

# **The Economics of Risk**

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# Introduction

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## –Warning–

Under the Michigan Equine Activity Liability Act, an Equine Professional is not liable for an injury to or even the death of a participant in an equine activity resulting from an inherent risk of the equine activity.

*Michigan Farm Bureau  
Farm Bureau Insurance*

This sign is posted at the horse stables where my two younger daughters ride horses on Saturday mornings. The sign communicates at least two distinct messages to its reader. First, riding horses is a risky activity. Even though it is a small percentage of riders overall, a number do get injured in horse-riding incidents with the possibility of even sustaining a serious or life-threatening injury. Second, when you decide to ride a horse at these stables, you take on and assume this risk; that is, the stable owner is not in any way liable for an injury that you may incur while participating in equine activities.

Riding horses is just one of almost countless situations in life in which you encounter risk—where you encounter the chance of injury, damage, loss, or of making a dangerous choice. Other examples include the risk of losing your job, the risk of contracting some debilitating disease, the chance of getting in an automobile accident on the way to the shopping mall, and the risk of being struck by lightning in a summer thunderstorm. Risk is all around us and affects us all. No one can escape from its clutches or attain perfect immunity to it. You may decide to not acquire the additional risk of riding a horse by not engaging in that activity, but one cannot so easily avoid the risk of getting cancer or the risk of being hit by a car while crossing the street on the way to school.

Risk is something that most of us dislike and try to avoid. Economists and other researchers have studied risk and have obtained considerable amounts of evidence that indicate that people are generally “risk averse” in their attitude towards risk. This means that, everything else held constant, people choose the less risky alternative and they will take measures to reduce or shift the risk to others when feasible. Purchasing health, life, or automobile insurance is one way to do this. Diversifying your investment portfolio by investing in different kinds of stocks, bonds, and money market securities is another. These measures help reduce the amount of risk that we must face to a more comfortable and manageable level. But we cannot completely insulate ourselves from the many risks that one can come across.

On occasion, people willingly seek to engage in a risky activity or situation instead of selecting the usual risk avoidance strategy. A slot machine or some other game of chance in a casino entices some people to gamble and take on risk. Other people invest a portion of their incomes in the risky stock market. This is not necessarily evidence contrary to risk aversion, because gambling can provide entertainment value or give an “adrenaline rush” to the gambler. Also, historically, the average return of the stock market has been higher than the return of safer money market assets, and this higher expected return can compensate for the higher risk of the stock market assets.

This book contains chapters that address various aspects of risk. Two chapters deal with risk directly by looking at risk management and how it is applied to decision making, or by assessing what researchers have learned over the last few decades in their theoretical investigations of risk. The other chapters look at risk indirectly by examining markets in which risk has a significant presence. Casino gambling enterprises, agriculture markets, auctions, and health insurance markets are places where risk makes a considerable impact. A number of problems that result from risk in these markets and in the economy will also be addressed. Auction participants may feel the sting of the “winner’s curse” when the object they are bidding on has uncertain value. Significant health issues and potential problems face those who are without health insurance. Risk incentive problems have plagued the Farm Bill, government’s response to farmers to decrease the risk in agriculture. Problem and pathological gamblers make up a percentage of those who enter a casino establishment.

The first chapter in this book is “Risk and Risk Management: Basic Concepts,” by Keith J. Crocker. The main focus of this chapter is on risk management for the business firm and for the general consumer. Crocker discusses how one identifies risk and then how to deal with it. This is a fitting first chapter because it is a natural starting place in the investigation of risk, and it is very basic and applicable to every reader, regardless of how and where one fits into the economy.

Crocker goes through a number of steps involved with risk management, starting with risk identification and then quantifying the magnitude of the existing risk. Risk mitigation and control follows in the process. Crocker examines both loss prevention and loss reduction measures and looks at the decision of which risks to retain and which to transfer.

Crocker highlights this process with a number of interesting applications and examples. His central backdrop is the February 1999 natural gas explosion occurrence at the Ford Motor Company River Rouge power plant in Detroit, Michigan. Detailed information associated with events leading up to and immediately following this catastrophe are used to exemplify the presence of risk and of risk control and management. Asbestos exposure and its subsequent cleanup and the tainting of Tylenol capsules with cyanide also serve as illustrations in Crocker’s discussion.

The second chapter, by Mark J. Machina, is entitled “States of the World and the State of Decision Theory.” As the title suggests, Machina assesses the state of the profession regarding its theoretical investigation of risk and uncertainty. He reviews and discusses where we are in terms of the modeling and development of risk analysis. The major theoretical risk research of the last several decades is divided into two major approaches.

Choice under objective uncertainty was the first theory developed about decision making under risk and comprises Machina’s initial discussion. Its roots go back several centuries to early work by Pascal and Fermat. Objects of choice can be described as objective lotteries in which all outcomes and the objective probabilities of these outcomes are known. An individual’s preference function over these lotteries is generally assumed to follow the objective expected utility form for some von Neumann-Morganstern utility function. Violations of the expected utility hypothesis, including the famous Allais Paradox, are

noted, and Machina discusses some nonexpected utility models that have developed as a response to these violations and paradoxes.

Choice under subjective uncertainty is the other main branch of theoretical risk research. Machina traces this theory back to work by Savage, who was instrumental in the formulation and early development of the subjective uncertainty model. The main tenets of this approach include states of nature, events, and outcomes or consequences. Individuals are allowed to have probabilistic beliefs, and these beliefs can differ across individuals. Thus, under this theory you and your friend can differ as to the assessed chance that the stock market will rise in the next few weeks. Machina then addresses violations of this theory including the Ellsberg Paradox and subsequent modeling adjustments in response to the violations.

After careful discussion of each of these theories, Machina offers his personal insights into the similarities and differences between them and how the approaches actually are more related than one might initially assess. Included in his observation is an intuitive discussion of his recently completed work on this subject. For more details, the interested reader is invited to consult Machina's fascinating developments and findings.

The third chapter is "Gambling with the Future: Economic and Social Perspectives on Casinos in America," by William R. Eadington. Strong demand for gambling activities for entertainment or risk-seeking value has existed as long as mankind has. Gambling has gone the gambit from an activity that has been largely banned and viewed by many as immoral to a more widely accepted, legalized, and controlled setting in which special interest groups compete for the industry revenues. Casino gambling is a significant and fast-growing industry, one whose growth often occurs in economic downturns when tax revenue generation and job creation are highly desirable. In this chapter, Eadington focuses on the economics of casinos, establishments that house numerous varieties of games of chance.

Eadington starts by tracing through U.S. casino history of the last century, beginning with Nevada's casino legislation in 1931. He examines the current status of the industry as well as looking at projected trends into the future, including new gambling forms such as Internet gambling. Different casino markets are described, including destination resort casinos such as Las Vegas, Atlantic City, or Biloxi, urban or

suburban casinos located in major metropolitan areas, and rural casinos which include most tribal casinos. Gambling is an ever-changing industry, as evidenced by the creation of “racinos”—horse race tracks that have become equipped with slot machines or other gaming devices.

Eadington explores a social as well as economic perspective on casinos by looking at cost–benefit analysis of casinos. The benefit side is well founded in consumer surplus theory in economics. Consumers benefit by having access to a legalized casino establishment, and many would be willing to pay money to do so. The cost side is much less developed and is harder to quantify. Problem and pathological gamblers impose a cost on themselves and others. Other researchers have tried to link casinos or gambling with increased crime rates, gambler financial troubles and higher divorce and suicide rates, and a general decline in the nation’s “moral fiber.”

The fourth chapter is by John H. Kagel and is entitled “Common Value Auctions and the Winner’s Curse: Lessons from the Economics Laboratory.” In this chapter, Kagel discusses the risk of experiencing the winner’s curse in a common value auction, where the auctioned item’s value is the same to all bidders but is unknown (risky) at the time of the bid. Bidding on an offshore oil tract is a fitting example, as the precise value of the hydrocarbons beneath the ocean floor is uncertain at the time the bids are placed.

Generally bidders obtain distinct private indicators or signals of the object’s value. Some of the signals will be higher than this value while others will be lower. The winning or high bidder likely has the highest or one of the highest signals. If the bidder doesn’t recognize this and factor it accordingly, the submitted bid may be more than the uncertain value even though it is less than the signal it is based on. If this happens, the winner is said to be “cursed,” and below-normal profits, even losses and bankruptcies, can result.

Kagel traces through the history and early reporting of the winner’s curse in auctions and in other markets. It is important to recognize that the winner’s curse is not a theoretical, equilibrium concept or result but rather is a hypothetical empirical phenomenon, indicating that bidders do not properly account for receiving private signals in the bidding process. Kagel discusses the considerable evidence of the curse, focusing on that of sealed bid auctions. He also examines alternative hypoth-

eses for explaining the overly aggressive bidding behavior such as limited liability for losses. Auction experience is found to be an important learning variable, as inexperienced bidders are generally most susceptible to the curse.

Kagel then looks for the winner's curse in the context of English auctions and first price auctions with insider information. These market types were selected because they are environments that may eliminate or at least sharply reduce the winner's curse effect. Kagel compares the data results in these markets with earlier findings of sealed bid auctions. He concludes that evidence for the winner's curse is present in these markets, although the magnitude seems to be less severe.

Chapter 5 is "Sharing High Risks: How Government can make Health Insurance Markets more Efficient and more Accessible," by Katherine Swartz. In this chapter Swartz looks at the characteristics of those in the economy who are without health insurance and then suggests how to make these health insurance markets more accessible and more efficient. Recall from earlier discussion that the typical decision maker in our economy is risk averse and desires insurance to help reduce the risk of undesirable events. To be without health insurance is not only bad for the uninsured individual but for the general economy as well.

Swartz begins by describing the traits of the uninsured, including that of age, income, labor force status, and health status. The typical uninsured person is young, has low income, is working, and is in good health. She goes on to examine the insurance company or seller side of the market. Health insurance markets can be divided into three different types: large employer group, small group, and individual. The small group and individual markets significantly differ from the large employer group, and this difference is critical for the occurrence of the uninsured.

The small and individual markets suffer from what is known in the risk literature as the *adverse selection problem*. The pool of people seeking health insurance is comprised of those who are at higher risk for illness, disease, and sizable medical bills, and those that are of lower risk. The insurance applicant generally knows much more about the size of this risk than does the insurance company. Insurance companies fear that those applying for coverage are *disproportionately* composed of the high risk or high cost group. This can lead to significant

losses for the insurance companies. This forces companies, Swartz suggests, to compete for the lower risk or relatively healthy individuals, and the high risk or sickly people subsequently get left out and tend to be uninsured.

Swartz proposes that the government should step in and cover the 2–3 percent of insured cases with the highest medical costs. This extreme cost segment makes up a large fraction of the costs paid out by insurance companies. By taking these cases over, the government frees up resources expended by insurance companies to try to screen out the cases expected to be high cost. This, Swartz argues, will enhance overall insurance market efficiency and also accessibility for those seeking health insurance coverage. She models her plan after a recently developed and implemented plan in New York state.

The sixth and final chapter is by Rulon D. Pope and is entitled “Risk and Agriculture: Some Issues and Evidence.” Adverse weather, disease, and damaging insect pests are just some of the risks farmers face during growing season that could result in uncertain crop yields. Product price is also risky, as many agricultural markets are atomistic in nature and crop prices are subject to changing market supply and demand conditions. In his chapter, Pope highlights some central concepts pertaining to risk in agriculture.

One of Pope’s primary concepts of interest is that of diversification as a response to risk. Diversification can be accomplished in a number of ways; for example, crop diversification, area diversification, or the diversification of labor income away from the farm. Pope also looks at risk reduction and input usage. He discusses hedging and forward markets as a means of risk reduction. All of these actions are consistent with farmers who exhibit risk aversion, and Pope cites empirical evidence in support of this position. Finally, food safety is addressed as a concern to both farmers and consumers alike.

Part of Pope’s analysis is devoted to government support programs and crop insurance. The government programs have not proven to be financially successful, because there is generally not enough money collected in insurance premiums to cover the crop loss payments. Two problems—adverse selection and moral hazard—can help explain why the government may have financial difficulty. Katherine Swartz discusses in Chapter 5 the adverse selection problem as it pertains to health insurance markets, which applies here as well. Moral hazard is

the idea that farmers may take fewer precautions to avoid risk when they hold insurance than when they do not. This can result in more crop losses than expected and more payouts by the government.

The six chapters in this book look at a broad array of research relating to risk. The authors convey much information about risk as it pertains to the various markets that they address. A comprehensive list of references accompanies each chapter to guide the interested reader who wants to pursue some particular facet in more detail. Learning more about what risk is and how it affects us reduces some of the uncertainty in life that we all face, and then helps us make more informed decisions. We will never be able to eliminate all the risk that we can potentially encounter, but we can strive to better understand the risks involved and then deal with them in the best light possible.