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Certified Financial Risk Management

Sample Material

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1. RISK BASICS

1.1. Nature of Risk

Risk management is primarily concerned with reducing earnings volatility and avoiding large losses. In a proper risk management process, one needs to identify the risk, measure and quantify the risk and develop strategies to manage the risk. The highest concerns in risk management are the most risky products.

The prior concerns for the risk management are those products that can cause the highest losses: high exposures with high default risk.

The next priorities are smaller exposures with high risk and large exposures with lower risk. The prioritization of both types is less straightforward. The lowest priorities have low exposures with low risk.

The time and resources allocated to risk management do not directly add to production of new loans or financial assets. However, without risk management functions, it is unlikely that the bank succeeds in achieving its long-term strategy and to remain solvent. In modern banking, risk management is seen as a partner of sales and production.

Financial risks include those risks that threaten the financial health and stability of a business. The basic components of financial risk are:

- ✓ The cost and availability of debt capital;
- ✓ The ability to meet cash flow needs and commitments in a timely manner;
- ✓ The ability to absorb short term financial shocks;
- ✓ The ability to maintain and grow the equity in the business.

Volatility in the agricultural economy requires close monitoring and planning of all financial transactions as well as regular scrutiny of the net worth or equity position. The capital structure of any business includes both debt or borrowed capital and equity or owned capital. The risks of debt capital are the ability to meet the contractual obligations made to others and the possibility of increasing interest rates. The generation of equity capital increases the owners' net worth or wealth. Eroding net worth can result from the risks of lower asset values including land and investments. The possibility of negative net incomes also poses a risk to net worth. Increasing equity provides resources for the expansion of the business to include additional family members and for retirement.

Financial Statements

To address the major elements of financial risk, a good set of financial records is mandatory. These records provide the flow of information needed to evaluate past performance and plan future strategies through a set of specific financial statements. Financial statements provide the basis to monitor the financial position, control expenditures, and measure various aspects of the financial performance of the business. The essential financial statements are the balance sheet, statement of owner's equity, income statement and cash flow statement.

- ✓ Balance Sheet: The balance sheet or net worth statement is a snapshot of the financial position of a business on a specific date. It shows the value of all assets which is "balanced" between the value of all liabilities or the claims of others against the business and the net worth or the owner's claims against the business. In agriculture both assets and liabilities are separated into current, intermediate and long term or fixed. Some analysts use only current and noncurrent categories for describing assets and liabilities. Current assets are cash or any asset such as grain or marketing livestock which will be converted into cash within a year. Current liabilities are any debts or payments that are due within a year. Intermediate assets typically include breeding livestock and machinery. Land is the major component in the long term category. Intermediate and long term liabilities are debts against the corresponding assets. Payments on any class of liabilities due within the year are part of current liabilities.

Often two sets of balance sheets are maintained, one using market value of assets and the other with cost values. The cost value approach measures the contribution of management to the growth of equity over time because it removes the impacts of inflation and deflation.

- ✓ **Income Statement:** The income statement, or profit and loss (P&L) statement, shows the net income for the business during the accounting period. It includes income generated, the operating and overhead costs, depreciation on assets, gains or losses on disposal of capital assets and income and expenses. It can be prepared on a cash or accrual basis. The accrual approach provides a true picture of the profitability of the business for that period by accounting for changes in the value of inventories, payables and receivables.

- ✓ **Statement of Owner's Equity:** The equity position over time measures the financial growth and progress of the business. Changes can occur due to retained earnings, withdrawals and contributions, changes in the market value of assets or changes in personal net worth from sources. It formally links together the beginning and ending balance sheets for the year and the corresponding income statement. This process reconciles the two statements and shows the impact of the withdrawals for family living costs.

- ✓ **Cash Flow Statement:** Effective financial control of the business requires thorough knowledge of the sources and uses of cash in the business. A business may have both a strong balance sheet and income statement but the cash needs and commitments may not match the cash inflows. The cash flow statement can be a statement of past activities or a budget of expected cash inflows and outflows. As a statement of past performance, a cash flow statement shows how and when cash was generated and used to pay for inputs, loan payments, family living and any capital purchases. A projected cash flow is essential for evaluating the borrowing needs of a business and the feasibility of repayment plans.

- ✓ A cash flow statement shows a complete accounting of debt transactions including principal and interest payments as well as the proceeds from new loans. An income statement only shows interest payments. Other items included in a complete cash flow but not in an income statement include family living costs, income and expenses, and income taxes.

Assessing and Managing Financial Risk Using Financial Performance Measures

The main financial risk factors are related to liquidity, solvency, profitability and repayment capacity of the business. The first two are based on data from the balance sheet, profitability measures come from the income statement and repayment capacity comes from cash flow information.

Financial Ratios

Financial ratios relating items in income statement to total assets in the balance sheet are calculated. About 20 ratios are used to appraise the performance of a bank. The financial ratios are calculated as a percent to total assets. They are:

Liquidity Ratios: Liquidity is the ability of a business to meet financial obligations as they come due without disrupting the normal operations of the business including paying living expenses, taxes and debt payments.

Liquidity	
Net Working Capital	Current Assets – Current Liabilities
Current Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$
Quick Ratio	$\frac{\text{Cash + Marketable Securities + Receivables}}{\text{Current Liabilities}}$

Activity

Accounts Receivable Turnover	$\frac{\text{Net Credit Sales}}{\text{Average Accounts Receivable}}$
Average Collection Period	$\frac{365}{\text{Accounts Receivable Turnover}}$
Inventory Turnover	$\frac{\text{Cost Of Goods Sold}}{\text{Average Inventory}}$
Average Age of Inventory	$\frac{365}{\text{Inventory Turnover}}$
Total Asset Turnover	$\frac{\text{Net Sales}}{\text{Average Total Assets}}$

Activity Ratios: the liquidity of specific assets and the efficiency of managing assets.

Leverage

Debt Ratio	$\frac{\text{Total Debt}}{\text{Total Assets}}$
Debt/Equity Ratio	$\frac{\text{Total Liabilities}}{\text{Stockholders' Equity}}$
Times Interest Earned	$\frac{\text{Earnings Before Interest \& Taxes}}{\text{Interest Expense}}$

Leverage Ratios: This is the firm's ability to meet cash needs as they arise.

Profitability Ratios: the overall performance of the firm and its efficiency in managing investment (assets, equity, capital).

Profitability

Gross Profit Margin	$\frac{\text{Gross Profit}}{\text{Net Sales}}$
Profit Margin	$\frac{\text{Net Income}}{\text{Net Sales}}$
Return On Total Assets	$\frac{\text{Net Income}}{\text{Average Total Assets}}$
Return On Common Equity	$\frac{\text{Net Income}}{\text{Common Equity}}$

Debt Ratios: - the extent of a firm's financing with debt relative to equity and its ability to cover fixed charges.

Market Value	
Earnings Per Share	$\frac{\text{Net Income – Preferred Dividends}}{\text{Common Stock Outstanding}}$
Price/Earnings Ratio	$\frac{\text{Market Price Per Share}}{\text{Earnings Per Share}}$
Book Value Per Share	$\frac{\text{Stockholders' Equity – Preferred Stock}}{\text{Common Stock Outstanding}}$
Dividend Yield	$\frac{\text{Dividends Per Share}}{\text{Market Price Per Share}}$
Dividend Payout	$\frac{\text{Dividends Per Share}}{\text{Earnings Per Share}}$

Other key ratios commonly used by bank analysts for evaluation of different dimensions of financial performance are

- ✓ capitalization
- ✓ asset quality
- ✓ operating efficiency
- ✓ liquidity
- ✓ interest sensitivity

Profit Ratios

Return on Equity (ROE), Return on Assets (ROA), profit margin, asset utilization and net interest margin are profit ratios.

- ✓ ROE indicates the rate of return on equity capital and is particularly on equity capital significant in the context of objective of maximization of share value. Equity is the sum of share capital, preferred shares, paid-in surplus, retained earnings and reserves for future contingencies.

  Rate of Return Equity % = [Net income/Total equity capital] × 100

- ✓ Return on Assets (ROA) measures the ability of management to utilize the real and financial resources of the bank to generate income and is used to evaluate management.

  Rate of Return Assets % = [Net income/Total assets] × 100

- ✓ The relationship between ROE and ROA is

  ROE = ROA × Equity multiplier (financial leverage)

  [Net income/Total equity] = [Net income/Total assets] × [Net assets/Total equity]

- ✓ Return on equity is a product of ROA and equity or leverage multiplier. A high equity multiplier can increase both ROE and the growth rate of the bank as long as ROA is positive. ROA is the product of profit margin and asset utilization.

  ROE = Profit margin × asset utilization × equity multiplier.

  [Net income/Total equity] = [Net income/Operating income] × [Operating income/Total assets] × [Total assets/Total equity]

Return on assets is also a product of profit margin and asset utilization ratio. Profit margin is determined given the operating income by the ability to control expenses; and asset utilization ratio on the effective employment of assets to generate revenues.

- ✓ Net Interest Margin (NIM) gives an insight into the bank's financial performance because interest income and expenses absorb a major share of total operating income and expenses.

  Net interest margin % = [(Total interest income –Total interest expense)/Average earning assets] × 100

Non-performing Assets

Non-performing assets equal the sum of non-accrual loans and restructured loans. Non-accrual loans are those whose cash flows stream is so uncertain that the bank does not recognize income until cash is received. Non-performing assets are a result of the compromise of the objectivity of credit appraisal and assessment.

The problem is aggravated by the weaknesses in the accounting, disclosure and legal frameworks. In the assessment of the status of current loans, the borrower's creditworthiness and the market value of collateral are not taken account rendering it difficult to spot bad loans.

Four Basic Components of Financial Risk

The financial statements and the ratios that can be generated from them provide most of the information needed to address the essential elements of financial risk listed at the beginning of this section.

- ✓ **The Cost and Availability of Debt Capital:** The financial analyses and ratios discussed above provide the tools to maintaining a sound financial foundation to ensure debt capital is available from lenders. The cost poses another risk - interest rate risk. Interest rates are largely beyond the control of the manager. However, favorable interest rates compared to market rates at any point in time, often can be achieved based on excellent financial ratios and the use of other risk management tools such as crop insurance and a sound marketing plan. These situations decrease the lender's exposure and risk which often can be passed on through reduced interest rates. The other aspect on interest rate risk is the possibility of a general increase in interest rates. This should be considered by calculating a number of "what if " scenarios when planning capital expenditures. One way to reduce interest rate risk is to use fixed rather than variable rate loans. The cost of reducing that risk is the higher interest rate on the fixed loan.

- ✓ **The Ability to Meet Cash Flow Needs and Commitments:** The current ratio and the working capital to gross income ratio are the key tools to assess the risks of cash flow commitments along with the cash flow budget.
- ✓ **The Ability to Absorb Short Term Financial Shocks**: The working capital provides the emergency fund to absorb short term shocks.
- ✓ **The Ability Maintain and Grow the Equity in the Business:** A number of the tools contribute to keeping the long term performance of the business on track. A key ratio to monitor is the Operating Profit Margin. One of the factors embedded in some of the ratios is Family Living. Controlling and meeting family living costs can be a significant component of financial risk. Family living expenses come out of net income. Using the operating profit margin goal of 25% means that Rs. 1000 of gross income is needed to generate Rs. 250 of net income. If family living costs are increased by Rs. 50,000 for example to bring an additional family member back into the business, means gross income must increase by Rs. 200,000 to generate that additional profit to use for family living items.

1.2. Sources of Risk

Mismatch

If balance sheets where all assets are exactly matched by liabilities, then the only balance sheet risk would be credit risk. Such exact matching does not exist in the real scenario.

Mismatching within limits is an inherent feature. While mismatching of maturities is inherent, it is invariably risky. Maturity mismatch, with short-term liabilities financing long-term assets, could render a company illiquid. Risks arise from the common cause of mismatching.

- ✓ Liquidity risk: when maturities of assets exceed those of liabilities.
- ✓ Interest rate risk: when interest rate terms differ.
- ✓ Currency risk: when currency denomination of assets and liabilities differ there is inevitably currency risk.
- ✓ Counter party risk: when transactions are undertaken for settlement at a later date counter party risk of the other party to a transaction will not complete as agreed exists.

Internationalization of Banking System

The internationalization of finance facilitated by telecommunications and computer technology while increasing the range of activities of banks, are likely to complicate the monitoring and controlling of the business. The increased interdependence of banks carries 'systemic risk' that is, if one bank defaults on its commitment, others may be forced to default.

Foreign banks have dramatically increased their cross-border lending to, and investment in India because of telecommunication advances, easing of regulatory barriers, and global economic integration. International banks transmit difficult financial shocks around the globe. Major banks can harshly reduce credit to India due to illiquid interbank markets, tightening credit standards, or pressure on the capital base. Going further, the ability of foreign-owned banks to raise funding from their parent banks abroad can fuel a domestic credit boom, potentially offsetting efforts by central banks to contain inflationary pressures or restrict capital inflows.

Other Risks

Other risks that may cause a reduction in the company's value due to changes in the business environment are:

- ✓ Market risk: It is the change in net asset value caused by the varying underlying economic factors like interest rates, exchange rates, and equity and commodity prices.
- ✓ Credit risk: It is the change in net asset value due to changes the perceived ability of counter-parties to meet their contractual obligations.
- ✓ Operational risk: This risk results from cost incurred through mistakes made in carrying out transactions such as settlement failures, failures to meet regulatory requirements, and untimely collections.
- ✓ Performance risk: This encompasses losses resulting from the failure to properly monitor employees or to use appropriate methods.

1.3. Need for Risk Management

The key risk management functions are:

- ✓ **Risk analysis:** The risk management analyzes the risks of transactions that the bank takes because of its business: credit, market and operational risks. It surveys whether the risks are in line with the risk appetite the banks wants to take. It informs the front office on the risk it takes on transactions and whether the bank is sufficiently rewarded for it.

- ✓ **Investment and pricing decisions:** The risk management has a key role in the decision making on investment and pricing decisions. Risk is involved in the early stage of the investment process, because it is better to avoid risks up front than to manage high-risk positions afterwards. Risk management often acts as a decision aid. The better the risk management, the better future losses are avoided and the better the risk return. On top of yes/no investment decisions, the risk management also provides a decision aid on a correct pricing with information on minimum margins for the assessed risk level.

- ✓ **Risk quantification:** Risk management has evolved from a rather qualitative risk ordering towards a quantitative risk environment that assigns numbers to categories of high and low risks. Such a risk quantification requires a good definition of risk measures, data with risk experience and quantitative analysts to model the risk.

- ✓ **Risk monitoring and reporting:** The risk of existing positions is continuously monitored. Individual transactions may become more risky, especially on longer maturities or because of important changes in the financial, market, or macroeconomic situation. The risk department also monitors the risk position of the bank at the levels of the different portfolio and on the level of the whole bank. It monitors whether the bank's risk profile evolves as expected.

- ✓ **Strategic advisor:** The risk management is a strategic advisor to indicate to the management of the bank which product types it should take. It surveys whether the investment strategy and global risk-return position are in line with the bank's strategy. Risk is about uncertainty, losses may impact the bank's earnings and erode its capital. Risk management is necessary to assess the possible impact changing economic and/or market conditions on the bank and how to mitigate risks that are too high.

- ✓ **Solvency:** Bank capital is required to absorb unexpected losses. When losses exceed expectations, the capital buffer serves to absorb an unexpected loss amount. When the capital buffer is insufficient, the bank becomes insolvent. Solvency risk depends on the possibility of unexpected high losses and the capital level. For a given portfolio, the capital level needs to be determined to obtain a sufficiently low solvency risk for the bank, which is determined by the management. Regulation recently evolved to more risk-sensitive capital rules. The new Basel II accord defines rules in which a higher regulatory capital buffer is required for riskier positions.

Recent banking regulation encourages and gives incentives to adequate internal risk management processes. Efficient banks find a good balance for risk management spending.

1.4. Process of Risk Management

The main steps in a risk management process are:

Identification: Within a defined perimeter and scope of the risk management process, one identifies all potential risks. The identification can start by analyzing sources of potential risk (e.g., lower housing prices may result in lower recoveries and higher losses on a mortgage loan) or identifying threats (e.g., which factors would result in higher losses on a mortgage loan). The identification of all the risks requires a good knowledge of the financial products. A main risk is the lack of identification ability in the organization, e.g., due to insufficient competencies. \

Measurement: Given the identified sources of risk, one needs to quantify the risk. For credit risk, this means, e.g., that one needs to determine the actual default probability and how much a change of the risk drivers (e.g., profitability of a firm) impacts the default probability. How much will the loss given default increase if housing prices reduce by 10%? Risk measurement requires thorough statistical analysis of past events. When past events are only available to a limited extent, one applies theoretical models and expert knowledge to quantify the risk.

Treatment: Risk can be treated via one of the following four ways:

- ✓ **Risk avoidance:** A simple way to treat risk is to avoid risk. This implies that one does not invest in products that are too risky or for which the risk is not well enough understood. Avoidance does not mean that one avoids all risks, a strategy may consists of selecting the good counterparts and not investing in counterparts with too high default, loss or exposure risk. Alternatively, one may decide to invest only small proportions in such counterparts; one limits the exposure on risky investments. This reduces the concentration risk.
- ✓ **Risk reduction:** Risk reduction or mitigation implies that one takes a part of the risk, but not the full part of it. For high-risk counterparts, one may require collateral that the bank can sell in the case of a default. The value of the sold collateral reduces the actual and hence the risk for the bank. One may also ask guarantees from a family. Risk reduction may not always be feasible.
- ✓ **Risk acceptance:** One accepts or retains the risk that one has to take as part of the business strategy. Risk acceptance is typically applied for low-risk assets. Risk is more easily accepted when it is well diversified: investments are made in various sectors and countries, where it is unlikely that high losses will occur simultaneously in all sectors and in all countries.
- ✓ **Risk transfer:** One transfers the risk to another bank, insurance or company. Insurance companies, called financial guarantors, exist that provide guarantees to credit risk. A specific type of credit derivatives, a.o., credit default swaps are a type of option contract in which the buyer of the contract is reimbursed in the case of the default of the underlying counterpart.

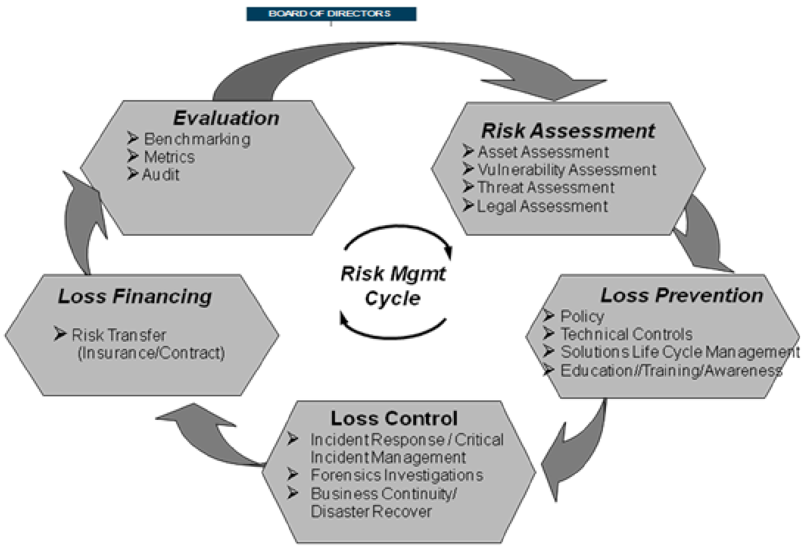
1.5. Risk Policy

The Board of Directors lay down the overall policies, while the Executive Board is in charge of the group's day-to-day management. The risk and capital management functions are separate from the credit assessment and credit-granting functions.

The company's management structure reflects the statutory requirements governing listed companies in general and financial institutions in particular, including the Executive Order on Management Control of Banks etc. The executive orders specify the obligations of directors as present for the requirements for effective corporate governance.

The heads of the business units and the heads of the operations and services are responsible for all business-related risks. The segment-based organisation allows risk management processes to be better tailored to the various customer segments and to be aligned across borders.

Figure: Risk Organisation



1.6. Risk Management Approaches

Implementation

Once the risk management strategy has been defined, it is implemented. People, statistical models, and IT infrastructure evaluate the risk of existing and new investments. Guidelines for the risk treatment define in which counterparts do not invest and in which one does not; which exposure limits are used for the most risky products; whether collateral for specific loans is mandatory or whether one buys protection from a financial guarantor. The risks of the bank are continuously reported and monitored. The implementation is supervised by senior management.

Evaluation

The effectiveness of the risk management strategy is evaluated frequently. One verifies whether the resulting risk taking remains in line with the strategy and applies corrections where necessary. This involves evaluation of the relevant risk drivers, the measurement process is evaluated, a.o., in backtesting procedures, the result of the risk treatment plans and the actual implementation.