**Ratios and Measures (agriculture)**

**Financial Ratios and Measures** are a useful tool to evaluate the financial performance of a farm business. However, they should not be used in a vacuum. The ratios and measures tend to be more diagnostic than prescriptive. That is, the measures can signal that the business is doing well or poorly. But, by themselves, they do not indicate what should be done. An in-depth knowledge of the business along with the measures should be used to decide what can and should be done.

*Whole farm financial ratio analysis* is most useful benchmarking the business over time, against itself or similar businesses. Used properly, the measures provide warning signs when the business is vulnerable to external forces or financial downturns as well as sending powerful signals that the business is in position to consider new opportunities.

**Warning!** Some of these ratios, especially the measures of business performance, can vary tremendously from year to year. It’s important to not put too much stock in results from one business year. The most successful farms build a track record over a period of years.

**About Ratios and Measures**

FINPACK uses twenty-one financial measures, recommended by *The Farm Financial*

*Standards Council (FFSC)*, to evaluate a farm's:

*Financial position* A look at the business at a point in time. Thus, these measures are from the balance sheet and reflect liquidity and solvency.

*Financial performance*

A look at the business over a period of time. These measures determine profitability, repayment capacity and financial efficiency.

The measures are used to standardize farm financial ratios, definitions, and reporting formats when analyzing agricultural credit.

**Note:** The FINPACK financial guideline measures in FINPACK's planning modules are based on the asset's market value. If the balance sheet is cost value only, the measures, when possible, are based on the entered cost valuations. FINPACK’s Financial Analysis (FINAN) displays measures based on both cost and market values. FINAN uses cost values to calculate net farm income if available.

**Warning!** To calculate accurately, 16 of the 21 ratios and measures require accrual income statements.

**Farm Financial Scorecard**

Originally developed at the University of Vermont, and now jointly published with the

Center for Farm Financial Management, the *Farm Financial Scorecard* lists each measure

ranking possible scores from red to green; with red being a potential vulnerability and green being a strong position. Download the Scorecard at:

[http://www.cffm.umn.edu/Publications/pubs/FarmMgtTopics/FarmFinanceScorecard.pdf.](http://www.cffm.umn.edu/Publications/pubs/FarmMgtTopics/FarmFinanceScorecard.pdf)

**Disclaimer:** The Council is a cooperative effort of agricultural producers, lenders, economists, financial consultants and Congressional leaders. The design and implementation of these guidelines is intended to aid in analyzing farm credit analysis, but the council does not intend these guidelines to be the only set of methods used to analyze the financial health of an operation.

**Liquidity Measures**

**Liquidity** is the ability of the business to meet its financial obligations in the very short term. Liquidity measures use current assets and current liabilities from the balance sheet to see how much of a buffer there is against bad years or economic downturns. Liquidity also makes a business agile; meaning that when opportunities come along, businesses with a lot of liquidity are in a much better position to act.

There are three liquidity measures:

 Current Ratio

 Working Capital

 Working Capital / Gross Revenues Ratio

**Current Ratio** measures the extent to which liquidating current farm assets covers current farm liabilities. Current assets are all cash and all other assets converted to cash or used

in production within one business year. Current liabilities include all debts due and payable

within one business year. It is calculated by:

Total current farm assets / Total current farm liabilities

A common quick and dirty benchmark is that a business should have a 2:1 current ratio, meaning that businesses should have twice as much in current assets as current liabilities.

**Note:** Current Ratio is the inverse of *Solvency's - Current debt to assets*.

**Working Capital** approximates the operating capital available from within the business. In other words, working capital is the money available to purchase crop and livestock inputs and equipment necessary to produce farm products. Working Capital is calculated by:

Total current farm assets – Total current farm liabilities

**Working Capital/Gross Revenues Ratio** is the relationship of working capital to the size of the farm business. As the ratio becomes larger, the liquidity of the business is higher. Working Capital/Gross Revenues Ratio is calculated by:

Working capital / Gross revenues

When using these liquidity measures, be careful and look at the whole picture. A business could have a strong current ratio but very little liquidity. For example, in the extreme, a farm could have $2,000 of current assets and $1,000 of current liabilities, or a 2:1 current ratio. But that business would have almost no liquidity.

In that case, the working capital should signal the liquidity weakness. But working capital has its limitations as well. The problem with working capital is it’s a dollar figure with no relation to the size of the business. For example consider the following two farms:

Farm A Farm B Current Assets $75,000 $200,000

Current Debt 25,000 100,000

Current Ratio 3:1 2:1

Working Capital 50,000 100,000

Gross Income 500,000 500,000

Working Capital/Gross

Revenues

10% 20%

*Which has more liquidity?* Based on working capital, Farm B is more liquid, but Farm A has a higher current ratio. However, looking at a measure of business size, like *gross farm income*, gives a better read on overall liquidity. Since both businesses generated $500,000 in the past year, Farm B is in a more liquid position, with 20% of a year’s income in working capital compared to 10% for Farm A

**Solvency Measures**

**Solvency** looks at the overall financial position of the business. The solvency ratios measure the risk position of the business by comparing total debt to total value of assets. Strictly from a risk management standpoint, the more debt used, the more risk faced by the owners and the creditors. Solvency ratios measure how much is left if the business is liquidated and all debts repaid.

One of the most important measures derived from the balance sheets is *net worth change*. Net worth change, while more of a measure of performance than a measure of financial position, is something that should be monitored for any business from year to year or period to period.

There are three measures of solvency included in the Farm Financial Standards.

 Debt to Asset Ratio

 Equity to Asset Ratio

 Debt to Equity Ratio

Since these measures use the same data to measure the same thing, only one of these ratios needs to be used.

With both cost and market values on the balance sheet, *market values* are used to measure solvency. In measuring solvency, cost values aren’t very useful because some assets, like land, may have an original purchase price that bears little relevancy to today's value.

**Debt/Asset Ratio** measures the portion of farm assets having debt against them. A higher ratio is generally considered to be an indicator of greater financial risk. Debt to asset ratio

is similar to total percent in debt ratio. The difference is that personal assets and liabilities

are included in total percent in debt but not in the debt to asset ratio. Debt to asset ratio is calculated by:

Total farm liabilities / Total farm assets

**Note:** The *Farm Financial Scorecard* states that farms with over 60% debt to assets are in a very high risk position, those between 30 and 60% debt to assets have moderate risk, and less than 30% is a low risk solvency position.

**Equity/Asset Ratio** measures the proportion of farm assets financed by owner equity, while *Debt to Asset Ratio* measures the proportion of farm assets financed by debt. Because these ratios describe how total farm assets are financed; when added together, they always equal 100 percent.

Equity to asset ratio is calculated by:

Total farm equity / Total farm assets

*Farm equity*, or *net worth*, is the amount by which total assets exceed total liabilities; i.e., calculated as total assets minus total liabilities. If liabilities are greater than assets, then equity is negative.

**Debt/Equity Ratio** measures the amount of borrowed capital used for every dollar of equity capital. Debt to equity can vary from 0, when there is no debt, to infinity, when there is zero or very little net worth. Debt to equity can be stated as a *number of times* ratio, where a 200 ratio means that the business has two times as much debt as equity or net worth.

Total farm liabilities / Total farm equity

**Note:** Net worth change, or equity change, is not one of the standard ratios but it is one of the most important factors to monitor from year to year for any business and particularly for a family farm business. It doesn’t fit neatly into solvency or profitability or one of the other categories, but it does pull together the performance of the business, nonfarm earnings, and nonfarm consumption to focus attention on the overall direction of the business.

**Profitability - Net Farm Income**

**Profitability** is the measure of how much income the business is making in relation to the resources used. More simply: Is the business making money? Over time, profits drive the liquidity and solvency of a farm/business.

Profitability looks at the farm business only. Some of the other measures, especially repayment capacity, include nonfarm funds. But profitability focuses solely on the farm business. All the profitability measures require that profits be measured based on accrual accounting, which is used by very few farmers, or based on an accrual adjusted income statement like that generated by FINAN.

There are five profitability measures. In addition, FINPACK includes *Asset Turnover Rate*

as well:

 Net Farm Income

 Rates of Return

 Rate of Return on Farm Assets

 Rate of Return on Farm Equity

 Profitability Drivers

 Operating Profit Margin Ratio

 Asset Turnover Rate – FFSC lists this as an efficiency measure.

 EBITDA (Earnings before interest, taxes, depreciation and amortization)

**Net Farm Income**

*Net Farm Income* is the bottom line on the income statement. The income statement, to measure profits accurately, needs to be adjusted for inventory changes as in the accrual

adjusted income statement produced by FINAN.

The economic definition of Net Farm Income is returns to unpaid labor, management and equity capital. That means that when net farm income is calculated, no expenses are taken out to compensate the owner for investing personal time and money in the business.

That may not be true for some businesses, like corporations, where owner compensation

is included in the business expense. But for sole proprietors, net farm income needs to be enough to give adequate returns to these resources. In more practical terms, net farm

income has to be enough to cover owner withdrawals for family living and income taxes with something left for net worth growth.

Net farm income is calculated by subtracting cash farm expenses from gross cash farm income and then adjusting for inventory changes and depreciation.

**Note:** Because FINLRB creates typical year plans, net farm income within FINLRB is calculated assuming zero as the value of inventory changes.

Perhaps more importantly, net farm income is what the farm is projected to produce toward net worth growth over time. Therefore, net farm income must be great enough to cover family living and tax liability needs or net worth gradually decreases. The exception is

when personal income supplements net farm income; thus, satisfying the family's long term need for both consumption and equity growth.

*Net worth growth* is calculated by:

net farm income – (family living + taxes)

**If projected net farm income is not adequate, how can it be improved?**

The profitability of a farm business is illustrated by the equation:

Net farm income = volume x (price/unit - cost/unit)

In other words, net farm income is the result of the relationship between business size (volume) and efficiency (price/cost per unit). Therefore, there are three general ways to improve net farm income:

 Get bigger (increase volume),

 Get better (increase efficiency),

 Reorganize the entire business.

The old adage, *get better before you get bigger*, holds true in most farm situations. If efficiency is poor, adding size may only make matters worse. This general rule may not be true in situations where unused resources; e.g., barn space, machinery capacity, etc., are available without adding substantial debt or stretching management beyond capacity.

If net farm income is being limited by poor operating efficiency, the farm manager should identify major problems and actively search for solutions; principally, by analyzing improved production methods, marketing techniques and cost control. FINLRB can show

the effects of improved efficiency, but it is still up to the farmer to attain the desired results.

If efficient production methods are being used, but profitability is inadequate, then the farm may not be big enough. Increasing volume usually involves increasing debt. An accurate FINLRB projection indicates whether the increased income generated supports the increased debt in a typical year.

Sometimes changing the size or the efficiency of the business does not improve profitability. There are two general situations where this might occur:

 When the present enterprise mix does not match the resources available.

 When a heavy debt load makes profitability virtually impossible to attain.

In the first situation, new enterprises may be considered and old enterprises may be liquidated; for example, a labor intensive enterprise being employed on a farm with limited labor resources. This farmer may consider liquidating the labor intensive enterprise and/or adopting a less intensive enterprise. The opposite may be an even bigger problem; i.e., low labor enterprises on a farm with ample labor supplies.

If changing enterprises does not help or is not feasible, changing resources may be necessary. In general, the resources that can be changed are land, labor, capital, and

management. Changing resources may call for debt restructuring and/or partial or complete liquidation.

**Note:** Partial liquidation only improves profits if efficiency is improved enough to offset the decreased volume.

**Profitability - Rates of Return**

**Rates of Return** measure profitability, as represented by *Net Farm Income*, against the amount invested to create that income. The purpose is to determine if, for example, a net farm income of $148,000 is good, bad or somewhere in between. The answer depends on

the size of the farm. If this is a small or mid-sized farm, it is probably pretty good. But if this is a multi-million dollar business employing multiple families, then it isn't as good. To

really measure profitability, it must be measured against the amount invested to create that

income.

Within the financial standard measures, the two measures of rate of return are:

 Rate of Return on Assets (ROA)

 Rate of Return on Equity (ROE)

The rule of thumb when evaluating returns on capital investment is: *ROE should be higher than ROA*. Borrowing money is like any other farm input. A crop farmer doesn't buy fertilizer if it isn't going to pay back more than it costs. The same is true for borrowed capital; it should earn more than the interest rate paid. Simply, that goal is met when ROE is higher than ROA.

**Rate of Return on Assets**

*Rate of Return on Assets*, commonly abbreviated as ROA, can be thought of as the average interest rate earned on all investment in the farm or ranch business. Depending

on the asset valuation type, the meaning of ROA is slightly different:

 If assets are valued at market value, the rate of return on assets can be considered the opportunity cost of farming versus alternative investments.

 If assets are valued at cost value, the rate of return on assets more closely represents actual return on the average dollar invested in the farm or ranch.

Rate of Return on Assets is an important measure for farmers highly capitalized or considering changes and needing to compete for capital. In theory, rate of return should be higher than average interest rate paid on debt. If it is higher, then positive leverage is being employed since the investment is earning enough to pay interest with something left over.

Agriculture, and particularly farm land, historically does not have a high rate of return; especially in light of risks involved. Farm businesses have survived with a low rate of return because, on average, agriculture has not been far in debt. Even though rates of return

have been lower than interest rates, total interest costs have been low enough to leave some residual returns to the farmer's equity invested in the business.

The individual farmer must be cautious about the relationship between return on assets and interest rate paid. As the business is expanded using debt capital, Return on Farm Assets takes on added importance. At the extreme, if the business is 100 percent in debt, the business must earn a rate of return at least equal to the average interest rate or it will not be able to meet its fixed interest obligations without accepting a lower return for labor and management.

*Rate Of Return On Assets* is calculated by:

Return on Farm Assets / Total Farm Assets

*Where:*

Return on Farm Assets =

Net Farm Income + Farm Interest Paid

– Value of Operator’s Labor and Management

In *FINLRB*:

Value of Operator’s Labor and Management =

($7 per hour × Total Labor) + (.05 × Value of Farm

Production)

*Where:*

Total Labor = maximum of 2,500 labor hours per alternative

Value of Farm Production =

Gross Farm Revenue – (Feeder Cattle Purchased + Purchased Feed)

*Why:*

*Feeder livestock* growth occurring prior to arrival on the farm and the value of

*Purchased Feed* are not part of farm production.

**Note:** The *Farm Financial Scorecard* states that farms with an ROA over 8% have strong profitability, less than 4% is considered weak or questionable profitability, and a percentage between 4 and 8 is considered average profitability.

**Rate of Return on Equity**

*Rate of return on equity*, or ROE, represents the percentage return earned on the operator's equity capital invested in the farm.

Rate of return on equity is calculated by:

(net farm income

- value of operator's labor and management) / Total farm equity

(net worth)

Like Rate of Return on Assets, if assets are valued at market value, the Rate of Return on Equity can be compared with the returns available if assets are liquidated and invested in alternative investments. If assets are valued at cost value, ROE represents the actual return to the amount of funds invested or retained in the business.

The relationship between ROA and ROE is affected by the farm's debt to asset ratio, or percent in debt, and the average interest rate paid on debt capital.

If ROA is higher than the average interest rate paid, then ROE is always higher than ROA, since there will be residual returns remaining after interest is paid.

If ROA is lower than the average interest rate paid, then ROE is always lower than ROA, since fixed interest requirements eat up residual returns to equity.

The relationship between rate of return on farm assets and interest rate increases as a farm's percent in debt increases. *Percent in debt*, or *debt to asset ratio*, measures financial leverage.

**Note:** The *Financial Leverage Principle* states:

 Adding debt increases the potential for net worth growth in profitable businesses.

 Adding debt also increases risk if profit goals are not reached.

For highly leveraged farms, those with high debt to asset ratios, the effect on ROE is magnified in a good way in positive years but in a bad way in negative years. Farms with high debt can earn tremendous returns on equity in profitable years. But the possibility of high returns comes at a very high risk. The return on equity will be very low and often negative in low profit years or in years when the farm doesn't reach its profit goals.

**Note:** The *Farm Financial Scorecard* states that farms with an ROE over 10% have strong profitability, less than 3% is considered weak or questionable profitability, and a percentage between 3 and 10 is considered average profitability.

**Profitability Drivers**

**Profitability Drivers** indicate how a business is doing in its efforts to increase the return on assets, or profitability. The two measures are:

 Operating Profit Margin

 Asset Turnover

**Note:** *Asset Turnover* is defined as an *Efficiency Measure* by *The Farm Financial Standards Council*. However, since it is a central measure used by the DuPont Model, it is treated as a *Profitability Driver*.

The DuPont model, created by the DuPont Corporation and in use since the 1920s, is a method of breaking down ROA into its component parts. DuPont realized that multiplying *Operating Profit Margin* by *Asset Turnover Rate* results in the *Rate of Return on Assets*. Thus, for a business to increase profitability, it should have a high operating profit margin and then turn over earnings as many times as possible per year.

For example, a supermarket will have a very low margin on sales, perhaps 3%. To achieve an acceptable ROA, they must turn over their inventory several times in a year. And they do, as lettuce doesn't sit on the shelf very long. In agriculture, there is too much fixed investment to attain that level of turnover, but a farm typically has a higher operating profit margin, which makes up for the low turnover.

**Operating Profit Margin**

*Operating Profit Margin* is a measure of the operating efficiency of the business. It is affected by efficiency of production, price levels and overhead costs. Anything a business

or farm owner can do to keep costs in control or increase income while holding cost constant improves the margin. The higher the margin, the better.

A farm will have a healthy Operating Profit Margin, if expenses are held in line relative to the value of output produced.

*Operating profit margin* indicates the average percentage operating margin per dollar of farm production and is calculated by:

Return on Farm Assets / Value of Farm Production

Where:

Return on Farm Assets =

Net farm income from operations + Farm interest expense

– Value of unpaid operator labor and management

Where:

Value of Farm Production =

Gross Farm Revenue - Feeder Livestock Purchase - Purchased

Feed

A low *Operating Profit Margin* may be caused by:

 Low prices per unit sold

 High overhead expenses

 Inefficient production

**Asset Turnover**

*Asset Turnover* measures how efficiently capital is used. Given a level of investment, businesses are more profitable when they increase the amount they produce.

Turnover is affected by volume of production, price level, and the level of asset use. Asset turnover rate varies by type of farm and by tenure of ownership, so different farms should not be compared using *Asset Turnover*.

**Note:** The more assets rented or leased, generally the higher the turnover.

*Asset Turnover* is calculated by:

Value of Farm Production / Total Farm Assets

Where:

Value of Farm Production =

Gross Farm Revenue - Feeder Livestock Purchase - Purchased

Feed

Since Asset Turnover is meant to measure the efficient use of assets, the higher the number the better. If the farm business is turning out a high level of production given the level of capital investment, it has an adequate level of asset turnover. If turnover is low, methods to use capital more fully should be explored, or possibly some low return assets should be sold.

Neither Operating Profit Margin nor Asset Turnover alone adequately explains the level of business profitability. But, when used together, these two efficiency measures are the building blocks of the farm's level of profitability.

**Remember!** Rate Of Return On Assets = Operating Profit Margin x Asset Turnover

Rate

Therefore, a farm with high operating efficiency and high capital efficiency shows a strong Rate of Return on Assets. If the Operating Profit Margin is low, the Asset Turnover rate must be strong enough to offset the low operating efficiency. The opposite is also true.

To improve profitability, if Asset Turnover is low, look for ways to increase revenue from existing assets and look for non-performing assets or under-performing assets that can be sold. If Asset Turnover is acceptable, then look at Operating Profit Margin. If it needs

improvement, look for ways to decrease expense without reducing revenues. If both Asset Turnover and Operating Profit Margin are acceptable, then maybe it’s time to consider an expansion.

**EBITDA (Earnings before interest, taxes, depreciation and amortization)**

*Earnings before interest, taxes, depreciation and amortization (EBITDA)* is rarely used within agriculture. However, Commercial investors may use EBITDA to compare

businesses. Since an investor may only be interested in income generated by a company or because the comparison is between businesses of different types, it is deemed

reasonable to ignore interest, taxes, depreciation and amortization expenses.

*EBITDA* is calculated by:

Net income from operations

+ interest expense

+ taxes

+ depreciation

+ amortization expense

**Note:** For sole proprietors, the net income, and therefore EBITDA, calculated in FINPACK does not include an expense for labor and management contributed by the operator.

**Repayment Capacity**

**Repayment Capacity** measures the ability of a borrower to repay term debt and replace assets using business and personal income. When evaluating repayment capacity, the source of repayment doesn't matter, so both business and personal sources of income are included.

Principal payments on term loans must come from accrual net income, with depreciation added back and after owner withdrawals, income taxes, and Social Security taxes are deducted.

**Capital Debt Repayment Capacity**

*Capital debt repayment capacity* is the net amount available from business and personal sources that can be used to repay debt and replace assets. Capital debt repayment capacity is calculated by:

Net income from operations (accrual)

+ Depreciation/amortization expense

+ Total personal income

+/- Total miscellaneous revenues/expenses

- Family Living Expenses or Owner withdrawals

- Total income tax expense

+ Interest expense on term debt

**Note:** Debt Coverage is measured in two ways, **Farm** and **Farm and Personal.** Both consider personal term debt, if it exists, but in different ways. For the **Farm** calculation personal debt is considered in much the same way as family living expense, it is simply subtracted from the funds available Capital repayment capacity so, it becomes a part of the numerator in the calculation (the numerator is reduced). In the **Farm and Personal** the term personal debt is added to the Scheduled term debt payments so, it becomes a part of the denominator (the denominator is increased).

**Capital Debt Repayment Margin**

*Capital Debt Repayment Margin* is the amount available after removing scheduled debt payments from Capital debt repayment capacity. If the amount remaining is greater than

zero, then enough capital has been generated to cover debt payments. Capital Debt

Repayment Margin is calculated as:

Capital debt repayment capacity

- Total principal and interest on term debt including capital leases

**Replacement Margin**

*Replacement Margin* indicates the ability of a farm/business to repay term debt and replace capital assets. In so doing, one is able to evaluate the ability to acquire business

assets or service additional debt as well as evaluate risk margin for capital replacement and debt service. If the replacement margin is positive, then the farm/business generates enough income to pay its debts and replace assets in a timely manner.

Replacement Margin is the margin after cash replacement. The key word is *Cash*. High debt farms often get most of their replacement cash from paying down debt and then re- borrowing. Other businesses, particularly those with little or no debt, likely have a very strong Capital Debt Repayment Margin, but will require more cash flow to replace assets.

**Note:** Replacement margin assumes credit obtained for current-year operations is repaid within one year.

*Replacement Margin* is calculated by:

Capital debt repayment margin

- Unfunded capital expenditures or cash replacement allowance

**Cash Replacement Allowance**

*Cash Replacement Allowance* is an estimate of the amount of cash necessary to replace assets in a timely manner. Part of asset replacement can come from borrowed funds and

part from cash flow. Only the cash amount is subtracted to arrive at the Replacement

Margin.

**FINPACK Notes on calculating Cash Replacement Allowance:**

In FINPACK, rather than trying to estimate actual unfunded or cash expenditures for capital replacement, an estimated *Cash Replacement Allowance* is used.

In FINPACK, the cash replacement allowance is estimated by first estimating total capital replacement needs by calculating depreciation on the market value, if available, of intermediate assets. The cash portion is then estimated by *Principal Due on Intermediate Debt*. This assumes that repaid debt could be borrowed back, leaving the balance sheet in no worse position.

*FINAN*

If *balance sheets are both cost and market*, then:

((beginning market value breeding livestock

+ beginning market value machinery and titled vehicles)

× depreciation defaults percentages)

- Intermediate principal payments from beginning balance sheet

When replacement requirements exceed these principal payments, the remainder is the

*Cash Replacement Allowance*.

If *only market or only cost balance sheets*, then:

Sum depreciation of breeding livestock, machinery, titled vehicles

- Intermediate principal payments from the beginning balance sheet

*Annual Plan and FINFLO*

Sum depreciation for breeding livestock and machinery and titled vehicles

- Intermediate principal payments from the balance sheet

*FINLRB*

Cash Required for Replacement is found in the cash flow section of FINLRB report.

In all cases, the minimum is zero (0).

**Term Debt Coverage Ratio**

Term debt coverage ratio measures the ability of the business to cover all term debt payments over a period of time. It is one of the most important measures lenders use to

evaluate proposed loans. It compares dollars generated by the business for intermediate and long term debt payments against the scheduled principal and interest payments on

term debt.

Debt Coverage is measured in two ways, **Farm** and **Farm and Personal.** Both consider personal term debt, if it exists, but in different ways. For the **Farm** calculation personal debt is considered in much the same way as family living expense, it is simply subtracted from the funds available Capital repayment capacity so, it becomes a part of the numerator in

the calculation (the numerator is reduced). In the **Farm and Personal** the term personal debt is added to the Scheduled term debt payments so, it becomes a part of the

denominator (the denominator is increased).

*Term Debt Coverage Ratio* is calculated by:

Capital debt repayment capacity / Total principal and interest on term debt

**Note:** In Financial Analysis (FINAN, Schedule F Cash to Accrual), the total Principal and Interest Payments are the intermediate and long term debt payments listed on the *beginning balance sheet.*

A value greater than 1, or 100%, means the business is generating sufficient cash to pay all debt obligations with a surplus margin remaining.

**Replacement Margin Coverage Ratio**

*Replacement Margin Coverage Ratio* measures the ability of the business to cover all term debt payments plus cash capital replacement requirements. A value greater than 1

indicates the business is generating sufficient income to pay all term debt and replace capital assets.

*Replacement Margin Coverage Ratio* is calculated by:

Capital debt repayment capacity /(Total principal and interest on term debt

+ Replacement allowance)

**Note:** Replacement allowance is also referred to as *Unfunded capital expenditures*.

**Efficiency Measures**

**Efficiency Measures** ask *"Is the business being operated in a cost-effective manner?"*

and look at where business revenue is going:

 To pay operating expenses,

 Purchase of capital assets to finance the business,

 Net returns to the owners.

The *Farm Financial Standards Council* includes five efficiency measures:

 Asset Turnover Rate

 Operating expense ratio

 Depreciation expense ratio

 Interest expense ratio

 Net farm income ratio

**Note:** FINPACK includes *Asset Turnover Rate* under Profitability Drivers.

Each of the four remaining measures is calculated by dividing the category total by accrual gross revenue. *Operating expense ratio* is total operating expenses; i.e., all expenses

other than depreciation and interest, divided by gross revenue. *Depreciation, interest*, and

*net farm income* are calculated in the same way. Taken together, the four ratios account for 100% of gross revenue.

**Operating Expense Ratio**

*Operating expense ratio* indicates the percent of gross farm income used to pay operating expenses. The operating expense ratio is widely used to evaluate operating efficiency.

Because interest expense is not included, it puts businesses on equal ground in terms of production efficiency. When farms go over 80% operating expense, they don’t have much margin left over for depreciation, interest and net returns to the operator. On the other

hand, when using the planning tools in FINPACK, evaluate plans with less than 60%

operating expense very carefully. The operating expenses ratio might be right, but it takes a pretty efficient farm to get below 60% operating expense.

*Operating expense ratio* is calculated by:

Total cash operating expenses / Gross revenues

**Depreciation/Amortization Expense Ratio**

*Depreciation Expense Ratio* indicates the percent of gross farm income used to cover depreciation expense. Depreciation expense ratio is intended to evaluate whether

businesses are spending too much on machinery, equipment, buildings, and other capital assets. It’s important to know how depreciation is calculated when evaluating this measure. For businesses that use book or economic depreciation, as FINPACK

recommends, rather than tax depreciation, it’s rare to see this ratio go over 10%. Farms forced to downsize because, for instance, loss of rented land often have very high

depreciation expense ratios.

*Depreciation Expense Ratio* is calculated by:

Depreciation or amortization expense / Gross revenues

**Interest Expense Ratio**

*Interest Expense Ratio* indicates the percent of gross farm income used to pay farm

interest expenses. In the 1980s, with interest rates in the teens and low incomes, it was not uncommon to see farms with interest expense ratios over 20%. At that level, there was

often nothing that could be done to salvage the business without major liquidation or debt

forgiveness. With current interest rate levels and a more conservative nature on the part of lenders and operators, it is rare to see farms pay more than 10% of income in interest.

*Interest Expense Ratio* is calculated by:

Total interest expense / Gross revenues

**Net Farm Income Ratio**

*Net Farm Income Ratio* indicates the percent of gross farm income remaining after expenses. Net farm income is the remainder after operating expenses, depreciation and

interest expense have been subtracted from gross revenues. An efficient, well positioned

farm, after paying operating, depreciation, and interest expenses, might have 20% of revenue left as returns to the operator, or net income. Over the years, Minnesota farms included in the FINBIN database that have grossed between $100,000 and $1,000,000,

have averaged about 16% net farm income. Those grossing under $100,000 have averaged 10% or less. Farms grossing over $1,000,000 have netted about 12%

*Net Farm Income Ratio* is calculated by:

Net farm income from operations / Gross revenues