

Financial risk management

Topic Gateway Series No. 47



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Definition and concept

What is financial risk?

‘Relating to the financial operation of an entity and includes:

- **credit risk:** possibility that a loss may occur from the failure of another party to perform according to the terms of a contract
- **currency risk:** risk that the value of a financial instrument will fluctuate due to changes in foreign exchange rates (IAS 32)
- **interest rate risk:** risk that interest rate changes will affect the financial well-being of an entity
- **liquidity risk:** risk that an entity will encounter difficulty in realising assets or otherwise raising funds to meet commitments associated with financial instruments – this is also known as funding risk.

CIMA Official Terminology, 2005

Risk management is:

‘A process of understanding and managing the risks that the entity is inevitably subject to in attempting to achieve its corporate objectives. For management purposes, risks are usually divided into categories such as operational, financial, legal compliance, information and personnel. One example of an integrated solution to risk management is enterprise risk management.’

CIMA Official Terminology, 2005

Context

Risk management (including financial risk management) is core to the current syllabus for P3 Management Accounting Risk and Control Strategy. Financial risk may arise in P9 Financial Strategy and in P10 TOPCIMA. Students must understand financial risk management and will be examined on it.

In the CIMA Professional Development Framework, financial risk features in corporate finance and treasury and risk and return.

Risk generally features in a number of additional areas including governance, enterprise risk management, strategic management, strategic risk and business skills, business acumen and managed risk.

Related concepts

Risk management; enterprise risk management; treasury management; market risk; derivatives; hedging.

Overview

There are two main categories of risks that affect a company's cash flows and/or cost of capital:

1. Firm-specific risk: also known as diversifiable or unsystematic risk. These risks are specific to the particular activities of the company such as fire, lawsuits and fraud. The company can manage many sources of these risks with adequate internal controls and other risk management techniques. Refer to the *Introduction to Managing Risk* Topic Gateway for further information on managing these types of risks. www.cimaglobal.com/mycima [Accessed 10 March 2008]
2. Market-wide or systematic risk: risk that cannot be diversified away and is measured by beta (*CIMA Official Terminology, 2005*). Market risk is associated with the economic environment in which all companies operate, including changes in interest rates, exchange rates and commodity prices. These risks can be managed using derivative contracts and other financial risk management tools.

Source: Collier, P.M. and Agyei-Ampomah, S. (2006). *Management accounting: risk and control strategy*. Oxford: Elsevier. (CIMA Official Study System)

Financial risk management identifies, measures and manages risk within the organisation's risk appetite and aims to maximise investment returns and earnings for a given level of risk. It does this in several ways.

- Reducing cash flow and earnings volatility.
- Managing the costs of financing costs (e.g. through the use of derivatives).
- Increasing the value of a company's shares. By reducing financial volatility, it can lower shareholders' rate of return and thus the cost of capital which can increase profits and value of a company.
- Management of operating costs by managing fluctuations.

Application

Companies may manage their financial risk in many different ways. This depends on the activities of the company, its attitude to risk and the level of risk it is prepared to accept. In this sense, the directors of the company will need to identify, assess and decide whether the company needs to manage the risks identified.

Stages in the financial risk management process are:

1. Identify the risk exposures

An organisation must identify and understand its financial risk exposures, including the significance of these risks. There are four main types of financial risk as defined by the *CIMA Official Terminology*, as outlined in the definition section. These include:

Currency risk: risk that the value of a financial instrument will fluctuate due to changes in foreign exchange rates (IAS 32). There are two sub-categories of currency risk:

- Translation or currency conversion exposure: susceptibility of the financial statements to the effect of foreign exchange rate changes.
- Currency transaction exposure: susceptibility of an entity to the effect of foreign exchange rate changes during the transaction cycle associated with the export/import of goods or services.

Interest rate risk: risk that interest rate changes will affect the financial well-being of an entity. This includes changes in interest rates adversely affecting the value and liquidity of fixed or floating rate exposures. In addition to bond prices, interest rate fluctuations also directly affect stock prices, foreign exchange rates and economic growth.

Liquidity: funding or cash flow risk: risk that an entity will encounter difficulty in realising assets or otherwise raising funds to meet commitments associated with financial instruments.

Credit risk: the possibility that a loss may occur from the failure of another party to perform according to the terms of a contract. One form of credit risk is debt leverage risk: the larger a debt becomes as a portion of an entity's capital structure, the risk of default of interest payments and repayment of the principal becomes greater.

Other exposures that an organisation should consider:

- **Commodity price exposure:** susceptibility to variations in the price of basic commodities in the production process, for example, raw materials such as aluminium, copper, lead, oil, gold, etc. In the case of airline companies, unanticipated increases in oil prices can pose a significant risk as they increase costs and reduce profits.
- **Operating exposure:** for example, the effect of changes in exchange rates or interest rates on the cash flows from operations.
- **Competitive exposure:** where an entity's competitive position is modified by fluctuations in exchange rates, financial instrument values and commodity prices.
- **Due diligence-determined investment risks,** for example merger and acquisition or joint venture uncertainties.

Source: The Society of Management Accountants of Canada. (1999). *Financial Risk Management - Management Accounting Guideline*

A good place to start is the balance sheet. If using a fair value basis for financial assets and liabilities, it will provide an initial overview of a company's liquidity, debt leverage, foreign exchange exposure, interest rate risk and commodity price vulnerability. The income statement (or profit and loss) and the cash flow statement (with the financial statement notes) should also be examined to evaluate financial changes over time and the impact they have on an organisation's risk profile.

2. Quantify the exposure

By its nature, risk is uncertain and putting a value on risk exposure will never be exact. However, it is important to measure the financial impact of the risk factor on either the value of the company or individual items such as earnings, cost or cash flow. This will determine if it is necessary to do something about managing against the risk.

Techniques used to quantify exposures include standard deviation (the most straightforward method), regression analysis, simulation analysis and value at risk (VaR). In practice, it depends on the nature of the risk but using more than one method is usually recommended.

Regression method. A statistical measure that attempts to determine the strength of the relationship between one dependent variable (usually denoted by 'Y') and a series of other changing variables (known as independent variables). The two basic types of regression are linear regression and multiple regression. Linear regression uses one independent variable to explain and/or predict the outcome of Y, while multiple regression uses two or more independent variables to predict the outcome. The general form of each type of regression is:

Linear regression: $Y = a + \beta X + u$

Multiple regression: $Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_{XXX} X_{XXX} + u$

Where Y is the variable that we are trying to predict, X is the variable that we are using to predict Y, a is the intercept, b is the slope, and u is the regression residual. In multiple regression, the separate variables are differentiated by using subscripted numbers.

Regression analysis is one way of measuring a company's exposure to various risk factors. This is done by regressing changes in the company's cash flows or stock price (as a dependent variable) against the various risk factors (changing or independent variables). Risk factors include changes in interest rates, changes in the exchange rate of a currency or basket of currencies, or changes in a commodity (such as gold or oil).

The regression model could be expressed as:

$$R = \alpha + \beta_1 \text{INT} + \beta_2 \text{FX} + \beta_3 \text{GOLD} + e$$

Where

R represents changes in the company's cash flows (or stock price)

INT represents changes in interest rates

FX represents changes in exchange rates

GOLD represents changes in global gold prices.

The coefficients β_1 , β_2 and β_3 represent the sensitivity of the company's cash flows or stock price to the risk factors (in this case, changes in interest rates, exchange rates and global gold prices).

To find out more information on regression analysis, you can consult any introduction to statistics or other types of mathematical or applied economics text books, such as The Economist's *Numbers Guide* (refer to the Books section below).

Simulation analysis or 'what if' analysis. This forward looking technique is used to evaluate the sensitivity of the value of the company or its cash flows to a variety of simulated values with changing risk factor assumptions.

The steps are:

1. Based on their probability of occurrence, calculate a number of different simulated values for each risk factor (such as changes in interest rates).
2. Select at random a possible simulated value to calculate the relevant cash flow.
3. Repeat this process so that a range of values has been calculated.
4. Using the range of values that has been calculated, calculate the mean (expected value) and standard deviation.
5. The standard deviation will give a measure of risk. The general rule of thumb is the greater the standard deviation, the greater the risk associated with the expected cash flows or value.

In practice, computer software such as Excel allows complex simulation analysis to be undertaken in an efficient and accurate way.

Unlike regression analysis, the simulation method does not specify the relationship between the value of the company or the company's cash flows.

Calculating expected value and standard deviation

Risk exposure can be measured by calculating the standard deviation of income items. To calculate the standard deviation, you first need to calculate the expected value (or mean). Both of these calculations are outlined below in the following example.

Example: Movements in oil prices can greatly affect the profitability of airlines, particularly in the US where oil is traded in US dollars. Suppose the profitability of a US airline over the year is predicted as follows:

Oil prices	Profit (\$)	Probability
\$50 per barrel	16 million	0.2 (20%)
\$80 per barrel	12 million	0.4 (40%)
\$100 per barrel	10 million	0.4 (40%)

Generally, the expected value of a random variable X , $E(X)$, is calculated as the sum of the products obtained by multiplying each possible outcome by the corresponding probability. This can be expressed as:

$$E(X) = \sum P_i X_i$$

Where X_i represents possible values of the random variable X and P_i is the corresponding probability that X_i would occur.

In this example, the expected value of profit is calculated as:

$$0.2 \times \$16 \text{ million} + 0.4 \times \$12 \text{ million} + 0.4 \times \$10 \text{ million} = \$12 \text{ million.}$$

The standard deviation, denoted as σ , is a measure of the dispersion of the possible values from the expected value or mean. This can be calculated as:

$$\sigma = \sqrt{\sum P_i [X_i - E(X)]^2}$$

Where $E(X)$ is the expected value (or mean) as above.

The standard deviation measures the variability (or uncertainty) of possible outcomes from the expected value, and thus gives an indication of the risk involved. For a given expected value, the greater the standard deviation the greater the risk involved.

Continuing the example above, the standard deviation can be calculated as:

$$\begin{aligned}\sigma &= \sqrt{0.3(10 - 12)^2 + 0.4(12 - 12)^2 + 0.3(14 - 12)^2} \\ \sigma &= 1.2 + 0 + 1.2 \\ \sigma &= 1.549\end{aligned}$$

In this example, profit has an expected value of \$12 million and a standard deviation of \$4.8 million. This provides an indication of the riskiness of profits due to the uncertainty over oil prices (and thus operating costs and profits).

Expected value and standard deviation are similar to regression analysis. To find out more about them, please consult an introduction to statistics or other mathematical or applied economics text.

Value at risk (VaR). Value at risk (VaR) measures the maximum loss possible due to normal market movements in a given period of time within a stated probability. Under normal market conditions, losses greater than the VaR occur with a very small probability. Although first used by the major financial institutions to measure the risks of their trading portfolios, VaR has now become an industry standard for measuring exposure to financial price risks.

There are three main methods of calculating VaR: the historical method; the variance-covariance method; and the Monte Carlo simulation. For guidance on how to use all of these methods, please refer to an article written by David Harper. The article is available on the Investopedia website:

www.taxopedia.com/articles/04/092904.asp

[Accessed 6 March 2008]

Risk measurement or qualification tools automatically come with many software packages. For example, Microsoft Excel has applications that automatically calculate the expected value and standard deviation, and applications to undertake simulation and regression analysis. Recently more sophisticated risk measurement software has come onto the market, such as Palisade@RISK which offers Monte Carlo simulation add-in for Microsoft Excel.

3. Hedging decision

The next step is to decide whether to hedge each of the significant exposures. This decision is based on factors such as the goals/objectives of the company, its business environment, its appetite for risk and whether the cost justifies the reduction in risk.

Strategies for managing exposures may include one or more of the following:

- a. Accept the risk (i.e. do nothing) where the cost does not justify action.
- b. Manage the risk using internal operating techniques. These should be used in preference to derivatives, especially as many exposures are completely or partly offsetting and do not involve transaction costs. Examples include:
 - Smoothing – used for interest rate risk management, this involves maintaining a balance between fixed and floating rate debt.
 - Leading and lagging – used to hedge against foreign currency fluctuations, this involves changing the timing payments or receivables depending on changes in foreign currencies.

- Matching – matching assets and liabilities of the same nature. For example, to hedge against foreign currency movements you would match assets and liabilities denominated in the same currency. Conversely, to protect against movements in interest rates, you would match assets and liabilities having a common interest rate.
- Netting – assets and liabilities are netted to determine the overall exposure which then can be hedged using external techniques.
- c. Manage the risk using external (derivative) hedging techniques such as the use of derivatives (forwards, futures, options, swaps and hybrids of these). This is usually the responsibility of the treasury department.

An important aspect of financial risk management is ensuring that the management strategy followed is monitored and evaluated for effectiveness (particularly if hedging strategies have been chosen). Again, this is usually the responsibility of the treasury department.

International Financial Reporting Standard (IFRS), IAS 39 Financial Instruments: Recognition and Measurement and the Financial Accounting Standards Board (FASB)'s Statement No. 133 Accounting for Derivative Instruments and Hedging Activities require that costs associated with hedging with derivatives are properly disclosed.

Introduction to derivatives

A derivative is a financial instrument whose value depends on or is derived from the price of other financial assets or some underlying factors. The underlying variables may be commodities such as oil and gold, stocks, interest rates, currencies or some abstract conditions such as the weather. Derivatives can be used to manage or reduce risk as well as to speculate.

There are four main basic types: forward contracts, futures contracts, options contracts and swaps. Hybrids of these also exist.

Derivative products can be classified into exchange traded derivatives and over the counter (OTC) derivatives. Exchange traded products include futures contracts and products traded on organised exchanges such as the London International Financial Futures and Options Exchange (LIFFE). OTC derivatives, such as forward or swap contracts, are individually negotiated between the buyer and the seller. Some products are available in both types of markets, such as options.

Application – example

An example of financial risk is interest rate risk and a number of internal (operating) and external (derivative) strategies are available to manage this type of financial risk.

Interest rate risk

Interest rate risk has received increased attention as an important source of corporate risk, as interest rate movements may affect present and future cash flows of the company.

Internal hedging strategies for managing interest rate risk involves matching cash flows or assets and liabilities to create natural hedges against interest rates. These work well for financial service companies such as banks which operate a centralised treasury system.

Companies, particularly non-financial companies, are limited in the amount of interest rate risk they can manage using internal strategies. It is often necessary to use derivative (external) hedging techniques in managing interest rate exposures such as interest rate swaps, forward rate agreements, interest rate futures, interest rate options and swaptions.

Usually a treasurer will choose a mix of internal and external management techniques. The type of techniques will vary depending the company's capital structure in terms of debt to equity, fixed and floating rate debt and the length of debt (short vs long term).

For example, a company is expecting to borrow \$5 million for six months and wishes to hedge itself against a rise in short term interest rates.

The company can either enter into a forward rate contract (these are usually for at least \$1m) or an interest rate futures contract (called a 'short') to hedge against a rise in interest rate over the next six months. These type of derivative products are best suited to short term exposures.

Key developments in managing financial risk

The rise of the global economy, coupled with advances in technology, has seen a significant increase in the use, type and sophistication of products available to companies to manage an increasing number and type of financial risk. One example is insurance derivative products.

Other key developments relate to changes to banking regulations such as Basel II and accounting standards including IFRS 39 and FAS 133. Regulatory changes can have a significant impact on the way companies can manage financial risk and how they measure, report and disclose related techniques.

Case studies

The International Financial Risk Institute (IFRI) has a number of case studies which cover the sources, types and latest thinking on how to manage financial risks.

Available from: www.riskinstitute.ch/Introduction.htm

[Accessed 10 March 2008]

The ICFAI Centre for Management Research has a large number of company case studies on enterprise risk management. Available from: www.icmrindia.org

[Accessed 10 March 2008]

PricewaterhouseCoopers (PwC) offers *Managing Risk* which has a number of case studies and white papers relating to risk management. Available from:

www.pwc.com

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Further information

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Other articles and publications

COSO. (2004). *Enterprise risk management: integrated framework executive summary*. Available from: www.coso.org/publications.htm

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Websites

Investopedia, a Forbes Media company, provides a number of resources including a dictionary, tutorials, calculators, free reports, newsletters and other tools relating to investment (including financial risk) management. Available from: www.investopedia.com
[Accessed 10 March 2008]

The Association of Corporate Treasurers (ACT), the international body for finance professionals working in treasury, risk and corporate finance, offers a number of articles, technical publications and books on treasury management including financial risk management. Available from: www.treasurers.org/index.cfm
[Accessed 10 March 2008]

The Committee of Sponsoring Organizations (COSO) website offers a number of articles and publications on risk including COSO's enterprise risk management (ERM) framework. Available from: www.coso.org
[Accessed 10 March 2008]

The Institute of Risk Management is the risk management's professional education body. Established as a not-for-profit organisation, the Institute is governed by practising risk professionals and has strong links to leading universities and business schools across the world. Available from: www.theirm.org
[Accessed 10 March 2008]

Standards Australia offers a range of publications on risk management. www.riskmanagement.com.au
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