Foundations of Risk Management (FRM)

This area focuses on your knowledge of foundational concepts of risk management and how risk management can add value to an organization. The broad areas of knowledge covered in foundations-related readings include the following:

- Basic risk types, measurement and management tools
- Creating value with risk management
- The role of risk management in corporate governance
- Enterprise risk management (ERM)
- Financial disasters and risk management failures
- The Capital Asset Pricing Model (CAPM)
- Risk-adjusted performance measurement
- Multi-factor models
- Information risk and data quality management
- Ethics and the GARP Code of Conduct
After completing this reading you should be able to:

- Explain the concept of risk and compare risk management with risk taking.
- Describe the risk management process and identify problems and challenges which can arise in the risk management process.
- Evaluate and apply tools and procedures used to measure and manage risk, including quantitative measures, qualitative assessment, and enterprise risk management.
- Distinguish between expected loss and unexpected loss, and provide examples of each.
- Interpret the relationship between risk and reward and explain how conflicts of interest can impact risk management.
- Describe and differentiate between the key classes of risks, explain how each type of risk can arise, and assess the potential impact of each type of risk on an organization.

**Learning objective: Explain the concept of risk and compare risk management with risk taking.**

Within the context of the FRM exam, risk is defined as variability of outcomes. These outcomes can be the result of a wide array of changes in expected future cash flows (earning potential), a change in book value (balance sheet assets), or broader economic variables. Companies are often exposed to an incredibly diverse range of risks, which could be described as business or financial risks.

Business risks include decisions purely related to business development, including marketing decisions, new product development, etc. Financial risks are risks that occur from changes in interest rates or other market movements. Ideally, companies will work to identify and minimize financial risks so they can concentrate on the risk to their business. A core concept of risk management is how a good business can be destroyed by mismanaged financial risks.

**Learning objective: Describe the risk management process and identify problems and challenges which can arise in the risk management process.**

The risk management process begins with identifying risk exposures, quantifying those exposures if possible, determining to keep or hedge the risk, finding the appropriate way to mitigate the risk if that is the choice—selling a business line or using financial products to hedge the risk are all ways of mitigating.
The big takeaway from this reading is this: Something may not be considered risk by the model or the market until something goes wrong. Risk management helps us monitor known risks but it is not so great at finding or predicting new sources of risk.

Learning objective: Evaluate and apply tools and procedures used to measure and manage risk, including quantitative measures, qualitative assessment, and enterprise risk management.

There are a number of quantitative and qualitative tools you need to know for the exam. Right now, just focus on these:

**Stop Loss**—Stop loss means “stop my losses at this price.” For example, if you are long a stock and you enter a stop-loss order, you are entering an order to exit the trade actually below where the current market is trading. To make this more concrete, if you own a stock at $50 and you wish to stop your losses at $45, your stop-loss order would be entered with a limit of $45. The problem with stop-loss orders is that they usually can trade through your limit leaving the order unexecuted. In other words, a stop-loss order is not a guarantee that you will exit the trade at the price that you want.

For purposes of risk management, this means that you could be open to larger losses than the stop price of your order, and that is what you need to know for the exam.

**Notional Limits**—Notional limits refer to the absolute dollar value that is committed to a trade. It has been an ineffective method of risk management.

There are limits to the use of notionals, however, because they only consider the dollar value committed to the trade. For example, a $1 billion trade in a bond with a duration of one year has significantly less risk than a single $1 billion investment in a 30-year bond—which has a much longer duration and therefore much higher risk for the same notional amount. Therefore, risk management by controlling notional amounts of derivatives, cash, or securities is ineffective because it does not put risk limits in terms of risk but in terms of notional, which is not an effective measure of risk. No major firm will look at risk in this way.

**Scenario Analysis**—Scenario analysis can be broadly lumped into a method of risk management that re-prices a portfolio over a wide range of outcomes. Scenario analysis typically takes a predefined scenario and alters the portfolio value (PV) according to that historical outcome. For example, if we again lose 23% of the stock market’s value in a single day (as we did on Black Monday), then what effect would there be on our portfolio?

**Stress Tests**—The key difference between scenario analysis and a stress test is usually the range of potential outcomes. For example, stress tests can be used to test a portfolio to the limit of what would normally be expected under extreme events—including correlation going to one, and the normal inverse relationship between stocks and bonds breaking down.

**Duration and Beta Exposure Limits**—Duration and beta exposure limits are, on the surface, a better measure of risk control than notional limits, stop-loss limits, or stress test and scenario analysis. The reason is that beta refers to the variation expected within an equity portfolio, and duration is a measure of fixed-income risk. For example, an
equity portfolio with a beta of 1.25 would, on average, be expected to have a variation 1.25 times greater than the underlying equity portfolio. Duration, on the other hand, is a measure of how long it takes to get your return of principal invested in a particular bond. The longer the duration, the greater the risk of the bond.

**VaR**—Value at risk is among the most widely used measures of risk because of its ease and simplicity. However, the ease of use belies the complex assumptions that the model makes. Due to the complexity of the underlying assumptions, VaR is often misused and/or misunderstood. While the mathematics of VaR are completely sound, the complexity of the VaR assumes a high degree of understanding about the assumptions of the model, which include how asset prices behave.

**Learning objective: Distinguish between expected loss and unexpected loss, and provide examples of each.**

Think of expected losses as when the market moves and you actually lose as much as you expected. This is a good thing because it means your risk runs are right and everything is working as it should. The problem arises when you actually lose more than you expected. It is equally as problematic when you lose less than you expected because it means something is wrong with your data, your calibration, or your model. So-called “tying out” is the single most important thing a desk can do—even more than generating a profit. If a desk doesn’t tie out it means something is wrong and this is the biggest micro risk flag an institution can face. Unexpected losses, or unexpected gains, all merit extra scrutiny.

**Learning objective: Interpret the relationship between risk and reward and explain how conflicts of interest can impact risk management.**

The greater the risk, the greater the potential for reward. We will come back to this more in the CAPM section where we quantify risk and portfolio construction. We will discuss a number of types of risk and you should know these definitions early on:

**Market Risk**—Risk that stems from changes in market prices or changes in the variability of market prices. The author highlights two types of market risk. *Absolute market risk* is used to measure the change in a portfolio’s value in dollar terms. *Relative risk*, by contrast, is used to measure the change in a portfolio according to some benchmark. An example of relative market risk would be the use of beta to limit or describe potential changes in equity portfolio relative to its underlying index.

**Liquidity Risk**—There are two types of liquidity risk you need to know. *Market/product liquidity* is the risk of moving the market due to the size of the trade necessary to manage risks. This type of risk is usually product-type specific. Secondly, there is *inability to meet cash flow requirements*, which could be an inability to pay on swaps or a pension fund unable to meet obligations. It can take many forms, related to any cash flow operation necessary for continued business operation.

**Credit Risk**—Credit risk seeks to describe the probability of counterparty failure. In this case, the risk manager wants to evaluate the probability that a counterparty is either unwilling or unable to meet their financial obligations.
An example is if a sovereign state declared all foreign liability null and void. In this case, the counterparty, the sovereign state, is perhaps able to make interest payments but is unwilling to do so.

By contrast, the more common example of credit risk is when a company is unable to meet its interest payment obligations.

**Operational Risk**—Operational risk is perhaps the most qualitative of all types of risk. Generically, operational risk describes the possibility of a breakdown in processes, the breakdown of a model, or the risk of fraud.

Learning objective: Describe and differentiate between the key classes of risks, explain how each type of risk can arise, and assess the potential impact of each type of risk on an organization.

**Market Risk**—This is the general risk of a change in asset prices due to a change in the overall market. This can refer to any type of market not just the listed stock market. Even commodity markets can have market risk and this is distinct from commodity risk which we will see in a moment. Also you will see general market risk discussed in the Capital Asset Pricing Model when we see this is effectively the risk that cannot be diversified away in a portfolio.

**Interest Rate Risk**—Changes in interest rate risk will impact different assets in different ways. For bonds and swaps, of course, there is the direct impact of change in the yield curve but for futures it could impact the cost of carry or time value of money—almost an inconsequential change. On the exam you will see bonds with embedded options and we will see how just having an option on the bond changes the degree to which interest rates change asset values.

**Equity Price Risk**—This is the risk of a portfolio that can be diversified away—the individual stock specific risk of a particular company. This will come up often in portfolio theory.

**Foreign Exchange Risk**—Unless there is direct exposure to foreign exchange through reserves or futures contracts, foreign exchange risk impacts companies indirectly. When a domestic currency rises relative to a foreign currency, this makes domestic goods more expensive and therefore less competitive, which may dampen a company’s future income potential and weigh down the stock as investors weight the changes in the global FX markets.

**Commodity Price Risk**—There are a few unique characteristics of commodity risk. First, there is usually a concentrated supply among a few large market players so liquidity risk can become a factor. Consequently, commodities often have greater volatility than other assets. Also, for some commodities there are risks that are effectively un-hedgeable (weather for instance), although there is a market for weather futures, which is only an indirect hedge at best. Also for commodities that are perishable or have high storage costs, their spot and futures prices may behave in odd ways, which we will discuss later.
**Credit Risk**—There are really only two ways credit risk is realized: (1) when a counter-party actually fails to fulfill obligations and cannot pay, which results in bankruptcy proceedings, or (2) when the possibility of failure to pay becomes priced into the marketplace and corporate bonds or credit default swaps change in price in response to some credit event.

**Portfolio Credit Risk**—This type of risk looks at the exposure an institution may have to particular industrial sectors or at particular times. If a bank has a large exposure to the automobile industry and we experience an economic recession then that bank will certainly have risks at the portfolio level, not just at individual companies.

**Liquidity Risk**—This is a big issue on the FRM exam because this usually occurs in times of stress when everyone is trying to get out of a particular asset class at the same time—or cover short sales—and there is a lack of liquidity to fulfill orders so the market price is moved based on the amount of volume going “one way.”

**Operational Risk**—We will spend a lot of time on operational risk (especially in Part Two) because it is so broad and subjective. It is the risk that a business operation fails and has a market impact on its supply chain or capacity to stay in business. There are five basic types:

1. *Legal and regulatory risk*—The risk that a company fails to comply with a known or unknown regulation or law and the economic consequence of that failure be it fines or perhaps the loss of a license to conduct business.
2. *Business risk*—This is risk of poor management decisions, bad products, poor supply chain management, inventory, etc. Everything governing the production and management of a business falls under this type of operational risk.
3. *Strategic risk*—Strategic risk is the possibility for large investments with high payoff potential to fail. Any company deciding to enter a new market is an example of strategic risk.
4. *Reputation risk*—This is the risk of a change in reputation that has the capacity to reduce the company’s prospect to exist as a going concern in the future. Does a seemingly minor issue now lead to longer term negative consequences?
5. *Systemic risk*—Don’t be confused by “systemic” versus “systematic.” This type, systemic, is the chance the failure of one company starts a chain reaction and brings the entire “system” down, hence the name. We will discuss systemic risk in portfolio management—the risk a portfolio has to a particular stock or asset that usually can be diversified away.