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Risk

3.1 Investment Risk

Corporate management will typically develop strategies and allocate resources to increase shareholder value. Shareholders, on the other hand, will focus on the cash growth of their investments. As to whether there is value in any potential cash flow growth will depend on the risks associated with these investments. Investors will generally demand a higher rate of return from investments that are perceived to be relatively riskier. The risks associated with corporate investments are found in variables such as prices, quantities, costs, competition, market share and project lifecycles. These variables can be unpredictable and result in cash flow volatility, which will therefore have an impact on any net present value (NPV) calculations.

The risk appetite of investors should therefore be included in investment analysis. As a result, the cash flows used in NPV estimates are modified by a discount rate that reflects both the time value of money and any related cash flow risks. Risk is represented in the discount rate determined from the risk appetites of investors and the financial markets. The hurdle rate is the discount rate that is the minimum acceptable rate of return that a firm will accept for a project. A number of methods have been developed to determine the discount rate used in NPV calculations. These include the Capital Asset Pricing Model (CAPM) and Risk-Adjusted Discount approach.

The foundations of quantifying risk can be found in Markowitz (1959), regarded as the origin of modern portfolio theory. Markowitz's solution was to assume that a portfolio could be structured as a function of the mean and

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the standard deviation of the portfolio return. His conclusions from this construct were that the risk of the portfolio will generally be less than the weighted average of the separate asset risks, and the lower the correlations between the component asset returns, the lower the portfolio risk (the diversification principle). Each asset's risk consists of two components—the diversifiable risk, which will disappear through the right combination of assets, and the non-diversifiable risk, which will always be carried by investors. The portfolio selection problem can therefore be defined as consisting of maximizing the return while minimizing the risk.

Sharpe, Lintner and Mossin extended Markowitz's portfolio theory with the assumption of homogeneous expectations, where all investors agree on expected returns, standard deviations and correlations, and therefore, choose the same portfolio. This concept led to the Capital Asset Pricing Model. The CAPM is a general model for formulating an asset's risk and return. The variance of the return is defined as the risk measure, with only the non-diversifiable or systematic component of the variance being rewarded. The relevant risk in pricing an asset is that part of an asset's risk, or variance of the assets return, that is correlated with the overall risk of a market, and not the overall risk of the asset. An asset's beta coefficient measures its systematic risk.

The CAPM model can be used to illustrate those businesses in which a firm should have operations. Diversifying a firm over a portfolio of independent businesses decreases the variance of the combined cash flows if the cash flows of the various businesses are not completely correlated. Reducing risk would therefore be consistent from the perspective of shareholders as they are typically risk adverse.

Shareholders can, however, reduce risk by maintaining diversified portfolios themselves. Individual shareholders can accomplish a broader diversification, typically at lower transaction costs, than that offered by the majority of firms diversifying through mergers and acquisitions. Creating shareholder value through diversification requires the existence of market imperfections that firms can exploit more efficiently than investors. As a firm can be described as a portfolio of assets and projects, the value of a new project would be conditional on the total risk of the firm, in which case, NPVs would not be additive. If, however, a project's risks are not correlated to existing assets or projects, NPVs will generally then be additive.

As the value of a firm can be considered as the value of all the firm's assets, the firm can therefore also be viewed as the value of all sources of financing. The weighted average cost of capital is a discount rate that represents the costs of the various sources of finance, which can consist of a firm's equity, debt and

any hybrid securities. The cost of equity can be derived using a CAPM model, the cost of debt from interest rates and bond ratings, and the cost of hybrid securities through the characteristics of each of their components. The weighted cost of capital can be used in project analysis decisions to determine which project NPVs do not change a firm's business risk, and also provide a hurdle rate for projects.

The objective of the Risk-Adjusted Discount Rate (RADR) method is to maximize a firm's market value by using discount rates from investments that have the similar risk characteristics as the investment projects under analysis. The NPV derived by discounting future cash flows at the RADR reflects the opportunity cost of capital, or the rate of return required by the firm or investors for similar investments. The RADR includes the time value of money, the risk-free rate and the discount risk premium. Conventional projects that have similar risk characteristics as existing businesses should not influence the aggregate risk of a firm, and would therefore be discounted at the opportunity cost of capital. The discount risk premium is adjusted upwards for projects with above average risk, and down for projects with below average risk. The return of an investment project can also be compared to a hurdle rate to determine whether the project should proceed.

3.2 Corporate Risk Management

Business risks are those that a firm assumes to create a competitive advantage and add value. The motivation for firms to better understand and measure risk is being driven by:

- the increasing awareness that earnings volatility can significantly affect stock valuations and shareholder value
- the increasing size and types of interrelated risk exposures firms are facing that include globalization, changing markets and industry dynamics, and
- organizational requirements for improved exposure and risk-related information to define management's risk appetite and improve decision making

Business risk management is a process where risk exposures are identified, measured and managed, where possible, within the context of strategy and corporate finance, and is essentially a core competency of all business activities. The focus is moving from individual price exposures to a firm's exposure as a portfolio of interrelated risks.

An effective risk management framework can address issues such as:

- using more transparent risk management methods to manage the external factors that can influence a firm's performance
- translating risk management practices to analysts, investors and rating agencies
- evaluating the potential impact of adverse market movements on a firm's capital
- defining risk and return targets for businesses and projects
- the use of risk adjusted measures that can influence management decisions, and,
- whether the rewards are adequate for a given level of performance

Financial theory defines risk as a dispersion of unexpected outcomes due to movements in market or risk factors, where positive and negative deviations are viewed as sources of risk. Changes can be expressed as either absolute or relative returns, and probabilities can be derived for the distributions of these returns. Risk can therefore be evaluated and measured in a probability context, where risk is conceptualized as the probability that an event will occur. Measures of risk can now be defined as the volatility of unexpected outcomes, such as the variance or volatility of an asset's returns.

Two risk measures—Value At Risk (VAR) and Cashflow At Risk (CFAR)—are based on volatility. These measures of market risk use probabilities to interpret risk exposures as a potential loss. VAR summarizes the expected maximum loss over a target horizon within some confidence interval. VAR however is not always a suitable risk measure for many firms, as it focuses on the potential loss in the market value of assets and liabilities over a short horizon. Many firms have physical assets, brand names and intangible assets such as capitalized research and development, for which market or liquidation values are only relevant for a small portion of the balance sheet. An alternative risk measure in these situations is CFAR, where an aggregate risk exposure is derived from the variability of projected cash inflows and outflows over a multi-year planning horizon.

Financial risk management encompasses the use of derivatives to manage foreign exchange, interest rate, credit and commodities risk. Derivative techniques can identify and measure corporate risk exposures, and provide a basis to build a framework that integrates financial risk management with strategy. Applications include identifying natural hedges, mitigating risk exposures, and risk reduction in mergers, acquisitions, privatizations and financing.

3.3 The Risk Drivers

Risk factors are any market price, value or index that can have an influence on a firm's cash flows. Event definitions of risk differentiate risk types by the nature of the event that can cause a loss. A number of factors, or risk drivers, that account for the volatility in value can generally be identified and analysed within a framework that includes:

- Financial risk: Financial risks are generally identified and classified as:
  - Market risk: the changes in prices of financial assets and liabilities
  - Basis risk: the price difference between the forward and spot price, or the potential for loss resulting from a hedge and the instrument being hedged not being perfectly matched (correlation risk); and includes:
    - Spread risk: the risk relative to a particular group of securities
    - Curve (or shape) risk: changes in the shape of yield and forward curves
  - Volatility risk: sensitivity with respect to the volatility of securities (typical of options)
  - Currency risk: relates to adverse changes in currency rates
  - Credit risk: possible changes in credit ratings, outright defaults or counterparties unwilling or unable to fulfil their contractual obligations
  - Liquidity risk: has two forms; when a transaction cannot be conducted at prevailing market prices due to insufficient market activity; and the inability to meet cash obligations

- Commodity risk: occurs when an organization is affected by fluctuations in the price of some commodity. A wide range of physical assets are considered as commodities:
  - Metals, such as gold and copper
  - Agricultural products, such as wheat, timber, and wool
  - Energy products, such as oil and gas

Commodities and energies are increasingly traded like financial instruments. The underlying price drivers, however, are fundamentally different from those found in financial assets. The dynamics of production and use, transport and storage, buying and selling, and advances in technology all add to the complexity of energy and commodity markets.

- Legal risk: is the loss from an organization's activities judged to be outside the relevant legal and/or regulatory framework governing such activities, and includes but is not limited to the enforceability of contracts. Legal risk includes disclosers, disclaimers, compliance and regulatory risks, and can take the form of shareholder lawsuits against firms that suffer large losses.
- Operational risk: the Group of Thirty defines operational risk as 'the risk of losses occurring as a result of inadequate systems and control, human error, or management failure.' This definition includes fraud and regulatory risk. Disaster recovery, a contingency plan to cope with a disaster, is also included in operational risk.
- Strategic risk: corporate strategy is a firm's pattern of decisions that determines its objectives, purposes or goals. Strategic planning processes include the identification of areas susceptible to changes within the firm's environment that can affect its future. Strategy includes identifying opportunities and threats in the firm's environment, and attaching some estimate of risk to alternatives.
- Technology risk: technology can lower operating costs, increase value and capture new markets. Technology risk occurs when the investments do not produce the anticipated cost savings in economies of scale (lower average costs of operations by expanding output), or scope (generate cost synergies through producing more than one output with the same inputs). Technology risk can result in major losses in competitive efficiency and can ultimately result in long-term failure.
- Product risk: can take a number of forms. Products go through a life cycle, growing in sales, declining and eventually being replaced. The length of the product cycle and actual product failure are examples.
- Political risk: arises from actions taken by policymakers that can significantly influence a firm's business operations.

3.4 Value and Risk

Firms manage sustainable competitive advantage by selecting markets that match its capabilities and abandoning markets in which it has a competitive disadvantage. Value is created through the management of a firm's strategic portfolio and its real options portfolio, where real options that have value are identified and exercised and those that do not are abandoned. A firm's capabilities will therefore include managing both its strategic portfolio and its real options portfolio.

Firm value is a stock at a point in time, representing the present value of the firm's future cash flows and its real options. Any one or combination of risk

factors can impact on value, and therefore, what is at risk is the likelihood that a firm will be unable to maintain the creation of value. A firm's real options can therefore be viewed as either sources of risk or sources of opportunity. A key distinguishing characteristic will be found in those firms with a risk management process that aims at value enhancement, where risk exposures are identified and managed in the context of strategy, investments and revenue optimization as opposed to risk control. While a firm's real assets are a significant component of its risk profile, its real options also contribute to value. A firm can therefore enhance its capabilities by integrating real options analysis into its strategic management, corporate finance and risk management processes.

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