



chapter seven

MANAGING YOUR FARM'S FINANCIAL RISK

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Instructor Guidelines

The objective of this chapter, *Managing Your Farm's Financial Risk*, is to provide specific strategies for managing financial risk faced by the farm business. The chapter focuses primarily on credit, investment and cash reserve/liquidity issues.

The chapter starts by establishing a definition for financial risk and identifies the primary sources of farm financial risk. Next, the chapter covers the relationships between debt, leverage, profitability, and risk. Managing credit, understanding liquidity, restructuring debt, and relating interest and principal to the risk position of the farm are covered. Additional materials are provided on restructuring debt and the impact of lease arrangements on the farm's financial position.

Each topic is developed first by definition, by presentation of examples, discussion of strategies to improve the issue under discussion, and finally by providing measures that the farm operator can use to determine whether corrective action is needed. The partial budget, a tool for evaluating potential investments and changes in farm enterprises, is described, and examples are provided using the partial budget. Finally an exercise is provided using the partial budget to analyze a potential investment in a grain storage facility.

It is recommended that this chapter be presented following the chapter on *Assessing Your Farm's Risk Bearing Capacity*.

Introduction

Agricultural production is a high risk business. Risks are numerous, diverse, and substantial.

Three Major Risks

1. Production
 - ☛ Variability in commodity yield and/or quality.
 - ☛ Caused by weather, disease, pests, biological lags, etc.
2. Market and price
 - ☛ Variability in commodity and input prices.
 - ☛ Caused by changes in supply (production decisions, weather, disease, gov't, trade, etc.) and demand (consumer income, strength of economy, exports, exchange rates, prices of competing commodities, etc.).
3. Financial
 - ☛ Variability in returns to equity capital and in cash flow resulting from financing.

Objectives of this Discussion

1. Defining and characterizing financial risk.
2. Identifying sources of financial risk.
3. Noting the relationships between debt, leverage, and risk.
4. Determining appropriate debt and leverage.
5. Managing credit and liquid reserves.
6. Fixed vs. variable interest rates.
7. Structuring the repayment of term debt.
8. Understanding the relationship between land lease agreements and risk.

Financial Risk: Definition and Sources

Definition

Variability in returns to equity capital and in cash flow resulting from financing.

Financial risks arise primarily out of producer financial obligations to lenders and lessors.

Major Sources of Financial Risk

1. High debt and financial leverage.
2. Availability of credit reserves.
3. Availability of cash and near cash reserves.
4. Variability in interest rates.
5. Abbreviated repayment schedules for term debt.
6. Leasing arrangements.

Risks are Interrelated

Financial, production, and marketing risks are interrelated.

Example: Ability to repay term debt is dependent on grain prices and yields.

Should consider all types of risk when developing a plan for the entire business.

Managing Financial Risks

Debt, Leverage and Risk

The appropriate level of debt and leverage is dependent on:

1. Profitability.

2. Risk.
3. Repayment capacity.
4. Farmer's tolerance for risk.

Financial Leverage—What Is It?

$$\text{Leverage} = \frac{\text{Debt}}{\text{Net worth}}$$

Table 1. Three balance sheets with increasing leverage.

	A	B	C
Total assets (A)	\$200,000	\$400,000	\$600,000
Debt (D)	0	200,000	400,000
Net worth (A-D)	200,000	200,000	200,000
Leverage (D+NW)	0	1:1	2:1

Debt, Leverage and Profitability

1. Leverage is good if return on assets (ROA) exceeds cost of debt.
 - ☛ When ROA exceeds cost of debt, increased leverage increases the return on equity (ROE). See Table 2, Part A.
2. Leverage is bad if cost of debt exceeds ROA.
 - ☛ When the cost of debt exceeds ROA, increased leverage decreases the ROE. See Table 2, Part B.

Table 2. Leverage and its impact on profit and risk.

	Leverage			
	0	1	2	5
Net worth	\$600,000	\$300,000	\$200,000	\$100,000
Debt	0	300,000	400,000	500,000
Total assets	\$600,000	\$600,000	\$600,000	\$600,000
Part A: ROA = 16%, Debt = 12% (debt used profitably)				
Return total assets	96,000	96,000	96,000	96,000
- Interest, debt	0	36,000	48,000	60,000
= Return, NW	96,000	60,000	48,000	36,000
% Return, NW (ROE)	16%	20%	24%	36%
Part B: ROA = 8%, Debt = 12% (debt used unprofitably)				
Return total assets	48,000	48,000	48,000	48,000
- Interest, debt	0	36,000	48,000	60,000
= Return, NW	48,000	12,000	0	-12,000
% Return, NW (ROE)	8%	4%	0	-12%
Change in ROE (A-B)	8%	16%	24%	48%

Principle of Increasing Risk

Increases in leverage cause unfavorable events to have a greater adverse impact on business profitability.

Note that when ROA changes from 16% to 8% (Table 2) the change in ROE is from 16% to 8% (an 8% swing) when leverage is zero, compared to a change from 36% to -12% (a 48% swing) when leverage is 5.

Maximum Debt/Asset Percentage Based on Profitability and Cost of Debt

$$= \frac{\text{ROA (\%)}}{\text{Average interest rate on debt (\%)}}$$

Example:
$$= \frac{5\%}{10\%} = 50\%$$

Return from \$1 pays interest on 50¢ of debt, but no principal.

Maximum debt/asset % assumes zero returns to equity.

Debt is serviced without using equity or non-farm earnings.

Debt, Leverage and Repayment Capacity

Capital replacement and term debt repayment margin reflects the ability of the business to replace capital assets (e.g., machinery) and service additional term debt after all other financial obligations have been met.

Table 3. Example of capital replacement and term debt repayment margin using Profit Farms.

Net farm income	\$28,211
+ Non-farm income	+16,550
+ Depreciation	+35,643
- Income and social security taxes	- 8,723
- Personal withdrawals	-44,596
= Capital replacement and term debt repayment capacity	=27,085
- Principal payments on term debt	-24,027
= Capital replacement and term debt repayment margin	= 3,058

Decision about using additional term debt should be based on several years (3-5) of term debt repayment margins.

Amount of additional debt supported by repayment margin depends on:

1. Length of repayment period.
2. Interest rate.

Example: \$10,000 margin is the annual principal and interest payment on a:

- \$ 37,908 loan at 10%, 5 years*
- \$ 94,269 loan at 10%, 30 years*
- \$ 39,927 loan at 8%, 5 years*
- \$112,578 loan at 8%, 30 years*

Strategies for Managing a Negative Capital Replacement and Term Debt Repayment Margin

1. Increase financial reserves (checking account, savings, CDs, etc.).
2. Increase personal withdrawals.
3. Borrow additional money to buy farm/non-farm capital assets.
4. Use equity capital to make down payments or purchase out right farm/non-farm capital assets.
5. Reduce reliance on non-farm income.
6. Prepay term debt if interest rate on debt is greater than rate of return from alternative use of margin.

Strategies for Managing a Negative Capital Replacement and Term Debt Repayment Margin

1. Reduce working capital.
 - Use savings.
 - Reduce checking account balance.
 - Reduce inventory.
 - Reduce accounts receivable.
 - Increase accounts payable.

2. Restructure existing term debt so that it is repaid over longer period of time with lower periodic payments.
3. Liquidate capital assets (least profitable assets).
4. Increase farm/non-farm net income.
5. Reduce personal withdrawals.

Proper Structuring of Debt Occurs When

1. Operating capital debt can be repaid from funds allocated to pay cash operating expenses.
2. Loans for depreciable assets can be repaid from depreciation allowances.
3. Real estate debt can be repaid from retained earnings (= net income after taxes minus personal withdrawals).

How much Debt/Leverage?

Summary of key points:

1. More leverage can increase earnings when debt capital is used profitably.
2. More leverage increases cash flow commitments.
3. More leverage increases variability of earnings (principle of increasing risk).

Upper limits on appropriate use of debt/leverage are set by:

1. Profitability of debt use.
2. Ability to properly structure debt repayment obligations.
3. Variability of earnings and cash flow.
4. Effectiveness of risk management in controlling variability of earnings and cash flow.

5. Willingness of producer/lender to assume risk.
6. Desired credit reserve.

Managing Credit Reserves

Definition

Credit reserve is the difference between the maximum amount a producer could borrow and the amount actually borrowed.

Credit reserve (unused borrowing capacity) can be used as a source of funds to meet risk-related needs, such as:

1. Increased borrowing.
2. Loan carryover and extensions.
3. Deferring loan payments.
4. Refinancing.

Size of Credit Reserve is Determined By

1. Analysis of financial statement.
2. Term debt repayment margin analysis.
3. Cash flow budget.
4. Risk management policy.
5. Lender(s) analysis of farm's credit worthiness.
6. Producer's willingness to accept risk.

Advantages of a Credit Reserve as a Source

1. Does not alter asset-liability relationships.
2. Don't have to liquidate assets to get funds.
3. Flexible in uses.

Disadvantages of a Credit Reserve as a Source of Liquidity

1. Returns from investment opportunities are forgone when funds are not actually borrowed.
2. Considerable uncertainty about availability and cost of credit when taken from reserves.
3. Substantial financial control may shift to lenders when additional borrowing occurs during stress.

Managing Liquid Reserves

Value of Liquidity

Self insurance through the maintenance of a reserve of cash and other highly liquid assets is a common strategy for minimizing the impact of financial adversity (risk).

The value of this liquidity is reflected by the fact that producers maintain low yielding liquid reserves (e.g., savings) while paying higher interest rates on debt, sacrificing higher earnings by foregoing investments, and postponing consumption.

Sources of Liquidity (In Decreasing Degree of Liquidity)

1. Cash on hand.
2. Checking/savings accounts.
3. Money market accounts.
4. Time deposits.

5. Securities.
6. Product inventories.
7. Supplies.
8. Growing crops/market animals.
9. Breeding animals.
10. Machinery.
11. Real estate.

Determinants of Liquidity

1. Transactions costs (e.g., commissions, transportation) associated with sale of asset.
2. Activity of market.
3. Variability of market over time.
4. Contingent tax liabilities.
5. Impact of sale on farm's income generating capacity
 - Sale of current assets (e.g., grain inventory) has small impact relative to sale of noncurrent assets (e.g., machinery, land).

Symptoms of Liquidity Problems

1. Declining profitability.
2. Build-up of carryover operating debt.
3. Living off depreciation.
4. Build-up of credit card balances.
5. Increasing number of past due notes.
6. Past due property taxes.



7. Canceled insurance.
8. Increasing leverage.
9. Multiple sources of credit (e.g., over 5).

Strategies for Managing a Liquidity Problem

1. Prepare an up-to-date and accurate balance sheet.
 - Shows current financial position, including debt structure.
 - Basis for cash flow management strategies.
2. Prepare a monthly cash flow projection for upcoming year.
3. Work closely with lender(s).
 - Use standard financial statements to communicate.
4. Examine possibility of restructuring debt.
5. Negotiate with lender to pay interest only on existing term debt.
6. Closely analyze capital asset expenditures.
7. Partial liquidation of capital assets.
8. Review production practices for cost-cutting opportunities.
9. Consider off-farm employment.
10. Evaluate living expenses.
11. Give financial management a higher priority.
12. Aggressively pursue risk management tools/strategies.

Interest Rate Plans

Fixed Rate

Same rate applies for the entire length of the loan repayment period.

Producer advantages:

1. No risk of change in principal and interest payments due to varying interest rates.
2. Doesn't suffer from rising interest rates.

Producer disadvantages:

1. Pay higher interest rate to compensate lender for assuming risk of change in interest rate.
2. Doesn't benefit from falling interest rates.
3. May be higher prepayment penalties.

Variable Rate

Interest rate may vary during loan repayment period due to changes in cost of money to lender:

Producer advantages:

1. Lower interest rate since assumes risk of interest rate change.
2. Opportunity to benefit from falling interest rates.

Producer disadvantages:

1. Uncertainty about future payment obligations.
2. Possibility of higher interest rates

Adjustable Rate

Combination of fixed and variable rate loans.
Applies to long-term loans and commonly referred to as adjustable rate mortgages or "ARM".

Rates are fixed for a period (e.g., 1 to 5 years), followed by another period when rates may increase or decrease, often subject to caps.

Risk of rate changes is shared between borrower and lender.

Advantages to producer are that interest rate is often lower than with variable rate loan and there is a limit on how much the rate can increase.

Which is Best?

Very difficult to determine unless know future direction of interest rates.

During a period of low interest rates, producers with a highly vulnerable financial situation are generally well advised to use fixed rates.

During a period of moderate to high interest rates, producers with a solid financial situation are generally well advised to use variable/ARM.

Ability to withstand risk of interest rate changes can be determined with a term debt repayment margin analysis.

- Start with most likely scenario (base) and then vary revenues down, expenses up, and interest rates up to determine vulnerability of repayment margin.
- How much can interest rates increase under alternative cost/revenue scenarios before repayment margin is gone?

Structuring the Repayment Term of Debt

Loan Repayment Obligation is Ideal When

1. Cash earnings over life of asset are at least as large as the principal plus interest.
2. Obligations are met in a timely manner by the asset's stream of cash earnings.
 - Loan repayment obligations that do not match the time pattern of cash earnings diminish the farm's cash flow and increase financial risk.
 - Repayment obligations on debt used to finance capital assets should be structured to fit the asset's stream of earnings.

Structuring of Term Debt Repayment

Proper structuring of term debt repayment obligations is based on financial analysis of proposed investments in capital assets.

EXAMPLE ANALYSIS: THE NO-TILL DRILL

A grain producer has been renting a no-till drill to seed 900 acres per year. The rental fee is \$14 per acre. However, serious consideration is now being given to purchasing the drill.

Assumptions applying to the proposed investment are:

- 1. The drill costs \$53,750.*
- 2. An 8-year life is anticipated with a \$15,000 salvage value at the end of that period.*
- 3. If purchased, the drill will be pulled by the same power unit now used to pull the rented drill.*
- 4. Average annual repairs on the purchased drill are estimated to be \$3,000.*
- 5. Property taxes on the purchased drill will average about \$500 per year.*
- 6. Repairs for the rented drill are always covered by the warranty (new machine), and the lease company pays property taxes.*
- 7. The producer must buy insurance on both the purchased and rented drill.*
- 8. Proposed financing for the purchased drill is a \$16,125 down payment (30%) and a \$37,625 loan. Tentatively, the lender is suggesting a 10% interest rate and five equal annual payments of \$9,925 each. Funds for a down payment would come from an alternative use yielding a 6% cash return.*

Three Key Questions a Sound Investment Analysis Should Address

1. Is the investment profitable?
2. Will the investment have a cash flow that matches debt repayment obligations?

3. What about the risk?

NO-TILL DRILL ANALYSIS RESULTS

As indicated by the partial budget analysis (table 4), the investment in the no-till drill is projected to increase average annual earnings by \$1,789 (Financial Analysis, line 1). However, the investment does not cash flow, since the lender is proposing a 5-year repayment period, and it is projected to take 6.6 years to retire the principal (Financial Analysis, line 3).

Financial risk could be reduced by negotiating for a 7-year repayment period at the expense of added interest.

What other risks are associated with this investment and are the \$1,789 improved earnings sufficient to compensate for those risks?

Table 4. Partial budget for buying a no-till drill.

Positive impacts (\$ per year)			Negative impacts (\$ per year)		
Added returns	Earnings	Cash flow	Added costs	Earnings	Cash flow
1.			1. Depr. $\frac{\$3,750 - 15,000}{8 \text{ yrs.}}$	4,844	
2.			2. Repairs	3,000	3,000
3.			3. Prop. taxes	500	500
4.			4. Int. on debt	1,500 (8 yrs.)	2,400 (5 yrs.)
Total added returns	\$ 0	\$ 0	Total added costs	\$9,844	\$5,900
Reduced costs			Reduced returns		
1. Rental fee (900 x \$14)	12,600	12,600	1. Int. on downpmt.	967	967
2.			2.		
3.			3.		
4.			4.		
Total reduced costs	\$12,600	\$12,600	Total reduced returns	\$967	\$967
Total positive impacts	\$12,600	\$12,600	Total negative impacts	\$10,811	\$6,867

Table 4. Partial budget for buying a no-till drill. (continued)

Financial Analysis

1. Change in annual earnings: \$ 12,600 total positive impact
(earnings column) – \$ 10,811 total negative impact (earnings column) = \$ 1,789

2. Cash available for annual retirement of principal: \$ 12,600 total
positive impact (cash flow column) – \$ 6,867 total negative
impact (cash flow column) = \$ 5,733

3. Years to recover debt: \$ 37,625 loan ÷ \$ 5,733 line 2 = 6.6

Lease Terms and Risk

Leasing is a Widely Used Method of Controlling Land

43% of land farmed in U.S. is farmed as leased ground (1992 Ag. Census).

47% of Washington land is leased:

62% Whitman County (dryland grain)

20% Yakima County (irrigated fruit, etc.)

Types of Leases are Highly Variable

About two-thirds of U.S. leases are cash leases.

In PNW, cash rent dominates on irrigated ground and crop-share is more popular for dryland grain production.

Nature of lease agreement can have major impact on producer risk.

Financial risk is also impacted by the length of the lease (land and machinery).

Crop-Share Leases

Value of the crop-share paid as rent varies with yield and crop price. Yield and price risk are shared by the landowner and the producer.

Since the value of the rent varies with the producer's ability to pay, crop-share leases have risk advantages for the producer.

Less risk often translates to higher rent, since landowner will require more rent to compensate for added risk.

Fixed Rent

High risk for producer in that must pay agreed upon amount regardless of ability to pay.

Producer withstands all the risk associated with the variability of yields, prices, and costs.

Landowner avoids these risks and therefore is often willing to accept a lower rent than would be required on comparable ground with a crop-share arrangement.

Variable Cash Rent

Cash rent for base yield and/or price is varied according to changes in yield and/or price.

Example of base rent varied by price change:

$$\text{Adjusted rent} = \text{base rent } (\$50) \times \frac{\text{Ave. daily closing price, Elevator X, Aug.-Oct. 1 } (\$3.25)}{\text{Base price } (\$3.50)} = \$46.43$$

Producer and landowner share in price risk.

Producer assumes all of production risk.

Example of base rent varied by price and yield changes:

$$\text{Adjusted rent} = \text{Base rent } (\$50) \times \frac{\text{Ave. daily closing price, Elevator X, Aug.-Oct. 1 } (\$3.25)}{\text{Base price } (\$3.50)} \times \frac{\text{Actual yield } (52)}{\text{Base yield } (65)} = \$37.14$$

Producer and landowner share in both price and yield risks.

Custom Farming

Operating agreement, not land lease agreement.

Landowner retains control of land and manages its use, including paying a fee for hiring labor and machinery services.

Landowner assumes production and price risk.

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Exercise: Analysis of Investment in Grain Storage Facility

Situation

Assume that Les Profit, a grain producer, is thinking about the purchase of a grain storage facility. Typically, Les stores around 30,000 bushels of grain annually for about six months. In the past, all of the grain has been stored at an off-farm commercial elevator.

The following information about the potential on-farm storage structure investment has been assembled in preparation for a partial budget analysis:

1. The structure has a capacity of 30,000 bushels and costs \$32,000.
2. Assume a 15-year life and no salvage value.
3. Commercial storage for 30,000 bushels costs about \$6,600 per year. This figure is based on storage fees of 2¢ per bushel per month and handling fees of 10¢ per bushel.
4. Annual on-farm storage structure costs for repairs, property taxes, structure insurance, electricity, pest control, and grain insurance are estimated to be \$2,500.
5. The \$32,000 investment will be financed with an \$8,000 down payment, and a \$24,000 loan. The loan has a 10 percent interest rate and tentatively must be repaid in seven annual level principal and interest payments of \$4,930 each. The average annual interest payment over the seven-year loan repayment period is \$1,501 and \$700 per year if averaged over the 15-year life of the structure. The \$8,000 down payment must be diverted from an alternative use of funds yielding six percent annual cash earnings.

Use the Partial Budget Form Which Follows to Answer these Three Questions

1. Is the proposed grain storage structure investment profitable? Why?
2. Will the investment likely have sufficient cash flow to retire the proposed debt in a timely manner? Why?
3. What risks should be considered in making the investment decision?

Table 5. Partial budget for _____.

Positive impacts (\$ per year)			Negative impacts (\$ per year)		
Added returns	Earnings	Cash flow	Added costs	Earnings	Cash flow
1. _____	_____	_____	1. _____	_____	_____
2. _____	_____	_____	2. _____	_____	_____
3. _____	_____	_____	3. _____	_____	_____
4. _____	_____	_____	4. _____	_____	_____
Total added returns	\$ _____	\$ _____	Total added costs	\$ _____	\$ _____
Reduced costs			Reduced returns		
1. _____	_____	_____	1. _____	_____	_____
2. _____	_____	_____	2. _____	_____	_____
3. _____	_____	_____	3. _____	_____	_____
4. _____	_____	_____	4. _____	_____	_____
Total reduced costs	\$ _____	\$ _____	Total reduced returns	\$ _____	\$ _____
Total positive impacts	\$ _____	\$ _____	Total negative impacts	\$ _____	\$ _____

Financial Analysis

1. Change in annual earnings: \$ _____ total positive impact (earnings column) – \$ _____ total negative impact (earnings column) = \$ _____
2. Cash available for annual retirement of principal: \$ _____ total positive impact (cash flow column) – \$ _____ total negative impact (cash flow column) = \$ _____
3. Years to recover debt: \$ _____ loan ÷ \$ _____ line 2 = _____

Table 6. Partial budget for grain storage structure

Positive impacts (\$ per year)			Negative impacts (\$ per year)		
Added returns	Earnings	Cash flow	Added costs	Earnings	Cash flow
1. _____	_____	_____	1. Depr. $\frac{32,000 - 0}{15 \text{ yrs.}}$	2,133	_____
2. _____	_____	_____	2. Repairs	700	1,501
3. _____	_____	_____	3. Prop. taxes	2,500	2,500
4. _____	_____	_____	4. _____	_____	_____
Total added returns	\$ 0	\$ 0	Total added costs	\$5,333	\$4,001
Reduced costs			Reduced returns		
1. Rental fee (900 x \$14)	6,600	6,600	1. Downpmt. (\$8,000 x .06)	480	480
2. _____	_____	_____	2. _____	_____	_____
3. _____	_____	_____	3. _____	_____	_____
4. _____	_____	_____	4. _____	_____	_____
Total reduced costs	\$6,600	\$6,600	Total reduced returns	\$5,813	\$4,481
Total positive impacts	\$6,600	\$6,600	Total negative impacts	\$5,813	\$4,481

Financial Analysis

1. Change in annual earnings: \$ 6,600 total positive impact (earnings column) – \$ 5,813 total negative impact (earnings column) = \$ 787
2. Cash available for annual retirement of principal: \$ 6,600 total positive impact (cash flow column) – \$ 4,481 total negative impact (cash flow column) = \$ 2,119
3. Years to recover debt: \$ 24,000 loan ÷ \$ 2,119 line 2 = 11.3

