios are very sensitive to the accuracy and reliability of the information used in the calculations.
3. Net farm/ranch income from operations is calculated on a pre-tax basis.
4. The depreciation expense ratio varies by farm type.

[18] This ratio can be calculated using the value of farm production rather than gross revenues. The calculator of any ratio should be very explicit in stating the approach used to calculate the ratio.

* Total operating expenses includes the total cash expense including owner operator compensation plus that accrual adjustments and depreciation.

[19] This ratio can be calculated using NFI. However, one must use caution in this approach because a gain/loss from the sale of a farm capital asset, particularly farm real estate, can distort the result. In both approaches, the ratio is most meaningful for comparisons when calculated on a before-tax basis, allowing farms to be compared independent of taxes. This approach is recommended because the amount of tax owed for a particular year may be affected by losses from other years (e.g., net operating loss carryback and carryover, treatment of a net capital loss, etc.), special tax laws (e.g., investment tax credit), and the difficulty of separating taxes on farm and non-farm earnings for sole proprietors with non-farm income.

SECTION IV

RECOMMENDED FINANCIAL STATEMENTS

The following are financial statements with the content recommended by the Farm Financial Standards Council and to accommodate the reporting format of QuickBooks Pro™ These statements include the following:

Balance Sheet*
Income Statement**

At the Fin Analysis to accommodate QuickBooks Pro spreadsheet, Net Farm Income from Operations and Financing is being used instead of Net Income From Operations. Owner operator compensation is included in operating expenses.

Illustrated is the report that reconciles the specific assets and the breeding livestock (Revenue Schedule).

Calculated Farm Financial Standards Recommended

Measures are shown at the end in this report.

* Market Values were added at the *Balance Sheet* reported from QuickBooks Pro™ in an Excel spreadsheet.
** At Fin Analysis for QuickBooks Pro™, *Profit and Loss* is being used instead of *Income Statement*.

GLOSSARY OF FINANCIAL TERMS

Accrual Farm Expense is the amount of expense that is associated with the production for an operating year.

Average Equity is the average of the beginning and ending equity for an operating year.

Balance Sheet is a financial statement that shows the financial conditions of the business at a particular point in time. It is a list of assets and liabilities (what the business owes) and equity (what the owner owns). For analysis purposes the balance sheet contains both the cost minus accumulated depreciation or book value, and the fair market value of the assets.

Base Value is a stipulated value that approximates the cost of raising the breeding animal. The base value is used to determine the cost basis value of the animal and it is used to determine the amount of revenue to recognize from raising the breeding animal.

Cash Available is the amount of cash that the firm has for meeting cash flow requirements.

Cash Interest Expense is the amount of actual cash that is paid out as interest.

Cash Required is the amount of cash that is needed to meet all of the cash needs of the operation. These include operating expenses, living expenses, debt payments, and capital purchases.

Cost Basis is asset valuation based on original purchase cost minus depreciation.

Current Assets are cash and near cash items that are convertible into cash with little loss in value. Included are cash, savings and time deposits, marketable securities, accounts and short term notes receivable and inventories that would be expected to be turned over in the operating year, supplies, prepaid expenses and cash invested in growing crops.

Current Liabilities are those liabilities that will come due within one year. Included are current loan principal payments, accrued interest, taxes, rents, leases and delinquent payments that are owing on the day of the statement.

Current Ratio is an indication of the liquidity position of the firm. It shows how many times the value of the current assets covers the value of the current liabilities.

Term Debt Coverage Ratio is the amount of cash available for term debt payments divided by the principal paid, plus interest paid adjusted for the income tax savings on interest paid.

Debt to Asset Ratio is an indicator of the solvency position of the owner. Shows how much of an interest the creditors have in the business.

Deferred Taxes are contingent income tax liabilities that would be realized if all of the farm assets were liquidated. Deferred taxes are separated into current and non-current portions.

Depreciation is the allocation of the purchase price of a capital assets over the useful life of the asset.

Depreciation Expense Ratio shows the portion of gross revenue that is required to cover the depreciation expense.

Direct Farm Expenses are expense items that are directly related to a farm/ranch production activity such as fertilizer or veterinary supplies.

Financial Efficiency is measured by the asset turnover ratio, which is gross revenues divided by total average farm assets. This is a measure of how efficiently farm assets are being used to generate revenue.

Equity is the difference between total assets and total liabilities. This gives an indication of the dollar amount actually owned by the operator, and represents the capital base available to handle adversity.

Extraordinary Items is an event or transaction that is distinguished by its unusual nature and by the infrequency of its occurrence.

Family Living Withdrawals is the amount of withdrawals taken from the operation for family expenses. For the purpose of the SPA analysis, it includes withdrawals equivalent to compensation for unpaid operator and family labor and management (wages and salaries not included in the operating costs) if these services were hired plus capital distribution.

Financial Leverage Situation is [return on equity/return on farm/ranch assets (adjusted)] where return on farm/ranch assets (adjusted) is [(net income + interest expense * (1 - tax rate))/total farm/ranch assets]. It is the return on equity divided by return on farm/ranch assets. If returns are positive and the index value is greater than one, then the index indicates that debt is beneficial. If the index is less than one, it means that the return on debt is less than its cost (thus reducing the earnings on equity).

Full Cost Absorption is the inventory valuation method where the value of the inventory is based on the total cost (accumulated cost) that have been assigned to the production of the inventoried items.

Gross Expense Ratio shows the portion of gross revenue that is required to cover the operating expenses.

Gross Margin is the difference between gross revenues and direct farm/ranch expenses.

Gross Revenue is a measure of accrual farm/ranch receipts plus value of farm/ranch products consumed on the farm/ranch.

Income Statement is an accrual-adjusted statement that is a summary of revenue and expenses for a certain period of time. It is also called the profit and loss statement. The income statement is used to help analyze the financial performance, i.e. profitability, of the total business. Similar statements can be developed at the enterprise level.

Indirect Farm Expenses are expense items that are not directly related to a production activity such as utilities or real estate taxes.

Interest Expense Ratio shows the portion of gross revenue that is required to cover interest expense.

Leverage is the relationship between debt and equity. To have a positive input on farm growth, earnings on debt must be greater than the cost of debt.

Liquidity is the ability of the business to generate sufficient cash to meet cash demands without disturbing the on-going operation of the business.

Net Farm/Ranch Accrual Income is the revenue earned minus the expenses incurred during the operating year including the interest expense without regard to the exchange of cash. Net income is calculated after accounting for family living withdrawals (owner labor and management) and reflects the enterprise contribution to total farm or ranch income. For operations that pay salary and wages, this cost is included in operating costs. This is a pre-tax net income and is not equal to IRS taxable income.

Net Cash Flow from Operations is the amount of cash that is available after cash operating expenses are subtracted from cash operating income.

Net Non-Farm/Ranch Cash Flow is the amount of cash that is available after non-farm/ranch cash expenses are subtracted from non-farm/ranch cash income.

Non-Current Assets represent the breeding livestock, equipment, machinery, buildings and land - real estate of the business. Non-current assets may be grouped according to economic life; intermediate (life ranging from 2 - 10 years), and long term (greater than 10 years). This is to make analysis more convenient and to match liabilities against the proper type of assets.

Non-Current Liabilities parallel the definition of non-current assets relative to matching the life of the asset to the liability.

Percent Ownership shows the portion of the total farm/ranch assets contributed by owner's equity.

Profitability is the ability of the farm to generate income in excess of expenses. It is expressed as the net returns to resources used in production. Taken from the income statement, total profit is divided by the average assets used by the farm/ranch business or accrual net income minus family living minus unaccounted cash withdrawals plus accrual interest expense, adjusted for taxes divided by average value of assets.

Rate of Return on Equity measures the rate of return on equity capital employed in the farm/ranch business. The more profitable the business is, the higher the value the rate of return on equity is.

Rate of Return on Assets also can be called return on investment. This ratio gives an indication of how productively the assets are being utilized. A low return on assets could indicate inefficiencies in the use of assets, low net income due to crop failure etc., or a combination of both.

Repayment Capacity is net cash flow from operations plus net non-farm cash flow less taxes, family living and unaccounted cash withdrawal, as a percent of total interest, and delinquent and term principal reduction requirements.

Retained Earnings is a measure of the real growth in the farm business and is the change in net worth adjusted for inflation (deflation) in asset values.

Statement of Owner Equity is a financial statement that reconciles the change in owner equity from the beginning to the ending balance sheets.

Solvency is the measure of what would remain if all assets were converted into cash and all debts paid.

Total Assets are assets that are owned. It may be either business (farm/ranch) or non-business (non-farm/ranch). Assets are categorized in the balance sheet as current and non-current.

Statement of Cash Flows is a financial statement that provides a summary of the business' cash effects of producers operating, investing and financing activities. All cash movements in and out are summarized. This statement is particularly valuable in reconciling the cash movements in the business.

Total Farm Interest Expense is the amount of interest expense that has been paid plus an adjustment for the change in accrued interest

Total Liabilities are the sum of all liabilities (debt) in the balance sheet and liabilities are categorized as current and non-current.

Total Operating Expense is the sum of the direct and indirect operating expense plus/minus the associated accrual adjustments. It does not include interest expense.

Unaccounted Cash Withdrawals is the residual value in the statement of cash flows after all revenue and expenses are entered. It is used as a check figure. Large or negative values indicate that either an expense or revenue item may have been missed.

Accounting Methods as Defined by the Farm Financial Standards Council Guidelines are as follows:

Basis of accounting: The procedures and methods adopted for the timing of recognition, the method of measurement, and the timing of recordation of events that change the *financial position* of a business.

Accrual Basis of Accounting: A method of *financial accounting,* or financial reporting, whereby events (generation of revenue, incurring expenses, etc.) that change the *financial position* of a business are recorded in the time period in which the events actually occur. *Revenue* is recorded when earned and *expenses* are recorded when incurred. This is in contrast to the cash basis of accounting where *revenue* is recorded only when cash is received, and *expenses* are recorded only when cash is paid.

Accrual Adjusted: A *financial statement* (*balance sheet, income statement, statement of cash flows,* and/or *statement of owner equity*) wherein the *basis of financial accounting* has been changed from cash basis of accounting, or modified cash basis accounting, to approximate *accrual basis of accounting* by incorporating into the cash basis numbers the changes to *accounts receivable, inventories, prepaid expenses, raised breeding livestock, accounts payable, accrued liabilities, deferred income taxes,* and other accrual amounts not otherwise already recorded in the cash basis, or modified cash basis, numbers.

Cash Basis of Accounting: A method of *financial accounting* by which *revenue* is recognized and recorded only when cash is actually received and *expenses* are recognized and recorded only when cash is actually paid, all regardless of the time when the agreement and/or obligation to sell, to purchase or to otherwise pay may have been incurred.

Modified Cash Basis Accounting: The *cash basis of accounting* which has been modified to deviate from the simple cash receipts-cash disbursements criteria by recognizing and recording certain items that otherwise are accrual in nature. The deviation may be the result of preference of the owner, or, more commonly, the result of tax or other laws. The most common modifications would be recognizing, and recording in the *statement of financial position*, the purchase of capital assets; and recognizing, and recording in the *statement of income,* the *depreciation* charges (which are non-cash expenses). Commonly referred to as cash accounting, notwithstanding the inclusion of certain accrual items.

Tax Basis of Accounting: Tax basis of accounting is not a single, uniquely defined *basis of accounting*. Rather, it is whatever *basis of accounting* (*cash basis, modified cash basis, accrual basis*) selected by a taxpayer for the purpose of calculating taxable income and which is acceptable to a taxing authority, consistent with the statutes and regulations of that taxing authority.

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