

FBP Module 8: Financial Analysis & Reports

The Financial Analysis module presents a discussion of the following ratios based on the recommendations made by the Farm Financial Standards Council (FFSC). The ratios discussed here are limited to those that will be part of the Phase 1 release of the Farm Business Plan. The complete publication of *Financial Guidelines for Agricultural Producers*, which addresses additional ratios and provides more information, is available from the FFSC at <http://www.ffsc.org>.

Liquidity

Current Ratio
Working Capital

Solvency

Debt/Asset Ratio

Profitability

Rate of Return on Farm Assets
Rate of Return on Farm Equity

Repayment Capacity

Term Debt and Capital Lease Coverage Ratio
Capital Replacement and Term Debt Repayment Margin

Financial Efficiency

Operating Expense Ratio

Also provided with this handout is a packet of reports from Web Equity Manager® that represents the results you should have achieved through the input exercises in Modules 1-7, provided you followed all instructions and entered the data correctly. The actual ratio calculations in this document are based on the data contained in the Web Equity Manager® reports for the 12/31/03 Balance Sheet and the 12/31/03 Actual Income/Expense.

NOTE: There is no data input exercise for Module 8. Proceed to the ECI eLearning Center to take the test for Module 8. Test questions relate to information in this handout and to information from the presentation you just experienced.

LIQUIDITY RATIO

Computation: Total current farm assets / Total current farm liabilities

Interpretation: This ratio indicates the extent to which current farm assets, if liquidated, would cover current farm liabilities. The higher the ratio, the greater the liquidity.

Limitations:

1. Current portion of deferred taxes should be included as current liabilities; failure to do so may overstate the current ratio.
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 that can sell at harvest or store for later sale, 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.).

Computation: Total current farm assets / Total current farm liabilities

Actual Data: 230,020 ÷ 120,589 = 1.9074708
Round to 1.91

WORKING CAPITAL

Computation: Total current farm assets - Total current farm liabilities

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. Current portion of deferred taxes should be included as current liabilities; failure to do so may overstate working capital.
2. The measure is a dollar amount (which may be positive or negative), 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 or 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 that can sell at harvest or store for later sale, etc.).

Computation: Total current farm assets - Total current farm liabilities

Actual Data: 230,020 - 120,589 = 109,431

DEBT/ASSET RATIO

Computation: Total farm liabilities / Total farm assets

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 the deferred taxes with respect to 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 greater risk exposure of the farm business.

Limitations:

1. Deferred taxes should be included as liabilities; failure to do so may understate the debt/asset ratio.
2. The ratio is greatly influenced by the value placed on the farm assets. If current market value is used but no deferred or estimated tax liability is recognized, a higher level of "comfort" might be thought to 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, on-going business.
3. 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 the fluctuations in farm asset values that may occur due to changing demand for agricultural assets.

Computation: Total farm liabilities / Total farm assets

Actual Data: $487,138 \div 1,187,570 = .4101972$
Multiply by 100 and round to 41.02%

RATE OF RETURN ON FARM ASSETS

Computation: (Net farm income from operations + Farm interest expense - Owner withdrawals for unpaid labor and management) / Average total farm assets^{1, 2, 3}

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 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, the more profitable the farming operation.

Limitations:

1. Owner withdrawals for unpaid labor and management must be correctly calculated. Otherwise, the result may be seriously understated or overstated.
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.
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.

Computation: (Net farm income from operations + Farm interest expense – Owner withdrawals for unpaid labor and management) / Average total farm assets.

Actual Data:	Net farm income from operations	+ 64,055
	Farm interest expense	+ 52,360
	Owner withdrawals for unpaid labor and management	- 32,000
	Total	84,415

$$84,415 / ((1,187,570 + 1,173,500) / 2) =$$

$$84,415 / 1,180,535 = .07150$$

Multiply by 100 and round to 7.15%

¹ 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 independently 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 with respect to on-farm and non-farm earnings for sole proprietors with non-farm income.

² 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— up to an amount representing the estimated value of unpaid labor and management. This amount is referred to as owner withdrawals for unpaid labor and management. Any additional withdrawals are treated as capital withdrawals for analysis purposes and should not be included in calculating this ratio. An alternative approach sometimes is used by record keeping services 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.

³ 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.

RATE OF RETURN ON FARM EQUITY

Computation: (Net farm income from operations - Owner withdrawals for unpaid labor and management) / Average total farm equity^{4, 5, 6}

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. The higher the value of the ratio, the more profitable the farming operation.

Limitations:

1. Deferred taxes should be included as liabilities; failure to do so may understate the rate of return on farm equity.
2. Owner withdrawals for unpaid labor and management must be correctly calculated, otherwise the result may be seriously understated or overstated.
3. 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.
4. The method used to value farm assets can affect the value of this ratio.
5. 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 the other ratios, should be used in conjunction with other ratios when analyzing a farm business.

Computation: (Net farm income from operations - Owner withdrawals for unpaid labor and management) / Average total farm equity.

Actual Data: $(64,055 - 32,000) / ((700,432 + 646,660) / 2) =$
 $32,055 / 673,546 = 0.04759$
 Multiply by 100 and round to 4.76%

⁴ 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 independently 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 with respect to on-farm and non-farm earnings for sole proprietors with non-farm income.

⁵ 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— up to an amount representing the estimated value of unpaid labor and management. This amount is referred to as owner withdrawals for unpaid labor and management. Any additional withdrawals are treated as capital withdrawals for analysis purposes and should not be included in calculating this ratio. An alternative approach sometimes is used by record keeping services 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.

⁶ 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 equity balance, then divide the total by thirteen.

TERM DEBT AND CAPITAL LEASE COVERAGE RATIO

Computation: (Net farm income from operations +/- Total miscellaneous revenue/expense + Total non-farm income + Depreciation & amortization expense + Interest on term debt + Interest on capital leases - Total income tax expense - Owner withdrawals (total) - Non-Farm Expense) / (Annual scheduled principal and interest payments on term debt + Annual scheduled principal and interest payments on capital leases)⁷

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 the 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 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 the 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 the non-farm 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 enterprise(s), the degree of diversification for farm and non-farm enterprises, and the financial and risk management abilities of the farmer.

Computation: (Net farm income from operations +/-Total miscellaneous revenue/expense + Total non-farm income + Depreciation/amortization expense + Interest on term debt + Interest on capital leases - Total income tax expense - Owner withdrawals (total)) / (Annual scheduled principal and interest payments on term debt + Annual scheduled principal and interest payments on capital leases)

Actual Data:	Net farm income from operations	+ 64,055	
	Non-farm income	+ 9,500	
	Depreciation/amortization expense	+ 32,600	
	*Interest on term debt	+ 42,360	
	*Interest on capital lease	+ 0	
	Total income tax expense	- 5,500	
	Owner withdrawals (total)	- 32,000	
	Non-Farm Expense	-0	
	Total	\$111,015	
	Annual scheduled principal and interest payments on term debt	+ 45,000	(principal)
	Annual scheduled principal and interest payments on capital leases	+ 42,360	(interest)
	Total	+ 0	
		\$87,360	
	111,015 / 87,360 = 1.270776		
	Round to 1.27		

⁷ Amortization means the scheduled or systematic reduction of a balance in an account (most often an intangible asset account or non-current liability account) over an appropriate period of time. The methods used to amortize an intangible asset are similar to methods used to depreciate tangible assets. Amortization of non-current liabilities (long term debt) involves the periodic reduction of the principal amount by regular principal debt repayments over time.

CAPITAL REPLACEMENT AND TERM DEBT REPAYMENT MARGIN

Computation:	Net farm income from operations + Total non-farm income* + Term Interest + Depreciation/amortization expense - Total income tax expense - Owner withdrawals (total) - Non-Farm Expense = Capital replacement and term debt repayment capacity - Annual Scheduled Principal and Interest Payments on Term Debt - Annual Scheduled Principal and Interest Payments on Capital Leases = Capital replacement and term debt repayment margin
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*To evaluate the measure for the business only, the items marked above with an * should not be included. Certain adjustments may be necessary for the portion of income taxes and owner withdrawals that are paid by non-farm income.

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 assets 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 a dollar amount (which may be positive or negative), 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 at 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 margin may be overstated.
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.
5. Other farm businesses can enjoy the tax deduction of depreciation, but need not replace buildings, machinery, and equipment except after long periods of extended use.
6. 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.
7. The appropriate margin will vary from farm to farm depending on the production and price variability associated with the enterprise(s), the degree of diversification for farm and non-farm enterprises, and the financial and risk management abilities of the farmer.
8. The stability of the non-farm income may vary from borrower to borrower, depending on type of employment.

Computation:	Net farm income from operations	
	+ Total non-farm income*	
	+ Term Interest	
	+ Depreciation/amortization expense	
	- Total income tax expense	
	- Owner withdrawals (total)	
	- Non-Farm Expense	
	= Capital replacement and term debt repayment capacity	
	- Annual Scheduled Principal and Interest Payments on Term Debt	
	- Annual Scheduled Principal and Interest Payments on Capital Leases	
	= Capital replacement and term debt repayment margin	

To evaluate the measure for the business only, the items marked above with an asterisk () should not be included. Certain adjustments may be necessary for the portion of income taxes and owner withdrawals that are paid by non-farm income.

Actual Data:	Net farm income from operations	+ 64,055
	Total non-farm income*	+ 9,500
	Term Interest	+ 42,360
	Depreciation/amortization expense	+ 32,600
	Total income tax expense	- 5,500
	Owner withdrawals (total)	- 32,000
	Non-Farm Expense	- 0
	Capital replacement and term debt repayment capacity	111,015
	Annual Scheduled Principal and Interest Pmts. on Term Debt	- 87,360
	Annual Scheduled Principal and Interest Pmts. on Capital Leases	- 0
	Capital replacement and term debt repayment margin	+ 23,655

Note: This number can be either positive or negative.

OPERATING EXPENSE RATIO

Interpretation: This ratio reflects the relationship of expenses to revenues. It indicates what percentage of revenue went to pay operating expenses.

Computation: (Total operating expenses – Depreciation & Amortization Expense – Interest Expense) / Value of Farm Production⁸

Actual Data: (333,460 - 32,600 - 52,360) / 397,515 =
248,500 / 397,515 = 0.62513
Multiply by 100 and round to 62.51%

⁸ This ratio can also be calculated by 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. Also, total operating expenses are defined using the definition recommended by the FFSC. That definition would exclude interest and include depreciation.