

# CHAPTER 1

## What is Risk?

### **EXECUTIVE SUMMARY**

In this chapter we come face-to-face with the core concepts of risk management strategy. Once we get a handle on these fundamental ideas, we can begin looking at risk management from a high-level business perspective. Executives in the financial services industry are already familiar with these concepts, but they tend to regard them mostly as processes for managing downside risk. In this chapter, we look at risk management as an enterprise strategy for making better business decisions, minimizing losses, avoiding catastrophe, improving profitability, and growing your business in a turbulent global economy.

### **THE BUSINESS OF RISK**

Here's a simple fact of which we often lose sight, particularly in the fray of day-to-day business: Banks and other financial institutions are in the business of risk.

Since risk plays an absolutely crucial role in a financial institution's very existence, you would expect it would know virtually everything about risk. You would expect all of the institution's executives, managers, and employees to possess a strong understanding of risk, and you would expect the institution to have specialists in every aspect of measuring and managing risk. You would also expect the institution to have developed a common language for discussing and evaluating risk with maximum clarity and transparency.

Chances are good, however, that reality would not live up to your expectations. Not because your expectations are unreasonable; in fact, they are quite reasonable.

Consider a firm that manufactures widgets. We would reasonably expect the firm to understand every aspect of the widgets it produces—it would perform measurements of quality and numerous attributes of the widgets at every step of the process. It would monitor the widgets closely in simulated and actual performance over time. We might even expect the firm to use Six Sigma or some other formal process to ensure continuous improvement of the widgets and the processes required to manufacture them.

Why are we suddenly talking about widgets? Because risk is to a financial institution what a widget is to its manufacturer. Each transaction or contract represents a risk “widget.”

This basic truth is inescapable. You can’t really understand finance unless you understand risk. You can’t just *skip over* the risk component of finance. That would be like taking an advanced class in molecular biology without first understanding basic chemistry. It ain’t gonna happen—or if it does, watch out.

And that’s why risk management must be a core competency and primary capability of every financial institution.

Instead, risk management is often considered a burden, something that controls and restricts legitimate business activities without adding any real value. Risk management is seen as something that holds back the business and restrains creativity. Risk management is also viewed as a “back office” function, something that takes place in dark basement rooms or far-off cubicles. In many companies, it’s considered a cost of doing business.

Some companies have moved beyond these parochial notions and have embraced risk management as a strategy for growth and profitability. They have taken their risk management capabilities and turned them into assets. Using their understanding of risk management, they create better products and services, boost efficiency, reduce costs, and improve margins. I’ve worked with companies whose risk management strategies have resulted in better reviews from industry analysts. The people at these companies think of risk management as a strategic platform rather than as an annoying burden placed on their shoulders by regulators.

That’s why it’s critical to develop a practical framework and a common language for describing, measuring, and managing risk across all of its many levels.

## **DEFINING RISK: LOSS, UNCERTAINTY, AND HORIZON**

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If you’re in the risk business, there’s no excuse for not spending the time necessary to understand it thoroughly. The first step in this process is

defining what we really mean when we use the word “risk.” Since so many finance professionals don’t give risk a second thought, most of them can’t define or explain the various pieces of the risk puzzle. Specific definitions of risk are frequently disregarded or misunderstood.

But these definitions and explanations are important, because risk needs to be discussed and measured in highly specific terms. Just like our hypothetical widget manufacturer, we really need to understand everything about our product, down to the smallest detail.

As we dig into the process of defining loss and its inherent behaviors, we discover that risk is a multi-faceted concept in and of itself. Its properties and manifestations drive the ways we measure, manage, and mitigate. In this book, we mainly address methods associated with financial risks, although we will discuss strategic and operational risks as well and their implications to measurement, management, and regulation.

### **Possibility of Loss: Expected Loss**

Most lay people and many definitions describe risk as the possibility of injury, damage, or loss. Risk is often perceived as the negative downside of an action, enterprise, or financial transaction. Risk professionals usually refer to this aspect of risk as *expected loss*. That is the loss we consider most likely to realize over a defined time horizon—usually one year—and is therefore “expected.” We think about expected loss as the product of the probability of loss, the exposure to loss, and the severity of loss. Here’s the formula we use to calculate expected loss:

$$\text{Expected Loss} = \text{Probability of Loss} \times \text{Exposure} \times \text{Severity}$$

As you’ve probably noticed, the formula is fairly simple. Don’t worry—we’ll revisit it when we discuss risk measures later in the book. If you are particularly sharp, you might also have noticed that this equation is also used to calculate *mean loss*.

I point this out because it illustrates a problem in the risk management field: Risk management professionals love to rename even the simplest of concepts so they can employ their own special jargon. Keep this in the back of your mind, and try not to worry too much about terminology. I will be throwing lots of new terms at you, but I promise that I won’t try to confuse you. The good news is that all of this is not nearly as mysterious as it may initially seem.

### **Uncertain Outcomes: Volatility**

Although expected loss is a widely used concept and integral to the measurement of risk, risk professionals generally define risk as *volatility*. The

formal definition of risk that most economists and actuaries use is *volatility of returns*, also called *earnings volatility*. Although this is a more encompassing and more accurate assessment of risk, we more often substitute *volatility of losses* as a proxy for that definition, because it is more readily modeled and managed.

As a warning to the uninitiated, you will discover that many risk professionals often use other terms, such as *value at risk*, to describe volatility—and rarely use the word volatility itself. Why they do this is a mystery that shall remain unsolved for the time being.

At any rate, we think of volatility as the true measure of risk for the simple reason that it is the “unexpected” aspect of loss that is of real concern. If we were certain that the mean or expected loss would occur each and every time, then it would be fully predictable and we would bake it into our expectations. This is why we call it “expected” loss. Conversely, volatility is more likely to morph and change. We can parameterize its likelihood, but there is always an aspect that remains “unexpected.” For this reason it is often called *unexpected loss*.

So, we now have two terms that refer to each of the core concepts: expected loss (equivalent to mean loss) and unexpected loss (equivalent to volatility). The terms are often used together, making it easier to define the basis of a loss distribution. In addition, expected loss is traditionally linked to *reserves*, our buffer against loss we “expect to incur,” and unexpected loss is linked to *economic capital*, our backstop in the event of more than expected losses. We will discuss these concepts later on as well.

## **MORE WAYS TO THINK ABOUT RISK**

We often characterize risk by the way it materializes within a portfolio or by its sources and behaviors within an organization. In particular, we like to consider how these risks behave during times of stress. This line of thinking leads us to different ways of naming types of risk, their individual measurement, and management techniques. Associated with this are several conventions to get familiar with:

- **Idiosyncratic risk.** A risk that is unique. It often also is referred to as *specific risk*. Typically we think of it as specific to a transaction. It may also be the unique risk associated with a project or operation. Idiosyncratic risk is generally at least partially diversifiable.
- **Systemic risk.** Risk that is not unique. It is associated with market movements and may be present regardless of the specific nature of the transaction, project, or operation. It is generally not diversifiable and for this reason it is often called residual or *undiversifiable risk*.

- **Concentration.** Risk associated with developing too many risks of similar profile such that the risk becomes large or significant. The larger the concentration, the more difficult or expensive it is to diversify and thus reduce the risk.
- **Contagion.** Risks that are linked to each other and therefore may trigger an effect in which one risk can set off another—much like a domino or snowball effect.
- **Extreme or “long tail” events.** Risks that are rare or infrequent but can become significant during times of stress. These are referred to as “long tail” events because they exist at the tail end of the loss distribution. Their probability is very low.

## TAXONOMY OF RISKS

In addition to the ways of describing risk behaviors, we also name the types of risks by way of their sources. This approach is particularly common in financial services and is important to understand, as risk management measures and approaches and regulation are developed on this basis.

In general, the conventions for naming risks are constructed in most organizations such that they are *mutually exclusive and collectively exhaustive* (MECE). We like to ensure that we can count up each of the risks by class and sub-class to reach a consolidated whole. That is, we account for all of the risks in the organization through this method. Unfortunately, even with more and more advances in risk metrics as well as discrete regulation—which has crystallized certain conventions—there still are some classes of risk that may vary among companies (and among regulators from various countries) by definition, emphasis, and management and measurement techniques. We will mention these as they come up throughout this book and in our definitions of risk classes outlined below.

Risks tend to fall into three very broad categories:

1. Financial risk
2. Operational risk
3. Strategic/business risk

In financial services, we typically further break down financial risks into the major categories of *credit risk*, *market risk*, and *insurance risk*.

### Financial Risk

In financial services firms, these risks tend to be our key focus. They are the risks most in mind and with which we should have the greatest familiarity.

These risks will be the most discussed in this book. They break down into several subcategories:

- **Credit risk.** The potential for economic loss due to the failure of a borrower or counterparty to fulfill its contractual obligations in a timely manner. This usually happens because of an inability or unwillingness to pay. Examples of credit risk may be found in most areas of banking, including settlement risk in the trading operation as well as the more obvious risks associated with lending obligations.
- **Market risk.** The exposure to potential loss resulting from changes in market prices or rates. Market risk further breaks down into traded market risk and non-traded market risk.

Traded market risk is most notably associated with those risks that affect the trading desks: foreign exchange (FX), commodities, equities, fixed income, and others. Traded market risk generally has shorter term effects associated with daily and weekly movements of the markets.

Non-traded market risk is associated with the risk evident in the structure of the business. It traditionally breaks down into interest rate risk and liquidity risk. These are often referred to as “balance sheet risks” because they are structurally inherent in the nature of the balance sheet and the way that a financial institution conducts its business against its balance sheet through its funding and leveraging approaches. They are often referred to as “mis-match risks” or “asset/liability risks” as they are associated with the ways in which assets and liabilities match—or do not match.

Interest rate risk also breaks down further and is frequently discussed in terms of *repricing risk*, *basis risk*, *yield curve risk*, and *optionality risk*. Each of these describes separate aspects of how interest rates on the liability side of the balance sheet can fall out of line with interest rates on the asset side of the balance sheet:

- **Repricing risk.** The risk associated with liabilities and assets having different maturity characteristics and, thus, repricing at different times at different rates.
- **Basis risk.** The possibility that a hedge with two different rate bases will have the rates move out of perfect sync with each other, thus creating a loss.
- **Yield curve risk.** When the yield curve changes from expectations, resulting in a market rate change on fixed income instruments.
- **Optionality risk.** Risks due to embedded options within the underlying liability or assets within the banking book that can dynamically change the structure of the book. These are typically associated with prepayment on loans, withdrawal of deposits draw down against lines or limits, or indeterminate maturity, such as found in credit cards.

Other key financial risks include *insurance risk*, associated with the possibility of unexpected claims on insurance policies or changes in insurance rates, renewals, or policy lapses. And there are a number of subcategories associated with this risk class, such as *pension risk*, which is the possibility that the institution will not be able to support its pension obligations when they are due.

## Operational Risk

Operational risk is by far the most ubiquitous risk as it affects literally every aspect of our operations and every type of business. It includes both internal operational risks and those caused by external events, such as natural disasters and security breaches. It is formally defined as the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events. This includes fraud and security issues, plus outside occurrences such as natural disaster, political upheaval, and other causes of business disruption such as widespread power outages.

Because of its far-reaching nature, definitions of operational risk may vary, and a number of subcategories may be included. The Basel Committee includes legal risk but excludes strategic and reputational risk. Nevertheless, some institutions do include these or may address these as separate risk categories which are often referred to as “other risks” in the parlance of regulatory risk management.

Operational risk is frequently subcategorized into its sources in order to support identification, measurement, and management. These are as follows:

- **People/organizational risks.** Risk that results from human error, employment practices, staffing inadequacy, loss of key personnel (key man risk), employee errors, wrongful acts, and workplace safety. These typically also include internal and external fraud, although the Basel Committee breaks these out separately.
- **Business process management risk.** Risk resulting from disruptions of processes that cause losses. It includes the potential of loss due to service delivery (customer service, product and service delivery, poor response to customer complaints, and others); processes and controls (failed transaction processing, vendor and supplier miscommunication, process control failures, inadequate or failed internal documentation); and client, product, and business practices (documentation, disclosure advisory, product flaws or inadequate specifications, improper business or market practices). The Basel committee further separates these into two categories: (1) service delivery and (2) processes and controls.

- **Systems and equipment risk.** Risk resulting from business disruption and cost due to system failures or lengthy maintenance or replacement of equipment.
- **Legal and compliance risk.** Risk associated with compliance with legal requirements such as legislation, regulations, standards, codes of practice, and contractual terms. This also extends to compliance with contracts, customer requirements, ethical standards, the social environment, and internal management.
- **Security risk.** Risks to premises, assets, people, and information.
- **Project risk.** Risk of loss associated with failed delivery of projects, including overrun, failed or inadequate outcomes, and other causes. This may fall under business-process management risks we noted previously, but it is frequently separated out as it can account for enormous expenditures.
- **External event risks.** Risk associated with damage to physical assets from natural disasters or other events.

Because of its amorphous nature, operational risk can be one of the more difficult risk categories to address through measurement. We will discuss this later, but for now, consider the difficulty in attempting to predict the financial value of seemingly one-time events that may reach into the organization and create contagion—both operational and that which cuts across other risk categories. This is particularly complicated by the individuality of each institution's infrastructure and business mix. Therefore, no two operational-risk events are likely to play out precisely the same way.

### **Strategic/Business Risks**

Strategic risk and business risk are often synonymous and involve concepts that are less well-defined than other risks. In this book, we'll consider them a class of risks that are synonymous.

These risks are broadly associated with changes in the business environment and how the company addresses or responds to those changes. They also encompass risks associated with how the company makes and implements strategic decisions.

Strategic/business risk is often defined as the current or prospective risk to earnings and capital arising from changes in the business environment and from adverse business decisions, improper implementation of decisions or lack of responsiveness to changes in the business environment.

It tends to include *commercial risk*, *stakeholder-management risk*, *technological/obsolescence risk*, and *reputation risk*.

It is often the hardest of the risk classes to define and to measure. Thus, we frequently see this risk or some of its subclasses reclassified with operational risk. On the whole, measurement and management techniques are still relatively crude, but they are worth discussing as an important component of the overall framework.

Overall, each of the deferent risk types presents different challenges in the approach and ability to measure and manage risk. Although the broad, underlying concepts are the same, notable differences define the issues, requirements, personnel, investment, and virtually all other aspects. Because of these differences, it is important that senior management and boards have among them at least a general, functional understanding of the differences and approaches.

## **RISK AND REWARD: MODERN PORTFOLIO THEORY**

Part and parcel with risk is return, or reward. After all, the chance to make returns is why we take risks. The interplay of risk and return are fundamental to the way we think about risk, measure it, manage it, and ultimately utilize our knowledge of it to optimize our capabilities. We will frequently come back to the concepts around risk and return throughout this book as the foundation for our thinking.

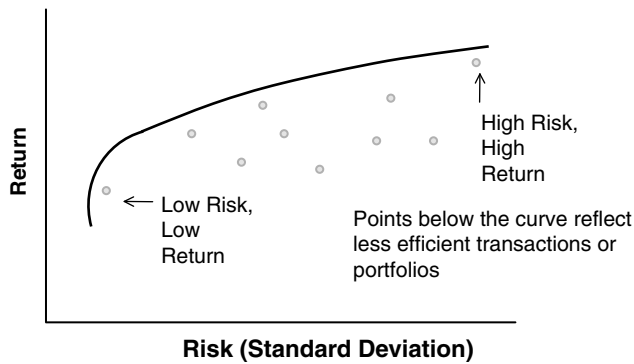
### **Overview: Markowitz and MPT**

Our thinking about the trade-offs between risk and return was crystallized with Markowitz and his Modern Portfolio Theory (MPT). MPT established the definition of risk as volatility, which we mentioned earlier. It further introduced the concept of diversification and its ability to reduce risk while yielding the same return.

Overall, MPT asserted that assets that have a higher volatility of return are riskier, so they must yield a higher overall average return to compensate for their higher risk.

MPT also asserted that all assets are not perfectly, positively correlated, and that we can reduce a portfolio's overall risk and maintain the same return by blending assets that are not positively correlated. The ideas behind *systemic risk* and *idiosyncratic risk* were introduced through these theories. In a perfectly diversified portfolio, all idiosyncratic risk would be diversified away and the only remaining risk would be systemic risk.

In a blended portfolio, we also can observe an *efficient frontier*. This is the line that describes the most efficient or best returning mix of portfolio assets relative to risk. It also demonstrates the overall efficiency of the



**FIGURE 1.1** Efficient Frontier

portfolio relative to the risk-free rate, usually a U.S. Treasury or other high quality, AAA asset (see Figure 1.1).

Although today we realize not all of Markowitz's concepts hold perfectly true to reality, the broad ideas are supported, and they form the foundation for much of our thinking today about risk measurement, risk management, and return relative to risk. Even though portfolio theory was originally constructed for market portfolios, the concepts hold well for other types of assets and for the broad approaches to analyzing risk.

### How Theory Has Evolved into Practice

Today, we can apply risk/reward concepts to every aspect of financial-services management. Linked to Markowitz's concepts of market returns, we find that an institution's underlying assets and the methods by which it manages risk are closely linked to the overall riskiness of its shares. Particularly in financial services, this process can be direct and relatively transparent.

This is a crucial point: Your ability to measure and manage risk is directly related to your ability to manage shareholder returns. In other words, the better you are at managing risk, the better you will be at managing returns.

Internal performance measures based in risk/return concepts provide a means to evaluate overall group performance, business-line performance, and asset, transaction, and customer-level performance. A well-linked framework for the measurement of risk-adjusted performance of every level of the institution ultimately will give senior management a clear means to steer the ship. It will help them provide direction for risk/return profile,

asset and business line size and growth, plus supply the tools to communicate and manage expectations internally and externally. Linking this to compensation can ensure organizational attentiveness and the ultimate institutionalization of risk concepts and culture. These concepts also extend to pricing which can be constructed to support minimum rates that yield the required performance for the relative risk of each transaction. So, a fully integrated risk-adjusted performance framework includes all of these elements—from specific transactions all the way up to risk-adjusted returns at the group level. We will discuss the approaches and mechanisms for this in Chapter 7.

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