PART I SCHWESER'S QuickSheet™

CRITICAL CONCEPTS FOR THE 2018 FRM® EXAM

FOUNDATIONS OF RISK MANAGEMENT

Types of Risk

Key classes of risk include market risk, credit risk, liquidity risk, operational risk, legal and regulatory risk, business risk, strategic risk, and reputation risk.

- *Market risk* includes interest rate risk, equity price risk, foreign exchange risk, and commodity price risk.
- *Credit risk* includes default risk, bankruptcy risk, downgrade risk, and settlement risk.
- *Liquidity risk* includes funding liquidity risk and trading liquidity risk.

Enterprise Risk Management (ERM)

Comprehensive and integrated framework for managing firm risks in order to meet business objectives, minimize unexpected earnings volatility, and maximize firm value. Benefits include (1) increased organizational effectiveness, (2) better risk reporting, and (3) improved business performance.

Determining Optimal Risk Exposure

Target certain default probability or specific credit rating: high credit rating may have opportunity costs (e.g., forego risky/profitable projects).
Sensitivity or scenario analysis: examine adverse impacts on value from specific shocks.

Financial Disasters

Drysdale Securities: borrowed $300 million in unsecured funds from Chase Manhattan by exploiting a flaw in the system for computing the value of collateral.
Kidder Peabody: Joseph Jett reported substantial artificial profits; after the fake profits were detected, $350 million in previously reported gains had to be reversed.
Barings: rogue trader, Nick Leeson, took speculative derivative positions (Nikkei 225 futures) in an attempt to cover trading losses; Leeson had dual responsibilities of trading and supervising settlement operations, allowing him to hide trading losses; lessons include separation of duties and management oversight.
Allied Irish Bank: currency trader, John Rusnak, hid $691 million in losses; Rusnak bullied back-office workers into not following-up on trade confirmations for fake trades.
UBS: equity derivatives business lost millions due to incorrect modeling of long-dated options and its stake in Long-Term Capital Management.
Société Générale: junior trader, Jérôme Kerviel, participated in unauthorized trading activity and hid activity with fake offsetting transactions; fraud resulted in losses of $7.1 billion.
Metallgesellschaft: short-term futures contracts used to hedge long-term exposure in the petroleum markets; stack-and-roll hedging strategy; marking to market on futures caused huge cash flow problems.
Long-Term Capital Management: hedge fund that used relative value strategies with enormous amounts of leverage; when Russia defaulted on its debt in 1998, the increase in yield spreads caused huge losses and enormous cash flow problems from realizing marking to market losses; lessons include lack of diversification, model risk, leverage, and funding and trading liquidity risks.
Banker's Trust: developed derivative structures that were intentionally complex; in taped phone conversations, staff bragged about how badly they fooled clients.
JPMorgan and Citigroup: main counterparties in Enron's derivatives transactions; agreed to pay a $286 million fine for assisting with fraud against Enron investors.

Role of Risk Management

1. Assess all risks faced by the firm.
2. Communicate these risks to risk-taking decision makers.
3. Monitor and manage these risks.

Objective of risk management is to recognize that large losses are possible and to develop contingency plans that deal with such losses if they should occur.

Systematic Risk

A standardized measure of systematic risk is **beta**:

$$\text{beta}_i = \frac{\text{Cov}(R_i, R_M)}{\sigma_M^2}$$

Capital Asset Pricing Model (CAPM)

In equilibrium, all investors hold a portfolio of risky assets that has the same weights as the market portfolio. The CAPM is expressed in the equation of the **security market line** (SML). For any single security or portfolio of securities *i*, the expected return in equilibrium, is:

$$E(R_i) = R_F + \text{beta}_i[E(R_M) - R_F]$$

CAPM Assumptions

- Investors seek to maximize the expected utility of their wealth at the end of the period, and all investors have the same investment horizon.
- Investors are risk averse.
- Investors only consider the mean and standard deviation of returns (which implicitly assumes the asset returns are normally distributed).
- Investors can borrow and lend at the same risk-free rate.
- Investors have the same expectations concerning returns.
- There are neither taxes nor transactions costs, and assets are infinitely divisible. This is often referred to as "perfect markets."

Measures of Performance

The **Treynor measure** is equal to the risk premium divided by beta, or systematic risk:

$$\text{Treynor measure} = \left|\frac{E(R_P) - R_F}{\beta_P}\right|$$

The **Sharpe measure** is equal to the risk premium divided by the standard deviation, or total risk:

$$\text{Sharpe measure} = \left|\frac{E(R_P) - R_F}{\sigma_P}\right|$$

The **Jensen measure** (a.k.a. Jensen's alpha or just alpha), is the asset's excess return over the return predicted by the CAPM:

$$\text{Jensen measure} = \alpha_P = E(R_P) - \{R_F + \beta_P[E(R_M) - R_F]\}$$

The **information ratio** is essentially the alpha of the managed portfolio relative to its benchmark divided by the tracking error.

$$\text{IR} = \left|\frac{E(R_P) - E(R_B)}{\text{tracking error}}\right|$$

The **Sortino ratio** is similar to the Sharpe ratio except we replace the risk-free rate with a minimum acceptable return, denoted R_{min}, and we replace the standard deviation with a type of semi-standard deviation.

$$\text{Sortino ratio} = \frac{E(R_P) - R_{min}}{\text{semi-standard deviation}}$$

Arbitrage Pricing Theory (APT)

The APT describes expected returns as a linear function of exposures to common risk factors:

$$E(R_i) = R_F + \beta_{i1}RP_1 + \beta_{i2}RP_2 + \ldots + \beta_{ik}RP_k$$

where:

β_{ij} = j^{th} factor beta for stock i
RP_j = risk premium associated with risk factor *j*

The APT defines the structure of returns but does not define which factors should be used in the model.
The *CAPM* is a special case of APT with only one factor exposure—the market risk premium.
The *Fama-French three-factor model* describes returns as a linear function of the market index return, firm size, and book-to-market factors.

Risk Data Aggregation

Defining, gathering, and processing risk data for measuring performance against risk tolerance.
Benefits of effective risk data aggregation and reporting systems:

- Increases ability to anticipate problems.
- Identifies routes to financial health.
- Improves resolvability in event of bank stress.
- Increases efficiency, reduces chance of loss, and increases profitability.

GARP Code of Conduct

Sets forth principles related to ethical behavior within the risk management profession.
It stresses ethical behavior in the following areas:

Principles

- Professional integrity and ethical conduct
- Conflicts of interest
- Confidentiality

Professional Standards

- Fundamental responsibilities
- Adherence to best practices

Violations of the Code of Conduct may result in temporary suspension or permanent removal from GARP membership. In addition, violations could lead to a revocation of the right to use the FRM designation.