

## CHAPTER 1

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### WHAT IS RISK?

Risk is part of every human endeavor. From the moment we get up in the morning, drive or take public transportation to get to school or to work until we get back into our beds (and perhaps even afterwards), we are exposed to risks of different degrees. What makes the study of risk fascinating is that while some of this risk bearing may not be completely voluntary, we seek out some risks on our own (speeding on the highways or gambling, for instance) and enjoy them. While some of these risks may seem trivial, others make a significant difference in the way we live our lives. On a loftier note, it can be argued that every major advance in human civilization, from the caveman's invention of tools to gene therapy, has been made possible because someone was willing to take a risk and challenge the status quo. In this chapter, we begin our exploration of risk by noting its presence through history and then look at how best to define what we mean by risk.

We close the chapter by restating the main theme of this book, which is that financial theorists and practitioners have chosen to take too narrow a view of risk, in general, and risk management, in particular. By equating risk management with risk hedging, they have underplayed the fact that the most successful firms in any industry get there not by avoiding risk but by actively seeking it out and exploiting it to their own advantage.

#### **A Very Short History of Risk**

For much of human history, risk and survival have gone hand in hand. Prehistoric humans lived short and brutal lives, as the search for food and shelter exposed them to physical danger from preying animals and poor weather.<sup>1</sup> Even as more established communities developed in Sumeria, Babylon and Greece, other risks (such as war and disease) continued to ravage humanity. For much of early history, though, physical risk

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<sup>1</sup> The average life span of prehistoric man was less than 30 years. Even the ancient Greeks and Romans were considered aged by the time they turned 40.

and material reward went hand in hand. The risk-taking caveman ended up with food and the risk-averse one starved to death.

The advent of shipping created a new forum for risk taking for the adventurous. The Vikings embarked in superbly constructed ships from Scandinavia for Britain, Ireland and even across the Atlantic to the Americas in search of new lands to plunder – the risk-return trade off of their age. The development of the shipping trades created fresh equations for risk and return, with the risk of ships sinking and being waylaid by pirates offset by the rewards from ships that made it back with cargo. It also allowed for the separation of physical from economic risk as wealthy traders bet their money while the poor risked their lives on the ships.

The spice trade that flourished as early as 350 BC, but expanded and became the basis for empires in the middle of the last millennium provides a good example. Merchants in India would load boats with pepper and cinnamon and send them to Persia, Arabia and East Africa. From there, the cargo was transferred to camels and taken across the continent to Venice and Genoa, and then on to the rest of Europe. The Spanish and the Dutch, followed by the English, expanded the trade to the East Indies with an entirely seafaring route. Traders in London, Lisbon and Amsterdam, with the backing of the crown, would invest in ships and supplies that would embark on the long journey. The hazards on the route were manifold and it was not uncommon to lose half or more of the cargo (and those bearing the cargo) along the way, but the hefty prices that the spices commanded in their final destinations still made this a lucrative endeavor for both the owners of the ships and the sailors who survived.<sup>2</sup> The spice trade was not unique. Economic activities until the industrial age often exposed those involved in it to physical risk with economic rewards. Thus, Spanish explorers set off for the New World,

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<sup>2</sup>A fascinating account of the spice trade is provided in “Nathaniel’s Nutmeg”, a book by Giles Milton where he follows Nathaniel Courthope, a British spice trader, through the wars between the Dutch East India Company and the British Crown for Run Island, a tiny Indonesian island where nutmeg grew freely. He provides details of the dangers that awaited the sailors on ships from foul weather, disease, malnutrition and hostile natives as they made the long trip from Europe around the horn of Africa past southern Asia to the island. The huge mark-up on the price of nutmeg (about 3,200 percent between Run Island and London) offered sufficient incentive to fight for the island. An ironic postscript to the tale is that the British ultimately ceded Run Island to the Dutch in exchange for Manhattan. See G. Milton, 1999, *Nathaniel’s Nutmeg*, Farrar, Strous and Giroux, New York. For more on spices and their place in history, see: Turner, J., 2004, *Spice: The History of a Temptation*, Alfred A. Knopf, New York.

recognizing that they ran a real risk of death and injury but also that they would be richly rewarded if they succeeded. Young men from England set off for distant outposts of the empire in India and China, hoping to make their fortunes while exposing themselves to risk of death from disease and war.

In the last couple of centuries, the advent of financial instruments and markets on the one hand and the growth of the leisure business on the other has allowed us to separate physical from economic risk. A person who buys options on technology stocks can be exposed to significant economic risk without any potential for physical risk, whereas a person who spends the weekend bungee jumping is exposed to significant physical risk with no economic payoff. While there remain significant physical risks in the universe, this book is about economic risks and their consequences.

### **Defining Risk**

Given the ubiquity of risk in almost every human activity, it is surprising how little consensus there is about how to define risk. The early discussion centered on the distinction between risk that could be quantified objectively and subjective risk. In 1921, Frank Knight summarized the difference between risk and uncertainty thus<sup>3</sup>:

"... Uncertainty must be taken in a sense radically distinct from the familiar notion of Risk, from which it has never been properly separated. ... The essential fact is that "risk" means in some cases a quantity susceptible of measurement, while at other times it is something distinctly not of this character; and there are far-reaching and crucial differences in the bearings of the phenomena depending on which of the two is really present and operating. ... It will appear that a measurable uncertainty, or "risk" proper, as we shall use the term, is so far different from an un-measurable one that it is not in effect an uncertainty at all."

In short, Knight defined only quantifiable uncertainty to be risk and provided the example of two individuals drawing from an urn of red and black balls; the first individual is ignorant of the numbers of each color whereas the second individual is aware that there are three red balls for each black ball. The second individual estimates (correctly) the probability of drawing a red ball to be 75% but the first operates under the misperception

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<sup>3</sup> Knight, F.H., 1921, Risk, Uncertainty and Profit, New York Hart, Schaffner and Marx.

that there is a 50% chance of drawing a red ball. Knight argues that the second individual is exposed to risk but that the first suffers from ignorance.

The emphasis on whether uncertainty is subjective or objective seems to us misplaced. It is true that risk that is measurable is easier to insure but we do care about all uncertainty, whether measurable or not. In a paper on defining risk, Holton (2004) argues that there are two ingredients that are needed for risk to exist.<sup>4</sup> The first is uncertainty about the potential outcomes from an experiment and the other is that the outcomes have to matter in terms of providing utility. He notes, for instance, that a person jumping out of an airplane without a parachute faces no risk since he is certain to die (no uncertainty) and that drawing balls out of an urn does not expose one to risk since one's well being or wealth is unaffected by whether a red or a black ball is drawn. Of course, attaching different monetary values to red and black balls would convert this activity to a risky one.

Risk is incorporated into so many different disciplines from insurance to engineering to portfolio theory that it should come as no surprise that it is defined in different ways by each one. It is worth looking at some of the distinctions:

- a. Risk versus Probability: While some definitions of risk focus only on the probability of an event occurring, more comprehensive definitions incorporate both the probability of the event occurring and the consequences of the event. Thus, the probability of a severe earthquake may be very small but the consequences are so catastrophic that it would be categorized as a high-risk event.
- b. Risk versus Threat: In some disciplines, a contrast is drawn between risk and a threat. A threat is a low probability event with very large negative consequences, where analysts may be unable to assess the probability. A risk, on the other hand, is defined to be a higher probability event, where there is enough information to make assessments of both the probability and the consequences.
- c. All outcomes versus Negative outcomes: Some definitions of risk tend to focus only on the downside scenarios, whereas others are more expansive and consider all variability as risk. The engineering definition of risk is defined as the product of the

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<sup>4</sup> Holton, Glyn A. (2004). Defining Risk, *Financial Analysts Journal*, 60 (6), 19–25.

probability of an event occurring, that is viewed as undesirable, and an assessment of the expected harm from the event occurring.

Risk = Probability of an accident \* Consequence in lost money/deaths

In contrast, risk in finance is defined in terms of variability of actual returns on an investment around an expected return, even when those returns represent positive outcomes.

Building on the last distinction, we should consider broader definitions of risk that capture both the positive and negative outcomes. The Chinese symbol for risk best captures this duality:

危險

This Chinese symbol for risk is a combination of danger (crisis) and opportunity, representing the downside and the upside of risk. This is the definition of risk that we will adhere to in this book because it captures perfectly both the essence of risk and the problems with focusing purely on risk reduction and hedging. Any approach that focuses on minimizing risk exposure (or danger) will also reduce the potential for opportunity.

### **Dealing with Risk**

While most of this book will be spent discussing why risk matters and how to incorporate it best into decisions, we will lay out two big themes that animate much of the discussion. The first is the link between risk and reward that has motivated much of risk taking through history. The other is the under mentioned link between risk and innovation, as new products and services have been developed to both hedge against and to exploit risk.

### ***Risk and Reward***

The “no free lunch” mantra has a logical extension. Those who desire large rewards have to be willing to expose themselves to considerable risk. The link between risk and return is most visible when making investment choices; stocks are riskier than bonds, but generate higher returns over long periods. It is less visible but just as important when making career choices; a job in sales and trading at an investment bank

may be more lucrative than a corporate finance job at a corporation but it does come with a greater likelihood that you will be laid off if you don't produce results.

Not surprisingly, therefore, the decisions on how much risk to take and what type of risks to take are critical to the success of a business. A business that decides to protect itself against all risk is unlikely to generate much upside for its owners, but a business that exposes itself to the wrong types of risk may be even worse off, though, since it is more likely to be damaged than helped by the risk exposure. In short, the essence of good management is making the right choices when it comes to dealing with different risks.

### ***Risk and Innovation***

The other aspect of risk that needs examination is the role that risk taking plays in creating innovation. Over history, many of our most durable and valuable inventions have come from a desire to either remove risk or expose ourselves to it. Consider again the example of the spice trade. The risks at sea and from hostile forces created a need for more seaworthy crafts and powerful weapons, innovations designed to exploit risk. At the same time, the first full-fledged examples of insurance and risk pooling showed up at about the same time in history. While there were sporadic attempts at offering insurance in previous years, the first organized insurance business was founded in 1688 by merchants, ship owners and underwriters in Lloyd's Coffee Shop in London in response to increased demands from ship owners for protection against risk.

Over the last few decades, innovations have come to financial markets at a dizzying pace and we will consider the array of choices that individuals and businesses face later in this book. Some of these innovations have been designed to help investors and businesses protect themselves against risk but many have been offered as ways of exploiting risk for higher returns. In some cases, the same instruments (options and futures, for example) have played both risk hedging and risk exploiting roles, albeit to different audiences.

### **Risk Management**

Risk clearly does matter but what does managing risk involve? For too long, we have ceded the definition and terms of risk management to risk hedgers, who see the

purpose of risk management as removing or reducing risk exposures. In this section, we will lay the foundation for a much broader agenda for risk managers, where increasing exposures to some risk is an integral part of success. In a later section in the book, we will consider the details, dangers and potential payoffs to this expanded risk management.

### ***The Conventional View and its limitations***

There are risk management books, consultants and services aplenty but the definition of risk management used has tended to be cramped. In fact, many risk management offerings are really risk reduction or hedging products, with little or no attention paid to exploiting risk. In finance, especially, our definition of risk has been narrowed more and more over time to the point where we define risk statistically and think off it often as a negative when it comes to assessing value.

There are several factors that have contributed to the narrow definition of risk management. The first is that the bulk of risk management products are risk hedging products, be they insurance, derivatives or swaps. Since these products generate substantial revenues for those offering them, it should come as no surprise that they become the centerpieces for the risk management story. The second is that it is human nature to remember losses (the downside of risk) more than profits (the upside of risk); we are easy prey, especially after disasters, calamities and market meltdowns for purveyors of risk hedging products. The third is the separation of management from ownership in most publicly traded firms creates a potential conflict of interest between what is good for the business (and its stockholders) and for the managers. Since it is the managers of firms and not to the owners of these firms who decide how much and how to hedge risk, it is possible that risks that owners would never want hedged in the first place will be hedged by managers.

### ***A More Expansive View of Risk Management***

If the allure of risk is that it offers upside potential, risk management has to be more than risk hedging. Businesses that are in a constant defensive crouch when it comes to risk are in no position to survey the landscape and find risks that they are suited to take. In fact, the most successful businesses of our time from General Motors in the early

part of the twentieth century to the Microsofts, Wal-Mart's and Googles of today have all risen to the top by finding particular risks that they are better at exploiting than their competitors.

This more complete view of risk management as encompassing both risk hedging at one end and strategic risk taking on the other is the central theme of this book. In the chapters to come, we will consider all aspects of risk management and examine ways in which businesses and individual investors can pick and choose through the myriad of risks that they face, which risks they should ignore, which risks they should reduce or eliminate (by hedging) and which risks they should actively seek out and exploit. In the process, we will look at the tools that have been developed in finance to evaluate risk and examine ways in which we can draw on other disciplines – corporate strategy and statistics, in particular – to make these tools more effective.

## **Conclusion**

Risk has been part of every day life for as long as we have been on this planet. While much of the risk humans faced in prehistoric times was physical, the development of trade and financial markets has allowed for a separation of physical and economic risk. Investors can risk their money without putting their lives in any danger.

The definitions of risk range the spectrum, with some focusing primarily on the likelihood of bad events occurring to those that weight in the consequences of those events to those that look at both upside and downside potential. In this book, we will use the last definition of risk. Consequently, risk provides opportunities while exposing us to outcomes that we may not desire. It is the coupling of risk and reward that lies at the core of the risk definition and the innovations that have been generated in response make risk central to the study of not just finance but to all of business.

In the final part of the chapter, we set up the themes for this book. We argue that risk has been treated far too narrowly in finance and in much of business, and that risk management has been equated for the most part with risk hedging. Successful businesses need a more complete vision of risk management, where they consider not only how to

protect themselves against some risks but also which risks to exploit and how to exploit them.

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