JOURNAL OF
RISK EDUCATION

Volume 9, Number 1, 2018

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Editor's Report

I am pleased to bring to you the 2018 issue of *Journal of Risk Education (JRE)*. Admittedly it is being published in 2020, but it is being published! The 2019 issue should following along shortly.

Thanks to the reviewers and associate editors who worked so hard to achieve our goal of fast turnaround on the submissions we receive. Any delays in turnaround this past year are my fault and mine alone.

There has been some discussion about possibly affiliating this journal with one of our academic associations. I would like your feedback on this idea. I need to hear from the readers of this journal before I make such a drastic change. I hope you will contact me at editor@jofriskeducation.org with your candid and confidential feedback.

Please continue to send us your papers for consideration. If you have questions, don't hesitate to ask them.

Sincerely,

Brenda Wells, Ph.D., CPCU, AAI, CRIS

Editor
Robert F. Bird Distinguished Professor of Risk and Insurance
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Call for Papers

The *Journal of Risk Education (JRE)* requests submissions of articles and other materials for its 2020 issue.

Submissions may be of most any format, as the journal offers several publication features:

Articles: double-blind peer reviewed articles related to risk management and insurance teaching and education. Both theoretical and pedagogical pieces are encouraged.

Editorials: editorially-reviewed commentary related to risk and insurance education.

Book Reviews: editorially-reviewed summaries of books and periodicals that pertain to risk management and insurance, with preference given to those items that have practical classroom applications.

Doctoral Perspectives: double-blind peer reviewed articles that are by or for doctoral students planning to become risk educators in the future. Any topic of relevance to doctoral candidates may be submitted.

Teaching Cases: cases for use in the risk management classroom. Teaching cases should be founded in the academic and practitioner literature, and will be double-blind peer reviewed.

To submit an article for consideration, please create an account on our website at www.jofriskeducation.org and follow our electronic submission process. If you are willing to serve as a reviewer for future papers, please contact the editor.

For questions and more information, please contact:

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Regulating the Bail Industry: A Comparison of Professional and Surety Licensees' Violations

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ABSTRACT

Bail bondspersons provide a service by obtaining the release of individuals who are charged with a crime until their case is adjudicated by a court of law. This occupation enables a defendant to remain in society with their family and friends, thus eliminating the need for additional jail space and mitigating the cost of keeping an individual incarcerated. However, there have been several instances where bondspersons have landed on the wrong side of the law by violating administrative law codes or by the manner in which they have pursued a bailee.

In North Carolina, the Department of Insurance (NCDOI) is tasked with regulating the bail bonding industry and investigating any alleged misconduct or legal violations committed by bondspeople. This paper focuses primarily on professional and surety bondspersons operating in the state of North Carolina. Using quantitative research, this study will delineate which of these two bondsperson categories—professional or surety—is more likely to be cited with a criminal or administrative law violation. Because the process and legal implications of bail bonding are not part of the general risk management and insurance vernacular, we first provide a brief history and overview of case law pertaining to bail bonding for the reader's edification.

Key Words: Professional bail bondspersons, surety bail bondspersons, criminal violations

INTRODUCTION

The number of bail bonding agents working in North Carolina has dramatically increased over the last decade. There are currently more than 2,300 bail bonding licenses issued in the state, an increase of over 200% since 2001.[1] The expanding number of people engaging in this profession, coupled with several high-profile instances of perceived bail-bonding abuse, have led scholars, practitioners and judicial officials to question whether the profession of commercial bail bonding needs to be reformed or more strictly regulated.

This request for additional scrutiny arises as bondspersons[2] in certain locations are given as much—if not more—authority than the police (Chamberlain, 1998). Several court cases and scholarly articles have argued that

[1] Agent Services Division. (October 24, 2018). Bail Bond Regulation Changes. *North Carolina Department of Insurance*.

[2] Even though most statutory language refers to the profession as "bondsmen", the authors chose to use the term "bondspersons" throughout the paper as a matter of inclusivity recognizing gender diversity within this field.

the current system of commercial bail bonding in the United States is unconstitutional and violates the Equal Protection Clause of the Fourteenth Amendment (Schnacke et. al, 2010). These individuals contend that commercial bail bonding discriminates against poorer members of society who cannot afford to post a monetary bond. (Menefee, 2018). Others have questioned the effectiveness of the current bail bonding system and the range of power the bail industry has over criminal defendants.[3] Many of these proponents advocate for a switch to a pretrial release model managed by governmental entities in lieu of private business (Clark et. al, 2016). While these arguments deserve additional consideration, they fall outside the scope of this study.

The responsibility of regulating the bail bonding industry generally rests with a state's department of insurance or a state's department of police or public safety (Johnson & Stevens, 2013). In North Carolina, the Department of Insurance (NCDOI) oversees and regulates the bail bonding industry. Bondspersons in this state can be categorized into several different classifications. A *professional* bail bondsperson is any individual who is approved and licensed by the Commissioner of Insurance and who pledges cash or approved securities with the Commissioner as security for bail bonds written in connection with a judicial proceeding.[4] Professional bail bondspersons are also required to deposit a specific amount of money with the Department of Insurance and must maintain an amount on deposit that covers at least one-twelfth of the total monetary amount of all bonds they have currently outstanding.[5] Alternatively, *surety* bondspersons are individuals licensed by the Commissioner of Insurance and who are appointed by an insurer (usually by a power of attorney) to execute or countersign bail bonds for the insurer in connection with judicial proceedings.[6] Therefore, as an agent of an insurance company, a surety bondsperson must operate not only within the guidelines of the Department of Insurance but also within the parameters of their agreement with the insurance company.

The study of bail bonding is relevant for insurance regulators since bail bondspersons provide a service by ensuring an individual's appearance in court, either by their own funds or through a surety company. Additionally, the future of the bail industry is threatened by claims that the system is biased towards certain demographics, inconsistently applied and unconstitutional. This point is further exacerbated by stories of illegal and arguably unethical actions committed by bondspersons. States across the nation are exploring ways to address these concerns, including North Carolina. As regulators attempt to develop solutions to problems affecting the bail bonding industry, it's imperative they examine whether comprehensive statutory reform is the most effective method of regulating all bail bonding practitioners. This study seeks to dissect the unique challenges confronting professional and surety bondspersons by focusing on administrative and criminal violations in North Carolina.

This paper compares two types of bonding agents in North Carolina, professional and surety bondspersons, to discern which of these two entities is more likely to have criminal or administrative violations, based on data collected by the NCDOI. Part I provides an overview of the background and evolution of the bail bonding profession. Part II examines the contemporary bail bonding model, which encompasses substantial statutory regulations and administrative law oversight. Part III analyzes the administrative and criminal violations of professional and surety bail bondspersons licensed in North Carolina during the past five years. Part IV offers conclusions and direction for future research based on this study.

[3] *State v. Mathis,* 349 N.C. 503 (1998).

[4] N.C.G.S. §58-71-1(8) (2015).

[5] N.C. G. S. §58-71-145 (2018).

[6] N.C.G.S. §58-71-1(11) (2015).

PART I: BACKGROUND AND EVOLUTION OF BAIL BONDING

History of Bail Bonding Reform in England

The contemporary bail bonding system in the United States stems from historical precedents that antecede the English Common Law (Chamberlin, 1998). Some scholars even contend the concept of bail originated as far back as ancient Rome (Lotze et. al., 1999). During the Middle Ages, the Anglo-Saxons in Britain realized the need for a more uniform set of laws as a way to prevent mob justice and retaliatory assaults which had the potential to escalate into wars or other forms of clan-related violence (Schnacke et. al., 2010). Under the Anglo-Saxon model, grievances were no longer settled through violence, but instead through the payment of "bots" or monetary compensation as remuneration for perceived offenses (Carbone, 1983). Unlike our current monetary bail system, the release of an individual in Anglo-Saxon Britain was generally undertaken only after a pledge or promise by a surety that the accused would appear to pay their bot or reparation (Schnacke et. al, 2010). However, Anglo-Saxon laws pertaining to bail during this time period were exceptionally harsh as "the surety was liable to suffer the punishment that was hanging over the head of the released prisoner" (Drimmer, 1996). Therefore, if an accused failed to appear in court and pay the judgment levied against them, the surety was then bound "money for money," or in some instances even "body for body," to suffer the same punishment that was initially imposed against the defendant (Duker, 1977).

Following the Norman Conquest of 1066, the Anglo-Saxon model of bail was slowly eliminated, and a more structured model of bail bonding began to emerge (Schnacke et. al, 2010). However, this newly established system of justice was rife with problems and potential for abuse. During this era in history, a sheriff was given broad discretion to detain an individual until a local magistrate judge arrived to administer justice. Since these magistrate judges rode a circuit from county to county, a person could be detained for days or even weeks until their bond could be properly determined (Drimmer, 1996). Furthermore, the lack of proper judicial oversight granted local sheriffs almost singular authority to determine whether a person would be released on bail or whether that individual would be forced to remain in custody (Chamberlin, 1998). The arbitrariness of this model caused the application of bail to vary from county to county and thus provided ample opportunities for abuse within the system (Carbone, 1983).

In order to combat these injustices, Parliament passed its first serious attempt at bail bonding reform in 1275 with the first Statute of Westminster (Schnacke et. al, 2010). It has been conjectured that this statute created the basic guidelines that would govern the English bail bonding system for five and a half centuries (Schnacke et. al, 2010). The protections established by the first Statute of Westminster were later buttressed in 1554 when Parliament required that all bail hearings be held before two justices, in an open session of court and subsequently put in writing (Holdsworth and Potten, 1924). Parliament also passed the Habeas Corpus Act of 1679 that enacted legal safeguards to prevent excessive delays before a bond hearing would occur (Foote, 1965). Ultimately, the principle guiding these bail bonding reforms was subsequently expressed by the English Bill of Rights in 1689 which reads, "excessive bail ought not to be required," a mantra which would eventually serve as the foundation of the American bail bonding system (Chamberlin, 1998).

History of Bail Bonding Reform in the United States

Prior to the ratification of the United States Constitution, several colonies, including Massachusetts, Pennsylvania and Virginia, created laws that mirrored the English model of bail bonding in order to protect their citizens from bail abuses (Foote, 1965). The first substantive endeavor at bail bonding reform in the United States occurred with the passage of the Federal Judiciary Act of 1789. This Act coincided with the establishment of a federal court system and was summarized in the Eighth Amendment of the United States Constitution which reads, "Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted" (U.S. Const. Amend. VIII).

While both the Judicial Act and Eighth Amendment ensured legal protections against arbitrary and capricious bail bonding practices by the government, neither document addressed commercial bail bonding as it currently exists in the United States. Interestingly, it appears the commercialization of the bail bonding industry in America occurred simultaneously with the nation's westward migration. This vast westward movement, coupled with the rapid industrialization of American cities, made a new form of monetary bail bonding necessary to ensure a defendant would be present at their subsequent court date, thus giving rise to the industry of commercial bail bonding (Chamberlin, 1998).

Although each state retains the autonomy to govern bail bonding within its borders, the federal bail bonding system has undergone several important reforms. In 1966, at the behest of North Carolina Senator Sam Ervin, the United States Congress passed the Federal Bail Reform Act. This Act heralded the first major reform of the federal bail system since 1789 and stressed that non-capital defendants be released with the least restrictive set of conditions to ensure their appearance in court (Schnacke et. al, 2010). Overall, this Act encouraged federal courts to release defendants on their own recognizance, with very little need for bondspersons (Koepke and Robinson, 2018).

The Federal Bail Reform Act was subsequently amended in 1984 with the passage of the Comprehensive Crime Control Act. For the first time in the history of the United States, judges could legally consider whether a person posed a danger to witnesses or the community when determining their bond amount (Dabney et. al, 2017). Historically, most attempts at bail bonding reform in the United States have addressed how bail is administered, but very few attempts have been made to regulate the behavior and ethics of commercial bail bonding practitioners. However, before any comprehensive changes can be made within the bail bonding industry, it is imperative to understand and address the unique challenges facing contemporary bail bondspersons in the United States.

PART II: CONTEMPORARY BAIL BONDING PRACTICES IN THE UNITED STATES

In many jurisdictions, an individual charged with a crime is taken before a magistrate court judge to determine if he or she must tender a bond amount in order to be released from custody. Since the purpose of a bond is to ensure the accused's appearance in court, in North Carolina the magistrate judge is authorized by statute to consider the seriousness of the individual's offense, the person's prior criminal record, ties to local community, and a host of other factors when determining the amount of a bond.[7] Once the magistrate has reviewed the individual's circumstances, the judge has several options they can enact with regard to the person's release from custody. First, the magistrate can have the defendant sign a written promise to appear in court and allow the defendant to be released on their own recognizance. Second, the judge can order the accused to be held in jail without the possibility of release; however, this is very rare and is normally enacted for capital cases or very serious offenses. Third, and most common, the judge can allow the defendant to place a sum of money on deposit with the court (a bail bond) to ensure that he or she will appear at their upcoming court date.

If a defendant is able to pay the mandated bail amount, that person's deposit will be returned to them when the case is resolved. However, when a defendant is not in a financial position to pay the entire bail amount, they can instead turn to a bail bonding agency for assistance. While the alleged actions of the defendant are criminal, the bondsperson relationship arises out of contract law, not criminal statutes. In most bail bonding agreements, the defendant or "principal" contracts to pay a percentage of the bond directly to the bondsperson. The bondsperson then acts as a surety for the remainder of the bond amount. In this scenario, the principal does not have their money returned to them when the case is resolved. However, if the principal fails to appear in court, then the agreement gives the bondsperson permission to collect the principal and return them to the custody of the court, or the bondsperson is required to pay the entire amount of the bond.[8]

[7] N.C.G.S. §58-71-1(1) (2015).

[8] N.C.G.S. §15A-544.3 (2017).

Bail Bonding Practices in North Carolina

There are several different classifications of bail bondspersons in North Carolina: accommodation, professional, surety, and runner. A runner is authorized to work on behalf of either a professional or surety bondsperson,[9] and as such serves as a legal agent of one of these categories. Thus, the runner is indirectly included in this paper's later discussions.

An *accommodation* bondsperson is generally a family member or friend who endorses the bond by providing real or personal property as collateral or payment of bail.[10] For example, a person in jail under a $1,000 bail may have a friend post the $1,000 bond. The defendant's friend is now responsible and becomes the guarantor that the defendant will show up for court on the trial date. If the defendant fails to appear, the friend's $1,000 will be forfeited.

A professional bondsperson is licensed and pledges cash or approved securities to write bonds. If the defendant does not show up for the trial date, the professional bondspersons must pay the bond out of their own funds or the security deposit will be forfeited. According to N.C. G. S. §58-71-145, the professional bail bondsperson must deposit a minimum of $15,000 with the Department of Insurance. In addition, the Commissioner requires "a fair market value of at least one-twelfth the amount of all bonds" that are written within the State, which is known as the "12 times rule." A professional bondsperson may not become liable on any one bond or multiple of bonds for one individual that totals more than one-fourth of the value of the securities that they have on deposit.[11] A professional bondsperson must be very diligent in tracking bonds written under their professional seal by their runners as this could easily cause violations to occur under the 12 times rule or ¼ rule unless tracked daily.

A surety bondsperson generally applies to a licensee that writes bonds on behalf of an insurance company. The bondsperson serves as an agent of the surety. If the defendant fails to appear in court, the insurer is responsible for the forfeiture of the bond; thus, the surety bondsperson is not a guarantor. Therefore, unlike a professional, a surety bondsperson does not pledge his or her own funds as collateral in order to write bonds.

There are fairly minimal statutory requirements to obtain a bail bonding license in North Carolina. Applicants must be at least 21 years of age, be a resident of North Carolina, have a valid driver's license and have a high school diploma.[12] Additionally, applicants must not have any outstanding bail bond obligations, such as unpaid forfeitures, fines, or penalties, and must not have been disqualified by any other state to engage in the business of bail bonding.

In 1964, the NCDOI set up the Special Services Division to oversee the bail bondsperson in only two counties. In 1983, the Special Services Division was expanded and the NCDOI began regulating all bail bondspersons in all 100 counties. However, in November of 2001, the Special Service Division was dissolved and the supervision of bail bondspersons was reassigned to the Criminal Investigations Division. This entity was tasked with handling criminal matters, while the administrative regulation of bail bondspersons was reassigned to the Agent Service Division. Later, the NCDOI Commissioner created the Bail Bond Regulatory Division in May 2017 to oversee both the criminal and administrative regulation of bail bondspersons in North Carolina (Agent Services Division, 2017).

[9] N.C.G.S. §58-71-1(9) (2015).

[10] N.C.G.S. §58-71-1 (2015).

[11] N.C.G.S. §58-71-175 (2015).

[12] N.C.G.S. §58-71-50 (2015).

Scope of Bondsperson Power as a Basis for Citation Challenges

A bail bondsperson's seemingly vast authority to apprehend a bailee is of preeminent concern to many insurance regulators. Bad acts by bondspersons when apprehending a bailee call into question the most appropriate way to regulate this industry as these acts impact the sustainability of the profession. However, historically and by law, bondspersons have been privy to immense legal authority when acting within the scope of their occupation. This expansive leeway was first addressed by the United States Supreme Court in 1872 with the seminal holding in the case of *Taylor v. Taintor*.[13] Although the underlying issue, in this case, did not directly address the matter of recapturing a person who failed to appear in court, Justice Swayne seized upon the opportunity to express the court's opinion regarding the authority of a bail bondspersons. The germane section, which is often cited in this case, reads:

> When bail is given, the principal is regarded as delivered to the custody of his sureties. Their dominion is a continuance of the original imprisonment. Whenever they choose to do so, they may seize him and deliver him up in their discharge; and if that cannot be done at once, they may imprison him until it can be done. They may exercise their rights in person or by agent. They may pursue him into another State; may arrest him on the Sabbath; and if necessary, may break and enter his house for that purpose. The seizure is not made by virtue of new process. None is needed. It is likened to the rearrest by the sheriff of an escaping prisoner.[14]

The language of this case appears to give bail bondspersons substantial authority to apprehend individuals fleeing from their custody; however, *Taylor* does not address bondsperson's scope of power in every situation. While the authority a bondsperson retains is broad, it is also complex. Bondspersons are not a police entity and in certain circumstances have the ability to surpass certain constitutional protections such as search and seizure. Yet, in many jurisdictions, they are subject to the same laws as a private citizen even in the active pursuit of someone who has skipped their court date. In *State v. McGee*, the bail bondsperson was charged with involuntary manslaughter after his fiancée was killed as he pursued a principal who skipped a court appearance. It was later determined that the bondsperson was traveling in excess of 35 MPH over the speed limit at the time of the accident.[15]

This intricate relationship also raises questions as to when it is appropriate for a bondsperson to enter the dwelling of the principal or a third party for the purpose of pursuing the defendant. In *Livingston v. Browder*, the principal failed to appear at his court date.[16] The bail bondsman, Livingston, based on the information provided in the bond, went to the principal's mother's house. He noticed the principal's car in the driveway, and the principal sitting in the living room watching television. The mother answered the door and as Livingston was asking about the defendant's whereabouts, saw him walk to the back of the house. Livingston entered the house to apprehend the principal and the mother brought a trespass action against him since he did not have her consent to enter the home. The court held that since Livingston saw the principal in the house, properly identified himself, and acted in a reasonable manner to enter the dwelling, he was not required to have permission to enter into the home.

The North Carolina Supreme Court subsequently rejected part of the *Livingston* holding in *State v. Mathis*.[17] The court stated "the principal has no authority to authorize the surety, by contract or otherwise, to enter the residence of a third party in which the principal does not himself reside [and] obtains no such power by virtue of

[13] *Taylor v. Taintor*, 83 U.S. 366 (1872).

[14] *Id.* at 371.

[15] *State v. McGee*, 234 N.C. App. 285 (2014).

[16] *Livingston v. Browder*, 51 Ala.App. 366 (1973).

[17] *State v. Mathis*, 349 N.C. 503 (1998).

the bond agreement".[18] However, the court held that when a principal resides at the house, even if it's owned by another person, the bond agreement allows the bondsperson to break and enter into the residence without the owner's consent.[19]

The Kansas Supreme Court was presented with a slightly different set of facts from *Livingston*.[20] Here, the bail bondsman, Burhans, went to the address of the principal's sister which he obtained by false pretenses. When he got to the home, he lied to gain entry into the home by pretending to be there to install a home security system. When he asked to use the sister's phone, he threw the phone down and announced he was there to arrest the principal. The sister maintained the defendant did not live there and entered into an argument with the bondsperson when he was asked to leave. Ultimately, Burhans found his way into a confrontation with the sister's husband and was charged with criminal trespass and misdemeanor assault. In upholding the conviction of the bondsman, the court made clear not every entry into a third party's home is reasonable.

In *Lund v. Seneca County Sheriff Dept*., bondspersons were arrested for leaving two small children in a house after capturing the principal to return him back to his home state[21] The court explained there is nothing in the opinion from *Taylor v. Taintor* that authorizes bondspersons to violate federal or state law in order to apprehend a principal. Additionally, the court found that a bondsperson must abide by the law of the state they enter when pursuing a principal.

Crossing state lines provide another challenge for bail bondspersons as their authority does not automatically permit them to apprehend someone in another state. Collins, a North Carolina bail bondsman learned that a principal who missed his court date would be in Virginia attending a funeral of a relative.[22] Collins and his bail agents went to Virginia to apprehend the defendant, but up to this point Collins had only seen a mugshot of the individual. When they arrived at the funeral, Collins saw a man whom he believed to be the principal opening the trunk of his car. The bondsperson got out of his car with a pistol, pointed it at the suspected principal and began cursing. After a back and forth exchange, Collins found out that the suspected principal was a Deputy Chief of Police in Virginia and his cousin was the person they were looking for. Collins and his agents were subsequently charged with several crimes related to the attempted abduction of the Deputy Sheriff. Furthermore, Virginia law does not honor the licenses of out of state bondsperson to operate in their state. The *Collins* court points out that the liberty provided in *Taylor vs. Taintor* can be abrogated by statute.[23]

Administrative Violations as a Basis of Citation

In North Carolina, when a bondsperson is convicted of a crime, that individual may also face administrative penalties from the Department of Insurance. The Commissioner also has the authority to refuse to renew a bondsperson's license for any prior or current felony convictions.[24] Should the Commissioner request a surrender of a bail bond license, the individual has the right to due process and may request an administrative hearing. In

[18] *Id.* at 513.

[19] *Id.* at 515.

[20] *Kansas v. Burhans*, 277 Kan. 858 (2004).

[21] *Lund v. Seneca County Sheriff Dept.,* 230 F.3d 196 (2000).

[22] *Collins v. Virginia Commonwealth*, 283 Va. 263 (2012).

[23] *Id.* at 273.

[24] N.C.G.S. §58-71-80(b)(2016).

addition to the bail industry's complex power, Burns et. al. (2005) suggests bail bondspersons lack training in tactics, education on legal issues and overall professional development.

This study utilizes data collected by the NCDOI to examine the frequency of criminal and administrative malfeasance committed by professional and surety bondspersons. The authors assert there is a difference in frequency of violations between the two types of bondspersons, with the percent of violations (either administrative or criminal) differing between the surety bail bondspersons and the professional bail bondspersons.

PART III: ADMINISTRATIVE AND CRIMINAL VIOLATIONS

This research has analyzed the number of administrative and criminal violations that have occurred with bail bondspersons in the past five years. Data was collected and coded according to the type of violations whether administrative or criminal. The administrative violations include infractions such as failure to return collateral in a timely manner, failure to complete a memorandum of agreement or failure to return premium as required by statute. The criminal violations include convictions such as false imprisonment, failure to report bonds on a monthly report, and drug convictions. There were not many multiple violations by any individual bondsperson; only two surety bondspersons had multiple (two) administrative violations and two professional bondspersons had multiple (two) administrative actions. Otherwise, the bondspersons included had only one violation each.

Method

Taking a positivist approach, the authors test the data for a difference in citation frequency (outcomes) and attempt to identify and assess the probable reasons for the difference discovered.[25]

The hypothesis was tested on two bases, a directional (one-tailed test) and a non-directional (two-tailed test). The one-tailed or directional hypothesis determines whether there is a specific difference between the two groups; whereas, a two-tailed test represents that there is a difference between groups with no specific direction (Salkind, 2016). Thus, a one-tailed test is used to determine statistical significance with a directional hypothesis while a two-tailed test is used on a non-directional hypothesis. Both a one-tailed test and a two-tailed test were employed to determine statistical significance in this research.

Data Skewness and Test Validity

The authors acknowledge there may be some skewed results due to the difference in population of the surety bail bondspersons versus the professional bail bondspersons. However, the calculations are based on percentages of the population, meaning that the formula is accurate in displaying the disparity between the two categories of bail bondspersons. Due to the law of large numbers, with both types of bondspersons being over the quantity of twenty-five percent, the accuracy of the findings should be valid. In addition, the data is presented in an aggregate format without identifying any specific individual or specific violation.

Findings

The analysis shows that looking at either the one tail test or the two tail-test, there is a difference between the surety bail bondspersons and the professional bail bondspersons, and that difference is statistically significant at the 5% level. This is true for either administrative violations or criminal violations. See Table 1, and Table 2 below.

[25] Creswell (2009) states that it is also known as the post positivist view, which is the belief that "causes probably determine effects or outcomes."

Table 1

	Surety Bail Bondsman	Professional Bail Bondsman
Number of Criminal Violations	10	4
Number of Bondsmen	1894	100
Percent	0.53%	4.00%
Alpha	5.0%	
Weighted Percent	0.7%	
Complement of Weighted Percent	99.3%	
Z	-4.05263771	
P value	**0.005064340%**	
Decision	**REJECT NULL HYPOTHESIS**	
Null Hypothesis	There is no difference in the proportion of either type, having a criminal violation	
Test	If the calculated P value is greater than the Alpha, accept the null hypothesis	
	If the calculated P value is less than the Alpha, reject the null hypothesis	
Discussion of the results of the statistical test	Since the P value is less than 5%; there is a difference in proportion of criminal violations between surety bail bondsmen; and that difference is statistically significant at the 5% level. We can reject the null hypothesis	

Table 2

	Surety Bail Bondsman	Professional Bail Bondsman
Number of Criminal Violations	10	4
Number of Bondsmen	1894	100
Percent	0.53%	4.00%
Alpha	5.0%	
Weighted Percent	0.7%	
Complement of Weighted Percent	99.3%	
Z	-4.05263771	
P value	**0.00253216979009160000000000000%**	
Decision	**REJECT NULL HYPOTHESIS**	
Null Hypothesis	There is no difference in the proportion of either type, having a criminal violation	
Test	If the calculated P value is greater than the Alpha, accept the null hypothesis	
	If the calculated P value is less than the Alpha, reject the null hypothesis	
Discussion of the results of the statistical test	Since the P value is less than 5%; there is a difference in proportion of criminal violations between surety bail bondsmen vs professional bail bondsmen; and that difference is statistically significant at the 5% level. We can reject the null hypothesis	

The findings were examined for skewed data with regards to disproportionate repeat violators. Of the total administrative and criminal violations, there were only two surety bondspersons who had multiple (two) administrative violations and two professional bondspersons who had multiple (two) administrative actions otherwise the other bondspersons mentioned had only one violation each. Therefore, the total violations were not skewed by repeat offenders. Thus, this research has found that the surety bondspersons have less administrative and criminal violations than the professional bondspersons.

Discussion

The authors rationalize that the primary reason for the difference in citations is that the surety bail bondsperson is acting on behalf of an insurance company and therefore must follow the stringent requirements of that insurance company (e.g., must adhere to the insurance companies' guidelines as to which bonds may be issued and which must be rejected), while the professional bail bondsperson may engage in riskier situations that inherently may lead to an increased possibility of statutory or code violations.

PART IV: CONCLUSIONS AND DIRECTION FOR FURTHER RESEARCH

Bail bondspersons play a significant role in many legal jurisdictions across the nation. However, it is imperative that additional research is conducted to improve the professionalism and integrity of this industry. This study contributes to the growing body of literature regarding the oversight of the bail bonding industry as states and regulatory bodies examine whether to reform this system. As these entities seek to tailor regulatory changes, it is important they understand the unique challenges posed by the different classifications of bail bond licensees.

While more research is needed to understand why there is a difference in the number of violations between professional and surety bondspersons, evidence from this study suggests specialized legislation and education may be necessary to address these issues. Thus, blanket reform may not be sufficient to address the respective needs of these specific licensees.

Further studies may provide insight as to what measures can be taken to reduce the gap and lessen the number of overall bail bonding violations. Three possible methods are to: (a) consider more specific training for both professional bail bondspersons and surety bail bondspersons, (b) examine possible legislative changes that may provide more comprehensive guidelines prior to bondspersons executing a bond, or (c) conduct further research to determine if the actions of the professional bail bondsperson's runners are causing a disproportionate amount of the professional's violations.

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U.S. Const. Amend. VIII

Employee Engagement: A Benchmark from the Insurance Industry

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ABSTRACT

The purpose of this descriptive research paper is to provide researchers and practitioners with benchmarking indicators of employee engagement in professional services organizations. The research addressed employee engagement in independent insurance agencies. Survey data from a large number of independent insurance agencies throughout the U.S. were analyzed to examine employee engagement. Job engagement was measured using the job engagement scale developed by Rich, Lepine, and Crawford (2010). The results of this research can be used to benchmark employee engagement in independent insurance agencies, and potentially other professional service industries, against the reported averages. Since the engagement numbers measured in this study prove to be considerably higher than other occupations, this data can prove useful in the recruitment of risk and insurance (RMI) majors in college and in convincing millennial employees that a career in risk and insurance can be very attractive.

INTRODUCTION

Employees are arguably an organization's most valuable assets. This is particularly true in professional service organizations where the work is highly labor intensive. Engaged front-line employees are key to the overall success of labor-intensive services like those performed in an independent insurance agency.

The majority of the U.S. labor force is employed in the service industry. Employee compensation typically represents the largest category of expenses for firms in the service industry.

Within the insurance industry, a particular type of service firm, there are over 281,500 employees working in approximately 38,500 independent agencies throughout the U.S. These agencies generate about $27.5 billion in revenue annually (Flannagan (2012). Total compensation expense is estimated to be $18.5 billion, or just over 67% of revenues. Of this, $13.4 billion, or 48% of total revenues, was paid in compensation expenses to non-owner employees (The National Alliance Research Academy (2014).

Research indicates that engaged employees are more productive employees and that organizations benefit from a workforce that is engaged. Employee engagement has been described as "the harnessing of an employee's full self in terms of physical, cognitive, and emotional energies to work role performance" (Kahn, 1990). The purpose of this research is to examine employee engagement of a service intensive industry, specifically employee engagement in independent insurance agencies. The averages reported in this paper can be used to benchmark employee engagement in independent insurance agencies, and potentially other professional service firms.

The other opportunity presented in this paper is that if engagement levels prove to be higher in this study than other industries, it can serve as powerful advantage as an industry competes for talent in a talent-deficient

market. As noted by many knowledgeable of the industry (McKinsey, 2010; Wells, 2015), there is a looming talent crisis in the insurance industry. This fact is born out in information provided in the Jacobson Insurance Talent Guide (2016) which notes that only about 10-15% of the industry's needs are covered by graduates from the nation's collegiate RMI programs. To address this gap, the guide indicates that,

> "Organizations must ramp up their engagement and recruiting efforts in order to bring more Millennial professionals into the industry. (Jacobson, p5, 2016)"

A similar message challenges senior insurance executives to take similar steps for its employees.

The McKinsey (2010) report poses questions for insurance senior executives. Question #8 of the 10 offered asks:

> "Are your employees engaged and motivated to perform? Do they find meaning and engagement at work? (McKinsey, p. 13, 2010)"

This question is offered in a section of questions related to talent development and is clearly a call for executives to create work environments that are engaging. What these don't address is what RMI programs must do to increase the flow of graduates into the insurance industry. Assuring that matriculating college students understand the advantages of working in the insurance industry will help improve the pipeline and help RMI programs attract high-school students or undecided college students to consider studying risk and insurance.

The message about high levels of engagement resonate particularly well at this time. Not only are insurance organizations facing a talent deficit, they are also faced with the prospect of having to staff many of the openings with recent and future graduates that are classified as millennials.

LITERATURE REVIEW

Prior research has clearly demonstrated engaged employees provide a competitive advantage and impact the bottom line of an organization (Meyer, 2013). Meta-analyses performed by Gallup, Inc. (2013) have demonstrated a correlation between employee engagement and nine performance outcomes:

1. Customer ratings
2. Profitability
3. Productivity
4. Turnover (for both high- and low-turnover organizations)
5. Safety incidents
6. Shrinkage (theft)
7. Absenteeism
8. Patient safety indices
9. Quality (defects)

Employee engagement has been associated with positive workplace behaviors including improved job/task performance, the willingness to engage in work duties outside one's direct job responsibilities, customer-focused behavior, and lower levels of absenteeism and turnover intentions (Christian, Garza, & Slaughter, 2011; Meyer, 2013). On the other hand, disengaged employees cost companies thousands of dollars per

employee per year and the U.S. economy hundreds of billions of dollars annually due to poor productivity and losses related to safety issues.

One of the leading organizations doing research in the area of employee engagement is Gallup, Inc. They produce a yearly study titled, "The State of The American Workplace Report" (Gallup, Inc., 2013). While this report compares different factors correlated with engagement such as company size, occupation, and gender, industries and industry segments are not addressed.

Job engagement is an important aspect of human resources. Managers must attract and retain competent people. Although benchmarking human resource practices has gained acceptance in recent years (Rodwell et. al, 2000), measures of the effectiveness of such practices have traditionally been done at the organizational level (Browne, 2000).

In order to tightly connect engagement literature to the literature on millennials it is necessary to find work that addresses both. However, there is a surprising lack of literature that does just that. There is considerable work on the difference between generations. Consider some of the following as examples of comparative studies: Deal, Altman & Rogelberg (2010); Meriac et al (2010); and Twenge et al (2010). There is also literature that address differences in generational values. This includes examples like: Weber & Urick (2017); and Schullery (2013).

Although it doesn't tie the concept of engagement directly to the issue of millennials, work by Gong et al (2018) does get into details that matter to millennial engagement. For example, these scholars note that millennials with considerable opportunity for individualized training will be more likely to engage in role innovation. This type of innovation is often described as a situation where employees feel less constrained to conduct work as it always has been. Instead, employees look for ways to improve effectiveness while shedding existing role constraints. In this way, it hints at things we can find in insurance agency careers that can cause it to be attractive to millennials.

Another aspect of this study relates to its focus on descriptive benchmarking. What we are suggesting here is that while there is value in predictive studies, there is also value in work that benchmarks a current phenomenon, particularly one that is poorly studied. There are many definitions of benchmarking provided in the management literature. For example, Camp (1989, p. 12) defines benchmarking as "the search for industry best practices that lead to superior performance". Spendolini (1992, p. 9) describes benchmarking as "a continuous, systematic process for evaluating the products, services and work processes for organizations that are recognized as representing best practices for the purposes of organizational improvement".

The use of benchmarking by firms to compare their own achievements with best practices is advised in management literature (e.g., Watson, 1993). Best practice benchmarking requires firms to use metrics to compare themselves to other firms that have established themselves as the best in that specific business function (Spendolini, 1992). To date, little research has focused on job engagement data that can be used for comparison purposes by independent agencies and other professional service firms. This paper aims to begin addressing the availability of data on specific types of work environment AND offers potential rationales for why the environment of independent agencies can be unique.

RESEARCH QUESTION

The previous work on engagement clearly establishes a link between engagement and positive organizational outcomes. However, what isn't as clear is what a high engagement level can be as compared with another level of engagement. The work of Wollard & Shuck (2013) specifically calls for comparative work on

high and low engagement environments, but in order to address this call, we first need to identify some environments that are at the extremes for high and low engagement. Once we secure this data we can better answer questions that are important to millennials. For example, does an environment with considerable opportunity for career progression, coupled with excellent and individualized training programs, offer higher levels of engagement (PwC, 2011)?" With respect to these environmental conditions, consider the following facts about the insurance industry:

With respect to career progression, the Jacobson and Ward (2018) Groups' Insurance Labor Market Study notes that the insurance industry is unique in that it has extraordinary levels of career opportunity. This opportunity is available now and extends well into the forseeable future. Among the many claims it makes, consider this one which notes,

> "The insurance industry continues to face an unprecedented talent recruitment environment. Today's increasingly challenging labor reality is being impacted by increased staffing demands, a growing mid-level talent gap, impending retirements, virtually non-existent industry unemployment and a shallowing talent pool. (p.1, 2018)"

Interpreted another way, intelligent, well-trained job candidates and employees will have ample opportunity for career advancement in the field of risk and insurance.

With respect to training, there are considerable opportunities for formal training, and often with employer aid to defray the cost. The Institutes (2018) website indicates 26 different designations that don't include any continuing professional education, while the USA Insurance Agents website (2018) indicates 24 possible designations. The actual number is not of concern. What is of concern is that the insurance industy offers far more professional designations than virtually any other industry.

What is interesting about the study of engagement and its connection to the insurance industry it that there are at least a few prominent studies that utilize the insurance industry as a source of engagement data. These include work by Tladinyane & Van de Merwe (2016); May, Gilson & Harter (2004); and Crosby & Stephens (1987). A potential limitation of all three studies is our inability to say with confidence that study results drawn from the insurance industry are generalizable to other work settings. As such, benchmark data on the insurance industry is long overdue.

METHOD

Survey Participants

The National Alliance Research Academy, in partnership with the article authors, conducted a survey of insurance professionals employed at independent agencies throughout the U.S. in the winter of 2014 (February-March) to explore this very issue. An on-line questionnaire was created and administered via SurveyMonkey.com. Participants were recruited through e-mail requests. All participants were ensured that their responses would be confidential and anonymous. Agency employees were asked questions on a variety of topics including employee engagement.

Responses were received from a total of 892 independent agency employees. In order to generalize the findings to a broad audience, only non-owner employee results are presented. The majority (76%) of participants had more than fifteen years of experience in the insurance and risk management industry. The majority of participants indicated their current position was either in sales or service (62%) and they had been in their current position for at least six years (65%). The participants predominantly worked for agencies with total

agency revenues over $3 million (62%). (See Appendix 1 for a presentation of summary demographics about the survey subjects.)

Measurements and Data Collection

Based on prior research support and Kahn's conceptualization of Job Engagement, Rich, LePine, and Crawford's (2010) Job Engagement Scale (JES) was selected for this study. Rich et al., suggest that "because engaged individuals invest their physical, cognitive, and emotional energies into their work roles, they should exhibit enhanced performance because they work with greater intensity on their tasks for longer periods of time, they pay more attention to and are more focused on responsibilities, and they are more emotionally connected to the tasks that constitute their role" (Rich, LePine, and Crawford (2010): 620). The original JES has eighteen question items broken down into three dimensions of job engagement: physical, cognitive, and emotional. The questionnaire for this study contained nine job engagement questions selected from the JES survey instrument. The nine questions were broken down into three questions for each dimension of employee engagement. This was done to improve the reliability of the results from the study. The questionnaire was designed to be short in order to increase the response rate. The questions were intended to measure the overall level of job engagement of the participants.

Participants were asked to rate their own job engagement using a five-point Likert scale that ranged from "strongly disagree" (1) to "strongly agree" (5). Gallup, Inc. (2013) suggests that employees can be divided into 3 types: engaged, not engaged, and highly disengaged.

For this study,

- respondents who answered either agree (4) or strongly agree (5) to the JES questions are considered **engaged employees**;
- respondents that answered neutral (3) are considered **not engaged**; and
- respondents that answered either disagree (2) or strongly disagree (1) are considered **highly disengaged**.

Results

The nine survey questions categorized by the three dimensions of job engagement are presented below. The question items for each dimension were averaged and aggregated to an overall job engagement scale. The mean value of each dimension is presented in parentheses.

Physical Engagement (4.3496)

- I work with intensity on my job
- I strive as hard as I can to complete my job
- I exert a lot of energy on my job

Cognitive engagement (4.2342)

- I focus a great deal of attention on my job at work
- I am absorbed by my job at work
- I concentrate on my job at work

Emotional Engagement (4.1941)

- I am interested in my job
- I am proud of my job
- I am excited about my job

The results of the questionnaire clearly indicate that the overall job engagement score of independent insurance agency employees is 4.2593, which means that the employees are generally engaged. Physical engagement received the highest average score of the three dimensions of job engagement (4.3496 mean score) followed by cognitive engagement (4.2342 mean score) and emotional engagement (4.1941 mean score). The responses of employee engagement range from "strongly disagree" (1) to "strongly agree" (5), with the majority of the participants responding "strongly agree" (5) on all three dimensions, indicating they were highly engaged.

	% Engaged	% Disengaged	% Highly Disengaged
Gallup, Inc.'s 2013 State of the American Workplace	**30%**	**50%**	**20%**
The National Alliance Research Academy: Independent Insurance Agency Employees	**90%**	**9%**	**1%**

For The Academy study, mean score is: above 3.50 for engaged employees, between 2.50 and 3.50 for disengaged employees, below 2.50 for highly disengaged employees.

The results of this study indicate that independent insurance agency employees are highly, highly engaged. They are engaged at a considerably higher level than the average American worker. This is great news for the independent agency system, agency owners, principals, and collegiate RMI programs. There are numerous benefits of an engaged workforce. Overall, independent agencies should see positive workplace behaviors such as improved job/task performance, customer-focused behavior, and lower levels of absenteeism and turnover as compared to other professional service firms. Also, consider the costs associated with actively disengaged employees. Gallup estimates the cost to the U.S. to be between $450 billion to $550 billion yearly due to lost productivity.

As managers benchmark the job engagement of their workforce compared to the sample included in this study, it is important to consider the practical implications – that job engagement is a measurable variable and that good management and leadership practices can significantly improve employee engagement.

This data, in addition to it being useful for managers, is also of use for those of us involved in student recruitment for RMI programs for the following reasons:

A. Millennials are the prime source of employees for the insurance industry now and into the near future

B. It is even more critical to engage Millennials in the work setting than any other generation

C. That work in the insurance industry should be very attractive to Millennials based on the engagement numbers reflected here.

LIMITATIONS

One important study limitation to consider here is that the instrument used in this study, the Rich et. al. (2010) employee engagement scale is different from the one used by Gallup. The Gallup Q12 Employee Engagement Questionnaire consists of 12 items, has been utilized for a considerable period of time, has tremendous face validity, but is also proprietary and information is not available from Gallup about how it makes distinctions between levels of engagement. As such, we were prompted to utilize a well-recognized instrument in the academic field developed by Rich et al (2010).

While the instrument may be different, what is even more different by orders of magnitude, are the results. With different instruments it is difficult to say with high certainty what % of the measured difference is due to measurement error. While the benchmarking estimations of our survey and the Gallop poll may vary, the difference between the two are still quite notable. It is not unlikely that there exists a difference in employee engagement between the insurance industry and the broader population

Another limitation to consider here is that, although ideas are presented as to why a sample of insurance agency employees are demonstrably more engaged in their work than a sample of the general population of employees, this research study is descriptive not predictive. The reason for this is that the initial attempt to study engagement was simply intended to obtain a base-line, benchmark score for the industry. Explanations about why insurance agency employees are more engaged are offered and compelling given the theories available, but that lack of a control group and lack of comparability between the samples makes predictive statistics problematic.

CONCLUSION & BENCHMARKING RECOMMENDATIONS

As noted earlier, firm's with engaged employees reap enormous benefits. Employee engagement is a construct highly worthy of research. In this study, we provide evidence from a survey that employees of insurance agencies are highly engaged. Further, when compared to a national, large sample, cross-sector survey of employee engagement developed by Gallup (2013), we find a noteworthy difference. Agency employees appear to have higher levels of engagement. There are inherent limitations when comparing two different surveys. However, the differences noted in the study would suggest a directionally correct conclusion that agency employees are more engaged than the average American worker. This difference is noteworthy and fodder for additional study. For example, with additional data sets and the use of a meta-analytic statistical approach to evaluating multiple studies simultaneously, it is possible to conduct a meaningful comparison of employee engagement across industries. As it stands, the study is offering managers the opportunity to improve by considering certain factors that can be manipulated to improve engagement.

The first factor to consider in employee engagement is employee empowerment. Empowerment is typically experienced by employees when they are able to develop a sense of meaning from their work, have a choice in how best to resolve issues, and an opportunity to display competence and positively impact their business unit or team (Meyer, 2013; Seibert, Wang, & Courtright, 2011). These issues are associated with multiple facets of engagement including both cognitive and emotional engagement.

The second factor that managers should consider in employee engagement is the actual design and/or structure of work. Job design research focuses on purposefully structuring work tasks and obligations in such a way that fosters employee engagement and motivation. A recent meta-analysis demonstrated that job design variables including task variety, level of responsibility, feedback, team interdependence, and workplace ergonomics all play an important role in enhancing employee motivation and engagement (Humphrey, Nahrgang, & Morgeson, 2007). These work design variables, when implemented effectively, have an impact on all three dimensions of engagement.

A third factor that should be considered when agency's attempt to improve employee workplace engagement is leadership (Meyer, 2013). Effective leadership has been recognized as a primary determinant of growth and success within a variety of business settings ranging from profit seeking enterprises to military units (Judge & Piccolo, 2004; Lowe, Kroeck, & Sivasubramaniam, 1996). Leadership behaviors are often described as either transactional or transformational. Bass (1985) suggested that transactional leaders tend to rely on contingent rewards and feedback to drive performance. Transformational leadership, on the other hand, utilize four distinct behaviors to connect with employees including: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass & Avolio, 2000). Both types of leader behaviors are critical for success. In fact, extant evidence suggests that transformational leadership behaviors augment, or build upon, transactional leadership behaviors such as utilizing contingent rewards (Judge & Piccolo, 2004).

Finally, engagement is maximized when the three factors (empowerment, work design, leadership) are combined in such a way that they help support the vision, mission, and purpose of an organization

Aside from managerial advice, to advance research on engagement, further comparative and predictive research needs to be conducted. Ideally, this research should be conducted in multiple settings using common instruments. Using the three factors noted earlier, studies could utilize environmental differences in empowerment, work design, and leadership to better predict engagement levels.

Finally, this data should be utilized by RMI education professionals, in cooperation with other materials like compelling case studies, examples of non-sales related careers, opportunities to highlight tech applications in the industry, and hands-on activities like a student captive as a way of creating interest among graduating high-schoolers and young college students. The talent deficit is a considerable challenge, but with RMI programs helping to highlight insurance employment conditions like high levels of employee engagement, we stand a better chance of meeting the industry's needs.

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Appendix 1: Demographics

Age:

Age group:		
Answer Options	**Response Percent**	**Response Count**
25 or less	0.1%	1
26-35	7.5%	72
36-45	18.8%	180
46-55	38.2%	365
56-65	31.5%	301
66 or above	3.8%	36
	Total responses	**955**

Gender:

Gender:		
Answer Options	**Response Percent**	**Response Count**
Male	26.3%	251
Female	73.7%	704
	Total responses	**955**

Job Title:

Job title of current job position:		
Answer Options	**Response Percent**	**Response Count**
Sales	27.5%	262
Department manager	15.1%	144
Service, e.g. CSR, account manager	40.7%	389
Other	16.7%	160
	Total responses	**955**

Note: These tables include demographics from owner employee and non-owner employee responses. Only non-owner employee results are presented in the paper, a total of 862 responses.

Online Education in Risk Management and Insurance

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ABSTRACT

A survey of risk management and insurance professors was conducted to gather information on the state of online education in the discipline. Survey questions centered on four areas: curriculum, technology, students, and faculty. Results indicate that less than a quarter of universities surveyed offer courses in an online format. While faculty respondents from these institutions generally perceive the courses and students in an online vs. face-to-face environment to be roughly equivalent and are reasonably satisfied with the technology used, they do not perceive online learning to be equal to that in a face-to-face setting.

INTRODUCTION

Many universities view online educational offerings as a strategy for growth. Others see online courses as a convenience they want to provide to existing students. Some schools feel they must offer online options just to keep up with the competition. Whatever the motive, the increase in post-secondary online enrollment has been significant in the past fifteen years and is growing at a rate faster than overall enrollment. With approximately 30% of higher education students taking at least one online course, and 14% of them taking all courses online (Allen and Seaman, 2016), this method of course delivery is becoming far more prevalent in higher education in general. This study aims to determine what presence online education has in the field of risk management and insurance (RMI) education in particular. How many universities offer online RMI courses? Is the curriculum the same as for face-to-face (F2F) courses? How are the courses delivered? What types of students are successful in an online environment? What is the attitude of faculty toward online RMI education? These are some of the questions we seek to answer.

METHODOLOGY AND DATA

The study utilizes a Qualtrics survey distributed to recent attendees of the American Risk and Insurance Association (ARIA) annual meetings. ARIA is the "premier professional organization of insurance scholars" whose membership is comprised primarily of academics and whose "goals include the expansion and improvement of academic instruction to students of risk management and insurance." (ARIA website) Faculty at universities with academic majors and/or minors in risk management and insurance are likely to be members of the association and frequent participants at ARIA conferences, hence distribution of the survey covers a wide swath of the insurance academic community in the United States and Canada.

The survey is designed to query RMI professors about four different areas of online education: curriculum, delivery method, students, and faculty. Curriculum questions focus on what courses are offered in an online format (if any) at both the undergraduate and graduate levels, how much of a program can be completed online, how online offerings compare to those that are face-to-face (F2F), and the content, workload, and learning goals of online courses. Delivery method questions ask about the course management platform used, technical support, delivery style (percentage of material delivered online, (a)synchronous meetings), and motivation. The student section is meant to uncover information about the population of those who enroll in online courses and their

performance in those courses. Faculty perceptions and practices are covered in the last section of the survey. See Appendix A for the complete questionnaire.

The survey was sent by email to 152 recipients at 68 different institutions. A reminder email to complete the survey was sent one week later to those who had not yet responded. Responses were received from 64 individuals, a 42% response rate, though eight of those responses were incomplete; the final sample is based on 52 respondents from 37 universities.

RESULTS

Curriculum

At the undergraduate level, eleven of the universities represented in the poll offer at least one online RMI course.[26] Six of these schools offer a single course, one each offers two and three courses respectively, and three schools offer six or more. See Appendix B for a listing of all institutions with online RMI offerings. Almost all of these courses are also offered in a F2F format; one university offers some courses in both formats while a single university offers all their courses exclusively online. Though course titles vary somewhat, the most likely course to be offered online is a Principles of Risk Management and Insurance course.

Table 1 presents the levels of agreement of faculty respondents with statements about undergraduate online courses, their content, their workloads, and their learning goals.

[26] An additional five respondents indicated their institution offered one online undergraduate RMI course but did not complete the survey and so are not included here.

TABLE 1 Undergraduate Curriculum	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree	N/A
A student can complete degree requirements completely online	12 63.16%	1 5.26%	0 0.00%	3 15.79%	2 10.53%	1 5.26%
The content of online courses is the same as their F2F equivalent courses	2 10.53%	3 15.79%	1 5.26%	7 36.84%	6 31.58%	0 0.00%
The student's workload in online courses is greater than in F2F courses	2 10.53%	6 31.58%	7 36.84%	3 15.79%	1 5.26%	0 0.00%
The student's workload in online courses is less than in F2F courses	1 5.26%	6 31.58%	8 42.11%	4 21.05%	0 0.00%	0 0.00%
Learning goals are clearly stated in online courses	0 0.00%	0 0.00%	1 5.26%	3 15.79%	13 68.42%	2 10.53%
Learning goals are the same for an online course and its F2F equivalent	0 0.00%	0 0.00%	1 5.26%	6 31.58%	11 57.89%	1 5.26%
Learning goals are adequately assessed in online courses	0 0.00%	2 10.53%	1 5.26%	9 47.37%	6 31.58%	1 5.26%

Perusing Table 1, one can draw the following conclusions:

- Most universities that offer online undergraduate RMI courses view them as complements to existing F2F courses rather than as an independent path to completing degree requirements.
- About two-thirds of faculty respondents agree that the content of online courses is approximately the same as their F2F equivalent courses.
- Workloads in undergraduate online RMI courses are not perceived by faculty to be substantially more or less than in F2F classes.
- Learning goals are clearly stated in online courses, are generally the same as in their F2F equivalents, and are viewed to be adequately assessed in an online format.

At the graduate level, fewer universities offer online options. Five universities provide RMI courses in an online curriculum.[27] Three of the schools offer only one course with one of these schools offering it exclusively online. One college offers four courses online, some of which are also offered in a F2F format. The last school with an online graduate curriculum offers nine courses which are exclusively provided online. As with undergraduate offerings, when a single course is offered, it is a general risk management and insurance course.

Table 2 provides faculty respondent views on graduate curriculum. Summarizing the results, we see that learning goals are generally seen to be clearly stated, adequately assessed, and equivalent to F2F goals when also offered as F2F. Workloads are viewed as similar to F2F courses. In the two programs that offer multiple courses, students can complete their degree requirements online.

TABLE 2 Graduate Curriculum	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Strongly Agree	N/A
A student can complete degree requirements completely online	3 25.00%	1 8.33%	0 0.00%	6 50.00%	0 0.00%
The content of online courses is the same as their F2F equivalent courses	0 0.00%	2 16.67%	0 0.00%	6 50.00%	4 33.33%
The student's workload in online courses is greater than in F2F courses	0 0.00%	2 16.67%	3 25.00%	0 0.00%	4 33.33%
The student's workload in online courses is less than in F2F courses	0 0.00%	4 33.33%	3 25.00%	0 0.00%	4 33.33%
Learning goals are clearly stated in online courses	1 8.33%	0 0.00%	0 0.00%	10 83.33%	0 0.00%
Learning goals are the same for an online course and its F2F equivalent	0 0.00%	0 0.00%	0 0.00%	7 58.33%	4 33.33%
Learning goals are adequately assessed in online courses	1 8.33%	0 0.00%	1 8.33%	7 58.33%	1 8.33%

[27] A sixth institution was indicated as having graduate courses online but did not have complete data about the course(s) and thus is not included here.

Delivery method

Universities that offer an undergraduate and/or graduate online curriculum utilize four different course management systems: Canvas, Blackboard, Desire2Learn and Moodle. Canvas and Blackboard dominate with adoption in approximately an equal split at 80% of the nineteen respondent schools. Moodle is used at a single institution with Desire2Learn at the remaining three (though one of them is converting to Canvas in the next academic year). Most courses at these universities are offered in a fully online format with 100% of the material delivered online. Only three respondents indicated that some portion of an online course uses a F2F component. The most popular format (72%) is for the courses to meet asynchronously; in other words, students access material at their own convenience. Only 17% require all students to login at the same time while 11% utilize some mixture of synchronous and asynchronous meetings.

Table 3 indicates the level of agreement of faculty regarding various aspects of the delivery of online courses. Approximately 83% of the survey respondents whose institutions provide online RMI classes are neutral toward or generally satisfied with the course management platform used. An even higher percentage (about 95%) is neutral toward or satisfied with the level of interaction with students in an online format. Testing integrity is an oft-cited concern with curricula delivered online, however, this survey finds that only 11% of faculty think that the integrity of the testing process is not adequately maintained. Methods listed to ensure testing integrity include video verification of identity, remote proctoring software, proctored F2F exams, and designing exams to be open-book and open-resource. Lastly, in terms of motivation for providing RMI courses in an online delivery format, about two-thirds of respondents view it as a convenience for students and three-quarters see it as a growth strategy. These motives are not mutually exclusive.

TABLE 3 **Delivery Format**	Strongly disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Strongly agree
The course management platform is satisfactory	3 16.67%	0 0.00%	6 33.33%	7 38.89%	2 11.11%
The level of student interaction is satisfactory	0 0.00%	1 5.56%	8 44.44%	7 38.89%	2 11.11%
Testing integrity is adequately maintained	2 11.11%	0 0.00%	6 33.33%	6 33.33%	4 22.22%
Online courses are offered as a convenience to students	1 5.56%	1 5.56%	4 22.22%	7 38.89%	5 27.78%
Online courses are offered as a growth strategy	0 0.00%	1 5.56%	3 16.67%	10 55.56%	4 22.22%

Students

Survey questions relating to students were designed to get a sense of the number students who take online courses, some of their characteristics, and their levels of satisfaction with the online experience. Class size for most online courses is no more than 50 students; of those about half are even at 25 students or less. A few permit 51-100 students while only one program utilizes a large class format at 150 students or more. Faculty respondents estimate that fewer than 25% of students in their programs typically take an online course. Only in graduate programs that are offered mostly online do 75% or more of students take online classes.

Perceptions of faculty respondents about characteristics of students in online RMI courses are presented in Table 4. There is some mild degree of consensus that most students who enroll in online courses are traditional college students which makes sense since most online courses have been shown to be offered at the undergraduate level at four-year universities. Not surprisingly then, digging into the data reveals the agreement that exists about students being adult learners directly corresponds to programs that are offered at the graduate level. Faculty do perceive that many students enrolled in online RMI courses across both graduate and undergraduate programs live a significant distance away. For the most part, student performance in online courses is not seen as being significantly better or worse than in F2F courses. However, faculty do see evidence that students expect online courses to be somewhat less demanding than those offered F2F. Faculty also clearly agree that more self-discipline is required of students who hope to be successful in online courses. For students having taken online courses, faculty believe that they have been generally satisfied with the experience and have received sufficient technical support in the process.

TABLE 4 **Student Characteristics**	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Most students who enroll in an online course are traditional college students	1 5.56%	4 22.22%	5 27.78%	5 27.78%	3 16.67%
Most students who enroll in an online course are adult learners	3 16.67%	3 16.67%	7 38.89%	2 11.11%	3 16.67%
Most students who enroll in an online course are a significant distance away	2 11.11%	0 0.00%	7 38.89%	9 50.00%	0 0.00%
Student grades in online courses are better than in F2F courses	2 11.11%	4 22.22%	9 50.00%	3 16.67%	0 0.00%
Student grades in online courses are worse than in F2F courses	2 11.76%	4 23.53%	9 52.94%	2 11.76%	0 0.00%
Students expect online courses to be less demanding than F2F courses	1 5.56%	1 5.56%	7 38.89%	8 44.44%	1 5.56%

Students must be more self-disciplined to succeed in an online course than in a F2F course	0 0.00%	0 0.00%	4 22.22%	8 44.44%	6 33.33%
Students seem satisfied with the online experience	0 0.00%	1 5.56%	7 38.89%	6 33.33%	4 22.22%
Students receive sufficient technological assistance when needed	0 0.00%	2 11.11%	4 22.22%	8 44.44%	4 22.22%

Faculty

The final area covered by the survey is summarized in Table 5 and investigates faculty attitudes and support for online teaching. Anecdotal perceptions that faculty are reluctant to teach online are somewhat borne out by survey results. An equal number of respondents agreed as disagreed with the statement that faculty were willing to teach online, though none strongly disagreed. While it appears that some faculty receive some type of financial incentive to teach online, the majority do not. They do, however, feel that the level of technical training and ongoing technical support are most often sufficient to make them successful in an online environment. Receiving support from teaching/graduate assistants appears to be inconsistent with responses approximately equal across the range of possible responses. One area of concern is in the perception faculty have of online learning. Over half of respondents disagreed with the statement that online learning is equal to that in F2F classes; fewer than a quarter have some level of agreement with the statement and no one agreed strongly that online learning is equivalent to F2F learning. Lastly, while faculty are almost all neutral to positive in agreement that sufficient office hours are held online, only 22% of them are at least somewhat satisfied with the level of interpersonal contact they have with students in an online course.

TABLE 5 **Faculty Characteristics**	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Faculty are generally willing to teach online courses	0 0.00%	8 44.44%	2 11.11%	6 33.33%	2 11.11%
Faculty receive additional financial incentives to teach online	6 33.33%	4 22.22%	2 11.11%	5 27.78%	1 5.56%
Faculty receive sufficient technological training to teach online	0 0.00%	2 11.11%	4 22.22%	10 55.56%	2 11.11%
Faculty receive sufficient ongoing	0 0.00%	3 16.67%	1 5.56%	10 55.56%	4 22.22%

technological support to teach online					
Faculty perceive online learning to be equal to F2F	3 16.67%	7 38.89%	4 22.22%	4 22.22%	0 0.00%
Faculty have teaching/grading assistants for large classes	3 16.67%	4 22.22%	3 16.67%	4 22.22%	4 22.22%
Faculty have sufficient office hours online	0 0.00%	1 5.56%	8 44.44%	6 33.33%	3 16.67%
Faculty have satisfactory interpersonal contacts with students	0 0.00%	5 29.41%	8 47.06%	3 17.65%	1 5.88%

CONCLUSIONS

Online education in the risk management and insurance discipline currently has a fairly small presence with fewer than 25% of universities surveyed offering courses in an online format; most of these offer a single course. Online courses in RMI are less likely to be offered at the graduate level than the undergraduate level although two graduate programs offer multiple courses so that students can complete most or all program requirements online. Canvas and Blackboard are the two most common course management platforms in use with most online courses delivering 100% of the course content in asynchronous sessions. Technical training and support seem to be reasonably adequate for both faculty and students participating in online curricula. Survey results generally indicate that faculty see the course content, learning goals, workloads, and grades in an online format as very similar to the F2F equivalent. However, they do not perceive online learning to be equal to that in F2F classes.

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American Risk and Insurance Association website: http://aria.org/whatisaria.htm

APPENDIX A

Survey Instrument

Curriculum:

1. Does your institution offer any undergraduate online RMI courses?

- ○ Yes (1)
- ○ No (2)

2. How many different undergraduate courses are offered in an online format?

- ○ 1 (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 (5)
- ○ 6 or more (6)

3. Are undergraduate online courses also offered in a face-to-face (F2F) format?

- ○ All online courses are also offered F2F (1)
- ○ Some online courses are also offered F2F (2)
- ○ No online courses are also offered F2F (3)

4. Rate your level of agreement with the following statements regarding undergraduate online RMI courses:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	N/A (6)
A student can complete degree requirements completely online (1)	○	○	○	○	○	○
The content of online courses is the same as their F2F equivalent courses (2)	○	○	○	○	○	○
The student's workload in online courses is greater than in F2F courses (3)	○	○	○	○	○	○
The student's workload in online courses is less than in F2F courses (4)	○	○	○	○	○	○
Learning goals are clearly stated in online courses (5)	○	○	○	○	○	○
Learning goals are the same for an online course and its F2F equivalent (6)	○	○	○	○	○	○
Learning goals are adequately assessed in online courses (7)	○	○	○	○	○	○

5. Describe method(s) used to assess learning goals in undergraduate online RMI courses.

6. List course **titles** of online undergraduate RMI offerings.

- ○ Course 1 (1) _____
- ○ Course 2 (2) _____
- ○ Course 3 (3) _____
- ○ Course 4 (4) _____
- ○ Course 5 (5) _____
- ○ Any other courses (please list all): (6) _____

7. Does your institution offer any graduate online RMI courses?

- ○ Yes (1)
- ○ No (2)

8. How many different graduate courses are offered in an online format?

- ○ 1 (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 (5)
- ○ 6 or more (6)

9. Are graduate online courses also offered in a F2F format?

- ○ All online courses are also offered F2F (1)
- ○ Some online courses are also offered F2F (2)
- ○ No online courses are also offered F2F (3)

10. Rate your level of agreement with the following statements regarding graduate online RMI courses:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	N/A (6)
A student can complete degree requirements completely online (1)	○	○	○	○	○	○
The content of online courses is the same as their F2F equivalent courses (2)	○	○	○	○	○	○
The student's workload in online courses is greater than in F2F courses (3)	○	○	○	○	○	○
The student's workload in online courses is less than in F2F courses (4)	○	○	○	○	○	○
Learning goals are clearly stated in online courses (5)	○	○	○	○	○	○
Learning goals are the same for an online course and its F2F equivalent (6)	○	○	○	○	○	○
Learning goals are adequately assessed in online courses (7)	○	○	○	○	○	○
Click to write Statement 8 (8)	○	○	○	○	○	○

11. Describe method(s) used to assess learning goals in graduate online RMI courses.

12. List course titles of online graduate RMI offerings.

- ○ Course 1 (1) _____
- ○ Course 2 (2) _____
- ○ Course 3 (3) _____
- ○ Course 4 (4) _____
- ○ Course 5 (5) _____
- ○ Any other courses (please list all): (6) _____

Delivery:

13. Which course management platform is used to deliver online courses?

- ○ Canvas (1)
- ○ Blackboard (2)
- ○ Other (please specify): (3) _____

14. What percentage of course content is delivered online versus in person?

- ○ 100% online (1)
- ○ 75% online/25% F2F (2)
- ○ 50% online/50% F2F (3)
- ○ 25% online/75% F2F (4)

15. Online sessions are

- ○ all synchronous (all students are online at the same time) (1)
- ○ all asynchronous (students can log in at their own convenience) (2)
- ○ a mixture of both synchronous and asynchronous (3)

16. Rate your level of agreement with the following statements:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree or disagree (3)	Somewhat agree (4)	Strongly agree (5)
The course management platform is satisfactory (1)	○	○	○	○	○
The level of student interaction is satisfactory (2)	○	○	○	○	○
Testing integrity is adequately maintained (3)	○	○	○	○	○
Online courses are offered as a convenience to students (4)	○	○	○	○	○
Online courses are offered as a growth strategy (5)	○	○	○	○	○

17. Describe method(s) used to maintain testing integrity.

Students:

18. The average class size of an online course is

- ○ 0-25 (1)
- ○ 26-50 (2)
- ○ 51-100 (3)
- ○ 101-150 (4)
- ○ 150+ (5)

19. What proportion of students in your RMI program complete at least one online course?

- ○ 0%-25% (1)
- ○ 26%-50% (2)
- ○ 51%-75% (3)
- ○ 76%-100% (4)

20. Rate your level of agreement with the following statements:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Most students who enroll in an online course are traditional college students (1)	○	○	○	○	○
Most students who enroll in an online course are adult learners (2)	○	○	○	○	○
Most students who enroll in an online course are a significant distance away (3)	○	○	○	○	○
Student grades in online courses are better than in F2F courses (4)	○	○	○	○	○
Student grades in online courses are worse than in F2F courses (5)	○	○	○	○	○
Students expect online courses to be less demanding than F2F courses (6)	○	○	○	○	○
Students must be more self-disciplined to succeed in an online course than in a F2F course (7)	○	○	○	○	○
Students seem satisfied with the online experience (8)	○	○	○	○	○
Students receive sufficient technological assistance when needed (9)	○	○	○	○	○

Faculty:

21. Rate your level of agreement with the following statements:

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Faculty are generally willing to teach online courses (1)	○	○	○	○	○
Faculty receive additional financial incentives to teach online (2)	○	○	○	○	○
Faculty receive sufficient technological training to teach online (3)	○	○	○	○	○
Faculty receive sufficient ongoing technological support to teach online (4)	○	○	○	○	○
Faculty perceive online learning to be equal to F2F (5)	○	○	○	○	○
Faculty have teaching/grading assistants for large classes (6)	○	○	○	○	○
Faculty have sufficient office hours online (7)	○	○	○	○	○
Faculty have satisfactory interpersonal contacts with students (8)	○	○	○	○	○

22. Would you be willing to be contacted for a follow-up conversation regarding you program?

○ Yes (1)

○ No (2)

APPENDIX B

Universities with Online RMI Courses

Undergraduate	Graduate
Appalachian State University	Ball State University
Ball State University	Colorado State University
Cal State Northridge	Florida State University
Eastern Kentucky University	St. John's University
Florida State University	Temple University
Laval University	
Northern Arizona University	
St. John's University	
Temple University	
University of Cincinnati	
University of Georgia	

With incomplete data:

Undergraduate	Graduate
Auburn University	Laval University
Baylor University	
Iowa University	
Ole Miss	
University of Alabama	

Risk Financing Simulation Exercises: From a Single Risk to ERM

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ABSTRACT

This set of exercises uses simulation to aid students in gaining an intuitive understanding of what drives risk financing effectiveness and efficiency. The exercises begin with a single risk and progresses to an enterprise-wide portfolio of firm risks. A discussion of differences between traditional 'siloed' risk management and enterprise risk management (ERM) is also included.

Introduction

The set of exercises in this assignment is designed to aid students in gaining an intuitive understanding of what drives risk financing effectiveness and efficiency. The assignment is also designed to be flexible. It can be used as a relatively modest assignment to teach basic concepts regarding the importance of focusing risk financing efforts on the left tail of the distribution and the impact of loadings. It can also be used to facilitate telling a more robust story that progresses from a single risk to an enterprise-wide perspective, enabling students to explore the efficiencies of multiline risk transfers, the impact of correlations among risks, the concept of risk tolerance, and enterprise risk management. This makes the assignment useful for a variety of courses, both introductory and advanced.

The assignment is easily transferred to other institutions. The assignment document below is completely self-contained and can be distributed to students as written. The associated spreadsheets use standard Excel (i.e., no need for add-ins, programming, or additional software). In addition, a comprehensive Instructor's Manual appears below after the assignment and includes a quick start guide, suggested implementation approaches, ideas for incorporating the exercises into particular courses, tips for assessing student learning, and forms to collect student answers. Electronic copies of the assignment document, Instructor's Manual (which also includes an answer key), and Excel spreadsheets are all available from the authors upon request. The authors would also be happy to consult with instructors to discuss how best to use the assignment in a particular class. The bottom line is that once an instructor spends a little time becoming familiarized with the assignment, it should be easy to implement in a course.

Risk Financing Simulation Exercises - Introduction and Objectives

Firms use risk financing techniques to provide funds to offset (at least partially) the financial impact of unexpected events (e.g., property loses from hurricanes or FOREX risks due to currency fluctuations). Common forms of risk financing include insurance, funded reserves, and hedges with market-traded securities. Risk financing strategies should pay for loss events in the most effective and efficient way possible in order to support the achievement of the firm's goals.

This set of exercises is designed to aid students in gaining an intuitive understanding of what drives risk financing effectiveness and efficiency. This set of exercises begins with a perspective that encourages students to efficiently hedge a single risk. It then asks students to efficiently hedge a set of risks within a risk management department (typically responsible for managing the "silo" of hazard risks). It concludes with a more holistic, enterprise-wide perspective. The objectives for this assignment include:

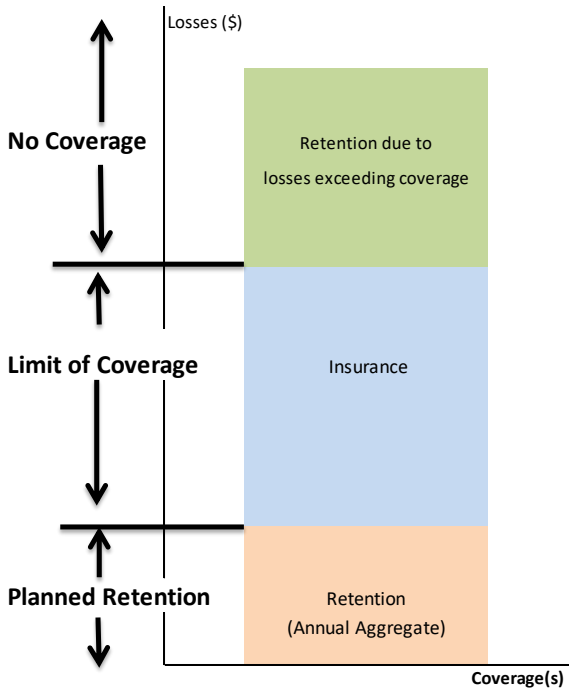
- **Risk financing for a single risk** (Practice Exercise & Exercises 1-2):
    - Determine which part of a risk's distribution should be targeted with a risk transfer to generate efficient risk reduction;
    - Evaluate and understand the impact of insurer loadings (i.e., loadings for profit, expenses and risk premiums).
- **Risk financing within a set of hazard risks, the "hazard-risk-portfolio"** (Exercises 3-6):
    - Determine which risk(s) should be prioritized for risk transfer and why.
    - Evaluate a multiline risk financing approach (as opposed to multiple monoline insurance policies). Determine which approach is more efficient and why.
    - Assess the impact of correlations among the risks
- **Evaluating retention levels** (Exercises 7 - 8):
    - Analyze various retention levels and assess the impact of retention level on:
        - The firm's retained range of risk costs (i.e., best case, worst case, and expected risk costs);
        - The cost and efficiency of risk transfer.
    - Evaluate retention levels based upon firm's risk tolerance (i.e., impact on EPS.)
- **Risk Financing from an Enterprise Risk Management (ERM) perspective** (Exercise 9):
    - Use the Lufthansa case to discuss differences between managing risk within silos (e.g., the silo of hazard risks) and at the enterprise level.
    - Allow students to examine and understand the components of the firm's risk-portfolio.
    - At the enterprise level, use the simulated risk-portfolio to reassess which risk(s) should be prioritized for risk financing and why.

Introduction to risk financing as modeled in this assignment

For simplicity, this assignment will assume risk transfers will take the form of an insurance-style risk transfer with an annual aggregate retention and an annual aggregate limit of coverage[28]. See Figure 1 below for a generic example. This assignment asks students to employ this basic risk transfer approach to evaluate different risk transfer and retention strategies. This analysis will help students learn concepts that would be relevant irrespective of the type of risk transfer used by a firm. These concepts will help students better understand questions important to risk managers.

Figure 1. Sample insurance-style risk transfer

In the generic insurance-style risk transfer below, the firm establishes its planned retention layer by specifying its size in the insurance contract it purchases. The planned retention might be referred to as a deductible or a self-insured retention – they function similarly.



Firms plan for a specific retention when designing their risk financing strategy and seek risk transfer contracts that meet those objectives. It is common for a firm to adjust its plans in response to what the market supplying risk transfers offers. For example, if the insurance market offers surprisingly inexpensive coverage with lower retentions, the firm may purchase a risk transfer with smaller retentions than it had planned.

Similarly, firms will seek to obtain limits of coverage that both meet their risk financing objectives and respond to market conditions. Once the policy limit is exhausted, however, the firm will once again be retaining the risk. Thus, when one considers the portion of a risk that is retained by a firm, it is necessary to include both portions – the planned retention below the risk transfer and the retention due to losses exceeding the coverage afforded by the risk transfer.

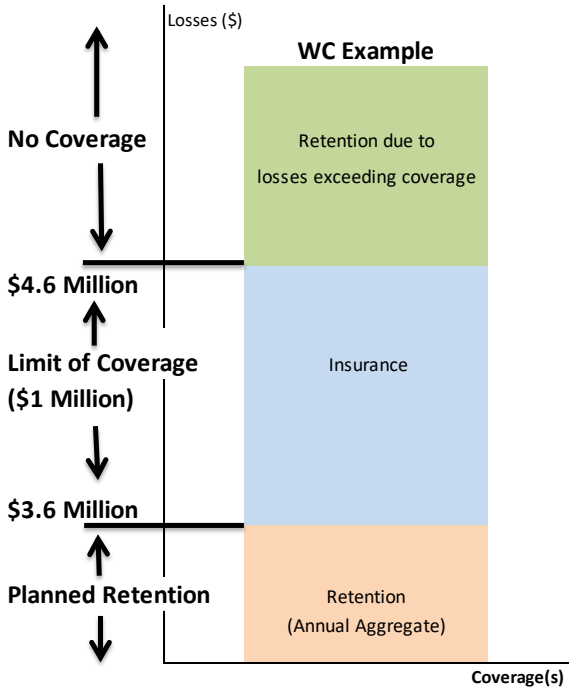
An example of risk financing – worker's compensation (WC)

Figure 2 below offers a risk financing example for worker's compensation (WC) that will aid in learning how to use the Excel tool for this assignment. We will use WC loss data over three (3) sample years to illustrate how the WC risk financing works. Then, we will demonstrate how to use the Excel tool that accompanies this assignment to model an identical WC risk transfer structure. Once we've introduced how to use the Excel tool, we'll start the practice exercise.

[28]The term "annual aggregate" simply means that the retention and limit are based on the total losses for the year.

Figure 2. WC risk financing

In the WC risk transfer below, the firm retains the first $3.6 million in WC losses. Above that retention, the firm has purchased insurance coverage for the next $1 million of WC losses.



In the WC example, the firm has purchased $1 million limit of insurance coverage above a $3.6 million retention. As a reminder, coverage limits and retentions are aggregate. If aggregate WC losses for a year exceeded $4.6 million, coverage from the WC risk transfer would be exhausted.

Let's determine how this risk financing structure works given three sample years of aggregate WC losses:

Sample Year	Aggregate WC Losses
1	$3,313,081
2	$3,832,943
3	$5,339,672

In the first year, the aggregate WC losses are within the planned retention of $3.6 million. Thus, all losses are retained, and the insurance makes no indemnification payment to the insured firm.

In the second year, the aggregate WC losses exceed the planned retention of $3.6 million by $232,943. Since the $1 million layer of insurance immediately follows the planned retention, the insurance will indemnify the firm for covered losses with a payment of $232,943.

In the third year, the aggregate WC losses exceed the planned retention of $3.6 million by $1,739,672. The insurance will indemnify the firm for covered losses up to the limit of coverage of $1,000,000. Thus, the insurance will provide the firm with a payment of $1,000,000. The balance of $739,672 exceeds the coverage limit, so it is retained by the firm. Therefore, total retained losses for year 3 are $4,339,672. The results for all three years are summarized in Figure 3.

Figure 3. WC results for sample years

The results below illustrate annual risk financing of $1 million limit of insurance coverage above a $3.6 million retention for three sample years. The portion of losses "felt" by the firm is the total retained WC losses (i.e., columns B+D) which can also be viewed as the losses net of any reimbursement from the risk transfer (i.e., columns A-C). Note that in the table, as in the Excel tool, losses are shown as negative numbers and indemnification payments are shown as positive numbers, since we want to show the impact of the losses and payments on the earnings of the firm.

	(A)	(B)	(C)	(D)	(B)+(D)
Year	Annual WC losses	Retained losses within planned retention	Indemnification from insurance	Retention due to losses exceeding coverage	Total retained WC losses
1	-3,313,081	-3,313,081	0	0	-3,313,081
2	-3,832,943	-3,600,000	232,943	0	-3,600,000
3	-5,339,672	-3,600,000	1,000,000	-739,672	-4,339,672

Using the Excel tool, RiskFinTool

Now, we will model the same WC risk financing described above ($1 million of coverage above a $3.6 million aggregate retention) within the Excel tool (*RiskFinTool*)[29]. To implement this risk transfer, open *RiskFinTool.SingleRisk-WC* and make the inputs shown in Figure 4.

Figure 4. Model a WC risk transfer (RiskFinTool.SingleRisk-WC)

The inputs below generate a risk financing structure with an insurance-style risk transfer with a $1 million limit of coverage above an annual aggregate retention of $3.6 million. Note that the "Insurance Limit of Coverage" is positive as it represents the magnitude of the risk transfer.

Risk Transfer: ON = 1; OFF = 0		1
Annual Aggregate Retention		-3,600,000
Insurance Limit of Coverage		1,000,000
	Loading %	0%

Now let's take a closer look at *RiskFinTool.SingleRisk-WC* and see what information it contains as well as how the information is organized. As Figure 5 shows, the information is organized into three sections:

1. **Summary Statistics.** The column labeled "Annual Losses" describes the WC losses without considering any risk transfers. The column labeled "Net of Risk Tran." describes the WC losses less any indemnifying cash flows from risk transfers. The data shown includes several statistics that describe the distribution (Min, Max,

[29] When referring to tabs within *RiskFinTool*, we will simply add a period (".") and continue with the name of the Excel worksheet tab. For example, the instruction, "Open *RiskFinTool.SingleRisk-WC*" is asking you to open the file, *RiskFinTool*, to the tab, *SingleRisk-WC*.

Mean, Standard Deviation, VaR). These statistics enable you to see the impact of a risk transfer by comparing the "before and after" risk characteristics.

2. **Risk Financing Structure.** The Annual Aggregate Retention defines the maximum total of WC losses the firm plans to retain before the insurance begins to pay (the planned retention layer). The Insurance Limit of Coverage similarly defines the insurance layer. The Expected Cost of Insurance Risk Transfer is calculated as follows:
   Expected Cost = (1 + Loading %) * Average (Indemnification from Risk Transfer for each simulated year)

3. **Annual Data**. Annual Data displays for each simulated year:
   - Annual aggregate losses;
   - Indemnification payments from a risk transfer (i.e., reimbursements from the insurer due to covered losses);
   - Total retained losses (i.e., annual losses less any indemnification received from the insurer).

The tool also contains a fourth section, which is not shown here, the graph of the WC probability distribution net of any risk transfer). This graph is shown later in Figure 10.

Figure 5. Overview of information displayed (RiskFinTool.SingleRisk-WC)

The Summary Statistics display risk characteristics before and after any modeled risk transfer. The Risk Financing Structure defines any risk transfer via the planned aggregate retention and the limit of insurance. The Annual Data displays the aggregate WC losses, any indemnification received due to the purchase of a risk transfer, and the total retained losses (i.e., total losses – insurance indemnifications) in each simulated year.

	Risk	Annual Losses WC		Net of Risk Tran. WC
Max	Best Case	-273,808		-273,808
	Mean	-3,608,389		-3,309,329
Min	Worst Case	-7,743,403		-6,743,403
	Std Dev (σ)	894,000		594,083
5.0%	VaR	-5,106,684		-4,106,684
10,000	Simulated Firm-Year Observations			

1. Summary Statistics

Risk Transfer: ON = 1; OFF = 0	1
Annual Aggregate Retention	-3,600,000
Insurance Limit of Coverage	1,000,000
Loading %	0%
Expected Cost of Insurance Risk Transfer	299,059

2. Risk Financing Structure

Simulated Year	Annual Losses WC	Indemnification from Risk Transfer WC	Total Retained Losses WC
1	-3,313,081		-3,313,081
2	-3,832,943	232,943	-3,600,000
3	-5,339,672	1,000,000	-4,339,672
4	-4,682,333	1,000,000	-3,682,333
5	-4,862,393	1,000,000	-3,862,393
6	-3,017,602		-3,017,602

3. Annual Data

It would be helpful to look at a small sample of data to get a better understanding of how ***RiskFinTool*** works. The WC data for the first three years in your ***RiskFinTool.SingleRisk-WC*** should match those in

Figure 5. We used ***RiskFinTool*** to replicate the same WC risk financing structure we used in our first WC example (i.e., Figure 2). Further, if you examine the Annual Data from ***RiskFinTool.SingleRisk-WC***, you will see that the annual losses in the first three years are also identical to those we used in the initial WC example. Thus, if you compare the indemnification cash flows and total retained losses, you should see that the results from ***RiskFinTool*** (displayed in Figure 6) are identical to the results from our WC example in Figure 3 above.

Figure 6. Annual Data for first 3 years (RiskFinTool.SingleRisk-WC)

The annual data displays annual losses, indemnification from risk transfer and the total retained losses for each simulated year. The data below are from ***RiskFinTool.SingleRisk-WC*** and are identical to the prior WC example (see Figure 3).

Simulated Year	Annual Losses WC	Indemnification from Risk Transfer WC	Total Retained Losses WC
1	-3,313,081		-3,313,081
2	-3,832,943	232,943	-3,600,000
3	-5,339,672	1,000,000	-4,339,672

The Expected Cost of Insurance Risk Transfer equals the expected indemnification payment made by the insurer (provided insurer loadings are set to 0%). In Figure 7, we manually work through the Expected Cost calculation using just the first three years. The expected cost of $299,059 from ***RiskFinTool.SingleRisk-WC*** (see Figure 5) is similarly calculated as the average of all 10,000 rows of simulated indemnification payments from the insurer to the firm.

Figure 7. Calculating the Expected Cost of Insurance Risk Transfer

The Expected Cost of Insurance Risk Transfer is defined as:

Expected Cost = (1 + Loading %) * Average (Indemnification from risk transfer)

Below we use our three sample years of WC losses to calculate the expected cost of the insurance ($1 million of coverage above a $3.6 million aggregate retention)

Expected Cost = (1 + 0) * Average (Indemnification from risk transfer)
Expected Cost = Average (Indemnification from risk transfer)
Expected Cost = (0 + 232,943 + 1,000,000)/3
Expected Cost = $410,981

Thus, the expected insurance cost (without loadings) is the average loss payment by the insurer. *This* average ($410,981) is based on using *just* those three sample years. The expected cost in ***RiskFinTool.SingleRisk-WC*** ($299,059) is the average insurance payout for all 10,000 simulated years (plus loadings if applicable).

If we look more closely at the ***RiskFinTool.SingleRisk-WC*** summary statistics, we can evaluate the WC risk and/or the impact of the risk transfer we just modeled. Figure 8 provides details of the summary statistics.

Figure 8. Summary Statistics – Impact of risk transfer (RiskFinTool.SingleRisk-WC)

The modeled risk transfer is $1 million of coverage above a $3.6 million aggregate retention. Based upon a review of the summary statistics, the cash flows from this risk transfer have the following impacts on the WC risk:

- Best Case: No change in net losses
- Mean: Losses reduced by 299,059
- Worst Case: Losses reduced by 1,000,000
- Standard Deviation: Reduced by 34% (894,000-594,083)/894,000
- 5% VaR: Reduced by 1,000,000

It is important to note that those changes in WC risk came at a price. The expected price (ignoring loadings) of this risk transfer is $299,059. Loadings will also play an important role as they compensate the insurer for bearing the firm's risk. Loadings will be incorporated into the assignment starting with Exercise #2.

	Risk		Annual Losses WC		Net of Risk Tran. WC
Max	Best Case		-273,808		-273,808
	Mean		-3,608,389		-3,309,329
Min	Worst Case		-7,743,403		-6,743,403
	Std Dev (σ)		894,000		594,083
5.0%	VaR		-5,106,684		-4,106,684
10,000	Simulated Firm-Year Observations				

Now that we have a better understanding of how ***RiskFinTool*** works, we can begin the practice exercise.

Practice Exercise (WC)

Our primary objective for this first exercise is to determine which part of a risk's distribution should be targeted with a risk transfer to generate efficient risk reduction. To help us determine the most efficient approach, we'll need a way to compare the relative efficiency of different strategies. As noted in Figure 8, the impact of risk transfer on the WC risk came at a price. What if we could design an alternative WC risk financing structure that was both less expensive and reduced the WC risk to a greater extent? That alternative approach would be more efficient. We'll define a measure, Risk Financing Efficiency (RF-Efficiency), to enable comparisons for analysis. RF-Efficiency is defined in Figure 9. For the practice exercise, we will also impose the constraint of spending no more than $50,000 on the insurance purchase[30].

Figure 9. Risk financing "efficiency" defined (RF-Efficiency)

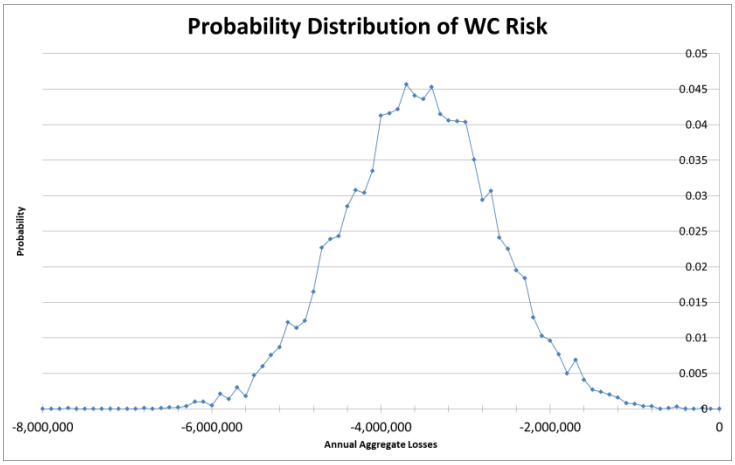
Throughout this assignment we will use the reduction in standard deviation (σ) per $1,000 spent on risk financing as a measure of risk financing efficiency. Using our example of $1 million of coverage above a $3.6 million aggregate retention yields risk financing efficiency (RF-Efficiency) of 1,003.

RF-Efficiency = [σ(risk) – σ(risk net of risk transfer)] / [Expected Cost/$1,000]
RF-Efficiency = [894,000-594,083] / 299 = 1,003

Now we can get back to our objective: determine which part of a risk's distribution should be targeted with a risk transfer to generate efficient risk reduction. The WC risk distribution is shown in Figure 10.

Figure 10. WC risk distribution[31]

The probability distribution of 10,000 simulated firm-years of WC losses. The distribution has a mean of $3.6 million and a maximum loss of $7.7 million.



The WC risk distribution is roughly normally distributed. The peak of the distribution reflects the higher probability that actual WC losses are relatively close to the mean of $3.6 million. The right tail of this distribution represents the best outcomes – the relatively rare years when WC losses are less than $2 million. The left tail of this distribution reflects the similarly low-probability of WC losses exceeding $5 million.

When developing risk treatment strategies, risk managers often use a risk matrix to categorize different risks by their relative likelihood and severity. Risk financing is typically recommended for risks with low probability and high severity[32]. That same logic would suggest risk financing

[30] Imposing a budget constraint on the three risk transfers is another method (in addition to using RF-Efficiency) to make the risk transfer impacts comparable.
[31] The WC risk distribution is also graphed in ***RiskFinTool.SingleRisk-WC***. The Excel graph of the WC risk distribution will automatically update to reflect any "turned-on" risk transfer.
[32] See appendix B for a sample risk matrix.

would be better suited for the left tail of the WC distribution. Let's verify whether a risk transfer targeting the left tail will be more efficient than similar risk transfers targeting the right tail or the middle peak.

For the practice exercise, we'll implement those three different risk transfers and evaluate their relative efficiency. We've already defined a risk transfer ($1 million of coverage above a $3.6 million retention) that is targeting the middle of the distribution, so let's start there. Since the expected cost of our $1 million of coverage is $299,059, we'll have to reduce the limit of coverage to get the price of insurance below our $50,000 budget constraint. Try reducing our limit to $500,000; once again, the expected cost of insurance exceeds our budget constraint. Try reducing our limit to $100,000; now the expected cost of insurance ($47,800) is below our budget constraint. Try increasing our limit to $110,000; now the expected cost of insurance exceeds our budget constraint.

Thus, $100,000 is the maximum limit of coverage we can purchase (at this retention level) without exceeding our budget constraint[33]. Calculate the reduction in risk (i.e., change in σ) and the RF-Efficiency for this risk transfer. Compare your results to those in the column labeled "Center" in Figure 11.

Practice Exercise Instructions (WC)

Task: Try a risk transfer that targets each area of the risk's distribution (e.g., right tail, left tail, or center). Determine which had the greatest impact on reducing risk. Calculate the RF-Efficiency of each risk transfer.

Constraints: Limit the expected cost insurance to no more than $50,000.
Suggestions/hints: Set the "Risk Transfer On/Off:" field to ON = 1". Set the "Loading %" = 0. To save time, round retentions and limits of coverage to the nearest $10,000.
Working Tab: RiskFinTool.SingleRisk-WC

Now let's target the right tail of the WC distribution. What would be an appropriate retention level for the extreme right tail of the distribution? Try a retention of $0 and increase the limit of coverage until the expected cost reaches $50,000. Again, to save time, use limit increments of at least $10,000. Calculate the reduction in risk (i.e., change in σ) and the RF-Efficiency for this risk transfer. Compare your results to those in the column labeled "Right Tail" in Figure 11.

Figure 11. Practice exercise results (WC)

The results below show that risk transfers targeting the left tail of a distribution are more efficient at reducing risk. They produce greater risk (σ) reduction per dollar spent.

[33] For simplicity, we round all retentions and limits of coverage to the nearest $10,000.

Practice Exercise Results

WC Risk Financing Characteristics	Left Tail	Center	Right Tail
Annual Aggregate Retention	-4,700,000	-3,600,000	0
Insurance Limit of Coverage	4,000,000	100,000	50,000
Loading %	0%	0%	0%
Expected Cost of Insurance Risk Transfer	49,259	47,800	50,000

Risk	WC	Risk Characteristics Annual Losses	Total Retained Losses Left Tail	Total Retained Losses Center	Total Retained Losses Right Tail
Max	Best Case	-273,808	-273,808	-273,808	-223,808
	Mean	-3,608,389	-3,559,130	-3,560,588	-3,558,389
Min	Worst Case	-7,743,403	-4,700,000	-7,643,403	-7,693,403
	Std Dev (σ)	894,000	807,311	854,647	894,000
5.0%	VaR	-5,106,684	-4,700,000	-5,006,684	-5,056,684

Change in Std Dev	86,689	39,353	0
Change in Std Dev (%)	-10%	-4%	0%
RF-Efficiency	1,760	823	0
Change in VaR	406,684	100,000	50,000

Now let's target the left tail of the WC distribution. Here, our approach to design the risk financing structure will need to change slightly to accommodate our budget restriction. Instead of fixing our retention level and adjusting our limit of coverage, we'll have to take the opposite approach. We'll need to increase our retention level to reduce the expected cost of insurance while making sure we always have a sufficient limit of coverage to cover our maximum loss; covering the maximum loss assures that we will fully address the left tail of the distribution. We'll arbitrarily choose to start with a retention level approximately two standard deviations above the mean ($3.6 million + 2 * $900k = $5.4 million) and a limit of coverage ($4 million) that will well exceed our maximum loss[34]. Since that risk transfer ($4 million of coverage above a $5.4 million retention) is well below our budget constraint, we'll lower our retention… down to $4.4 million. With this lower retention of $4.4 million, our limit of coverage still exceeds our maximum loss, but our insurance costs exceed our budget. Thus, we must find a retention level (to the nearest $10,000) that maximizes our insurance coverage without exceed our budget constraint. Find that retention level. Calculate the reduction in risk (i.e., change in σ) and the RF-Efficiency for this risk transfer. Then compare your results to those in the column labeled "Left Tail" in Figure 11.

Question(s) for reflection or discussion: When purchasing a risk transfer for the extreme right tail of a distribution, what happens? How much risk reduction was achieved? How efficient was this risk transfer? Why?

Suggestions/hints: What happens to the other summary statistics (min, max, & mean)? It might also be informative to look at the Excel graph of the WC risk distribution and use the "Risk Transfer On/Off:" field to turn the insurance off and on again.

Figure 12. Practice exercise results (WC + Goal Seek)

The results below show that risk transfers targeting the left tail of a distribution are more efficient at reducing risk. They produce greater risk (σ) reduction per dollar spent.

[34] Since this model calculates Expected Cost based on expected insurance indemnification payments, there are no additional insurance costs associated with buying limits well above the maximum loss. Please see Appendix A for discussion of the tradeoffs between realism and facilitating learning.

Practice Exercise Results (with Goal Seek)

WC Risk Financing Characteristics	Left Tail	Center	Right Tail
Annual Aggregate Retention	-4,693,545	-3,600,000	0
Insurance Limit of Coverage	4,000,000	104,828	50,000
Loading %	0%	0%	0%
Expected Cost of Insurance Risk Transfer	50,000	50,000	50,000

Risk	WC	Risk Characteristics Annual Losses	Total Retained Losses Left Tail	Total Retained Losses Center	Total Retained Losses Right Tail
Max	Best Case	-273,808	-273,808	-273,808	-223,808
	Mean	-3,608,389	-3,558,389	-3,558,389	-3,558,389
Min	Worst Case	-7,743,403	-4,693,545	-7,638,575	-7,693,403
	Std Dev (σ)	894,000	806,265	852,778	894,000
5.0%	VaR	-5,106,684	-4,693,545	-5,001,856	-5,056,684

Change in Std Dev	87,735	41,222	0
Change in Std Dev (%)	-10%	-5%	0%
RF-Efficiency	1,755	824	0
Change in VaR	413,139	104,828	50,000

To accomplish a goal of maximizing risk reduction given a budget constraint, Goal Seek is a very useful Excel function. Use Excel's Help (or the internet) to learn the basics of the Goal Seek function. Then use Goal Seek to set the expected cost of the left-tail risk transfer to $50,000 by having Goal Seek change the retention[35]. Calculate the reduction in risk (i.e., change in σ) and the RF-Efficiency for this risk transfer. Then compare your results to those in the column labeled "Left Tail" in Figure 12.

Use Goal Seek for the "Center" risk transfer as well. For this risk transfer, however, set your retention level back to $3.6 million and use Goal Seek to achieve a $50,000 expected cost by changing the limit of insurance. Calculate the reduction in risk (i.e., change in σ) and the RF-Efficiency for this risk transfer. Then compare your results to those in the column labeled "Center" in Figure 12.

Objectives for Practice Exercise:

1. Determine which part of the WC distribution should be targeted with a risk transfer to generate efficient risk reduction.
2. Practice working with the Excel tool, ***RiskFinTool***.
3. Learn how to use Excel's Goal Seek function.

Practice Exercise - Question(s) for reflection or discussion:

1. Why is targeting the left tail of the WC distribution more efficient at reducing risk than targeting other areas of the distribution?

[35] Note that the Goal Seek function will only modify one cell to help obtain the target result. If the cell to be modified contains a formula, you will receive an error. Be certain that all other cells you need to adjust to define your risk transfer are set appropriately before you use the Goal Seek function. Thus, you are encouraged to get "close" to the answer by manually adjusting retentions and limits. Then, get precise by using the Goal Seek function.

Exercise #1 – Auto Liability (AL) risk

Our objective for this exercise is to determine which part of a risk's distribution should be targeted with a risk transfer to generate efficient risk reduction. Unlike the practice exercise, however, the answers will not be provided.

Exercise #1 Instructions (AL)

Task: Try a risk transfer that targets each area of the risk's distribution (e.g., right tail, left tail, or center). Determine which has the greatest impact on reducing risk. Calculate the RF-Efficiency of each risk transfer.

Constraints: Limit the expected cost insurance to no more than $50,000.
Suggestions/hints: Set the "Risk Transfer On/Off:" field to ON = 1". Set the "Loading %" = 0. Use Goal Seek to utilize your full risk financing budget.
Working Tab: RiskFinTool.SingleRisk-AL

Exercise #2 – Premium Loadings (AL)

Our objective for this exercise is to understand the impact of premium loadings on the ability of risk transfers to reduce risk efficiently. Premium loadings cover the insurer's operating expenses and expected profits[36]. In this exercise, we calculate an estimate of premium loadings and incorporate the estimate into the model. Then we assess the impact of premium loadings on risk reduction (i.e., reduction in σ) and RF-Efficiency.

Exercise #2 Instructions (Premium Loadings)

Tasks: Use several years of recent P&C industry results to estimate a premium loading for the property and casualty insurance industry. The Insurance Information Institute publishes relevant industry data (insert desired year in URL):

- For years 2001 – 2015: http://www.iii.org/article/2015-year-end-results (see table at bottom of page)
- For years 2016 – present: https://www.iii.org/article/2016-commentary-on-year-end-financial-results (see table at bottom of page)

Net Earned Premiums = (1 + Loading %) * Incurred Losses (Including loss adjustment expenses)

This is analogous to the formula for industrial firms, Revenue = (1 + Markup %) * COGS (Cost of Goods Sold),.

Set the "Loading %" in ***RiskFinTool.SingleRisk-AL*** equal to your estimate. Try a risk transfer that targets the left tail of the AL distribution. Assess the impact of premium loadings on risk reduction (i.e., reduction in σ) and RF-Efficiency.

Constraints: Limit the expected cost insurance to no more than $50,000.
Suggestions/hints: Manually change the year in the internet address of III's year-end results to obtain results from a different year. Results go back to 2001. Set the "Risk Transfer On/Off:" field to "ON = 1". Use Goal Seek to utilize your full risk financing budget.
Working Tab: RiskFinTool.SingleRisk-AL

Exercise #2 - Question(s) for reflection or discussion:

1. Consider the impact of premium loadings on the efficiency of risk reduction with insurance as a hedging mechanism. Consider how premium loadings impact a corporation's optimal risk financing strategy.
2. Read and reflect on the costs and benefits of transfer versus retention.
3. Consider how taxes might play a role in risk financing decisions.

[36] Premium loadings can also be viewed as risk premiums that compensate the insurer for bearing the transferred risk.

4. How do Net Earned Premium and Incurred Losses (including ALAE) compare with Revenue and COGS?

Challenging question(s):

5. What assumptions are made by the Excel model (***RiskFinTool***) to estimate a hedge's "Expected Cost"? In what ways are these assumptions realistic and/or unrealistic? How could the ***RiskFinTool's*** estimate of "Expected Cost" be made more realistic?

Exercise #3 – Risk financing within the Hazard-Risk-Portfolio (HRP)

Now that we've examined how to optimize the hedging of an individual risk, let's explore what new issues and opportunities arise when a risk manager is responsible for hedging a collection of hazard risks. In this exercise, we assume the risk manager is responsible for managing the firm's three hazard risks (WC, AL, GL[37]) which form the "hazard-risk-portfolio" (HRP)[38]. Our objective for this exercise is to determine which risk(s) within the hazard-risk-portfolio should be prioritized for risk transfer and why.

Figure 13. Hazard-Risk-Portfolio summary statistics

The worst case for each individual risk is summed to negative $47,288,653. When viewing the three risks as a portfolio, however, the worst single year is a loss of $29,874,419. This difference reflects the risk reduction through diversification in the portfolio.

It may be useful to inspect the Excel formulas to understand this difference.

Sums of Individual Risks		Total Losses Hazard-Risk Portfolio (HRP)		Net of Risk Tran. Hazard-Risk Portfolio (HRP)
-296,778	Best Case	-1,114,196		-1,114,196
-5,843,952	Mean	-5,843,952		-5,843,952
-47,288,653	Worst Case	-29,874,419		-29,874,419
3,341,184	Std Dev	1,893,091		1,893,091
-15,458,188	VaR	-11,315,471		-11,315,471

Note that in this exercise, we have two new columns in the **Annual Data** section of ***RiskFinTool.HazRiskPort-Monoline***. The two new columns are **Total HRP Losses** and **Total Retained HRP Losses**. These new columns combine the three hazard risks into a portfolio. For each year, the **Total HRP Losses** is calculated as the sum of the WC, AL and GL losses in that same year. Similarly, **Total Retained HRP Losses** is calculated as the sum of all losses and insurance indemnification cash flows.

Summary statistics are also calculated for these new data columns. Take some time to compare the new HRP columns with the sums of the same statistics for the three individual risks (see Figure 13). The risk reduction reflected in the summary statistics for the two new HRP columns illustrates the risk reduction via diversification in the hazard-risk-portfolio[39].

[37] General liability (GL) is a common hazard risk faced by firms.

[38] Corporate risk managers are commonly delegated the responsibility for managing the set of hazard risks. Typically, non-hazard risks are similarly delegated to other departments within the firm (e.g., financial risks are often delegated to the finance department because of their familiarity with the set of financial risk transfer tools). Delegating risks to different departments is referred to as the "siloed" approach to risk management. This siloed risk management approach has disadvantages. A more holistic view of firm risks, enterprise risk management (ERM), enhances the prioritization of risks for treatment and the evaluation of risk financing strategies. We'll set aside these issues associated with the siloed risk management approach for now, but we will directly address them when shifting to an ERM perspective in later exercises.

[39] See Hoyt, Powell, and Sommer (2007) for additional explanation and related exercises.

Being responsible for managing the hazard-risk-portfolio, the corporate risk manager's budget reflects both the HRP retained losses and the cost of any risk transfers. That is, the risk management department "feels" the following impacts:

- Retained losses within the hazard-risk-portfolio. These losses are found and described in the column, "Net of Risk Transfers Hazard-Risk-Portfolio"
- The purchase price of any risk transfers. The cost of any insurance-style risk transfer can be found in the row labeled, "Expected Cost of Insurance Risk Transfer." ,

In this exercise, we will buy a risk transfer for each of the three hazard risks. The risk transfer should target the left tail of each distribution and the cost should stay within our budget constraint. For this exercise, we will assume the premium loading is 30%.

Exercise #3 Instructions (Hazard-Risk-Portfolio)

Tasks: Design an insurance risk transfer for each of the three risks. Stay within your budget constraint of $40,000 per risk. Evaluate the risk reduction (i.e., reduction in σ) and RF-Efficiency of each risk transfer.

Constraints: Limit the expected cost of insurance to no more than $40,000 per risk. For this exercise, use an assumed premium loading of 30% for all three risks.
Suggestions/hints: Set the "Risk Transfer On/Off:" field to "ON = 1". Use Goal Seek to utilize your full risk financing budget.
Working Tab: RiskFinTool.HazRiskPort-Monoline

Once all three risk transfers have been designed, use the field, **On/Off**, to turn on just one insurance policy at a time. Evaluate the risk reduction (i.e., reduction in σ) and RF-Efficiency of each risk transfer.

Now we should consider which single $40,000 insurance policy is reducing hazard risk the most. We can also consider which risk is most responsible for driving the tail risk[40] (σ) of the hazard-risk-portfolio. Which risk is second? If we were freed from the constraint of spending exactly $40,000 on each insurance policy, which risk would you prioritize when allocating your insurance dollars? The answers to these questions should aid us with the next exercise.

Exercise #3 - Question(s) for reflection or discussion:

1. Describe the difference between the sum of σ (Std Dev) for the three individual risks and the σ (Std Dev) for the hazard-risk-portfolio. Why do you think they differ?

Exercise #4 – Risk financing within the HRP (flexible budget)

In this exercise, we'll allow the budget to be allocated in a more flexible way across the three hazard risks. We'll maintain the same total budget for risk transfer of $120,000, but if we reduce what we spend on one risk transfer, we can use those funds to buy more insurance for another risk. The goal is to adjust the spending levels across the three insurance policies to maximize the risk reduction (lowest σ) given our budget constraint. Put another way, we are trying to improve our RF-Efficiency by changing how we allocate our insurance budget.

[40] "Tails" refer to the skinny end portions of a distribution. Here we are concerned with which risk is most responsible for those rare, bad outcomes that make up the left "tail" of the HRP.

For simplicity, we'll assume that insurance can be purchased in $10,000 increments. Thus, instead of spending $40,000 on each risk, you could spend $30,000, $50,000, $70,000, etc. Goal Seek won't be able to immediately produce the solution to this optimization problem as Goal Seek can't solve a system with multiple constraints. Goal Seek can, however, quickly generate insurance policies with different prices (i.e., Expected Cost).

So, how do we begin? Let's start with where we ended in the last exercise; let's start with a $40,000 insurance policy covering the left tail of each of our three risks. Which of the three $40,000 policies is most efficient at reducing risk? If we want to increase the risk-reducing efficiency of our collection of three policies, would it be reasonable to allocate more of our budget to the policy that's most efficient (and reduce the weight on the policy that's least efficient)? Thus, let's first try allocating (the minimum increment of) $10,000 more to GL and $10,000 less to WC. Does this change in allocation of our risk financing budget improve HRP risk reduction?

Exercise #4 Instructions (flexible budget HRP)

Tasks: Adjust your risk financing allocation in increments of $10,000 to optimize risk reduction within the HRP. Evaluate the risk reduction (i.e., reduction in the HRP's σ) and RF-Efficiency to determine the optimal set of risk transfers.

Constraints: Limit the total expected cost of insurance for all three risks to no more than $120,000. For this exercise, use an assumed premium loading of 30%.
Suggestions/hints: Start with a plan/strategy. Use Goal Seek to experiment with policies of different prices. Save (copy/paste) the settings for retentions and limits that generate policies with different prices – this can save time during the experimentation phase.
Working Tab: RiskFinTool.HazRiskPort-Monoline

Develop a strategy to find the optimum allocation of the risk financing budget. While implementing the strategy, recall the lessons learned in the practice exercise and make certain to adjust policy limits so that each policy is fully insuring the left tail of its risk. As new risk transfers are applied to the HRP, the retained portion of the HRP is constantly being modified. Thus, it may be useful to regularly reconsider questions from Exercise 3: At this stage, which single insurance policy is reducing hazard risk (σ) the most? Which risk is driving the tail risk (σ) of the hazard-risk-portfolio?

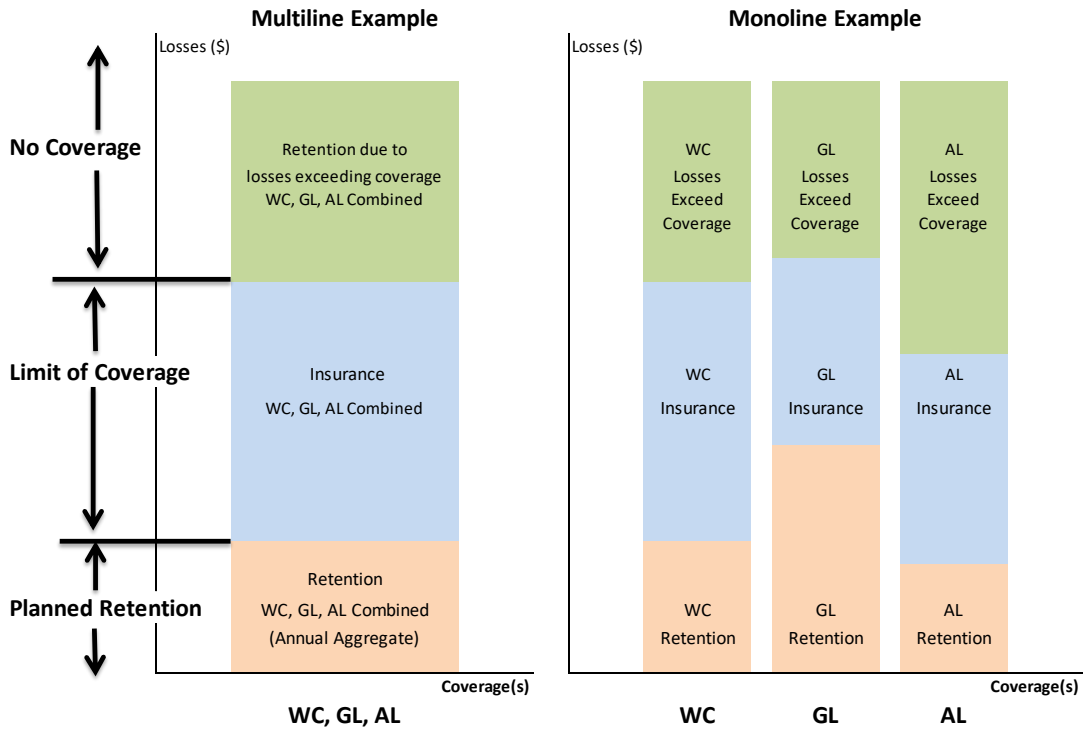
Exercise #5 – Multiline versus monoline risk transfers (HRP)

The objective of this exercise is to compare the results of Exercises 3 & 4 above (i.e., buying separate insurance policies for each risk) with the results one may obtain from purchasing a multiline risk transfer[41]. A multiline insurance policy covers multiple lines of insurance (e.g., WC, GL, AL) with a single retention and a single coverage limit (see Figure 14.).

[41] Multiline policies are available as risk financing tools in the commercial market, but they are surprisingly rare. Insurers may be reluctant to offer multiline policies as they often face internal barriers to offering multiline policies to large commercial customers; insurers often evaluate (and sometimes organize) their operations by line of insurance (pricing and underwriting). One could also argue that insurers face little incentive to offer multiline policies as giving credit to customers for diversification within the transferred risk would lower insurer revenues. Conversely, the theoretical advantages of multiline policies highlight a potential opportunity for insurers to offer value to customers by creating more competitively priced products for their customers. To offer an anecdotal case, The European division of Marsh negotiated with underwriters in the London insurance market to obtain multiline policies for large corporate clients who had sufficient loss experience to support actuarial pricing of a diversified HRP. This approach was used to great effect (at least in the late 1990's) to leverage the "credit" for diversification (and reduced transaction costs) to create more competitively priced solutions. Thus, multiline policies were used to create a win-win-win for the risk manager, broker and underwriter.

Figure 14. Multiline versus monoline risk transfers

Multiline policies use one contract with a single retention and limit to address multiple lines of insurance that would typically be covered with monoline insurance contracts.



Use ***RiskFinTool.HazRiskPort-Multiline*** to implement a single $120,000 multiline insurance risk transfer for the WC, GL, and AL risks. There are many useful ways to compare the results:

- Compare the reduction in HRP risk (σ) between Exercises 3,4, and 5;
- Compare the RF-Efficiency achieved in Exercises 3,4, and 5;
- Compare the graphs, "Probability Distribution of Hazard-Risk-Portfolio (Net of Risk Transfer)" between Exercises 4 and 5;
- Compare the expected impact on the risk manager's budget of the HRP and all risk financing purchased by completing the table below. Be sure to include the risk transfer costs where applicable.

Exercise #5 Instructions (Multiline HRP)

Tasks: Use Goal Seek to design a multiline risk transfer. Evaluate the risk reduction (i.e., reduction in HRP σ) and RF-Efficiency. Compare the results to monoline options.

Constraints: Limit the total expected cost of insurance to no more than $120,000. For this exercise, use an assumed premium loading of 30%.
Working Tab: RiskFinTool.HazRiskPort-Multipline

	100% Retention No risk transfer	Net of risk transfer (HRP) plus the cost of the risk transfer ($120,000)		
	Total Losses HRP	Exercise 3 ($40k/risk=$120k)	Exercise 4 ($120k/3risks)	Exercise 5 ($120k Multiline)
Best Case	-1,114,196			
Mean	-5,843,952			
Worst Case	-29,874,419			
Std Dev (σ)	1,893,091			

Exercise #5 - Question(s) for reflection or discussion:

1. Which risk financing approach is more efficient – insuring several hazard risks individually or directly insuring the hazard-risk-portfolio with a multiline policy?
2. What drives the more efficient risk financing approach?
3. Why add the risk transfer costs to the retained losses when evaluating the impact of risk financing options?
4. How do the loadings paid to insurers impact the risk manager's budget?

Challenging question(s):

5. Which approach would you select if you were the risk manager: retaining the HRP; insuring several hazard risks individually; or insuring the hazard-risk-portfolio with a multiline policy? Why?
6. What drives efficiency in risk financing?

Exercise #6 – Diversification and risk correlations (HRP)

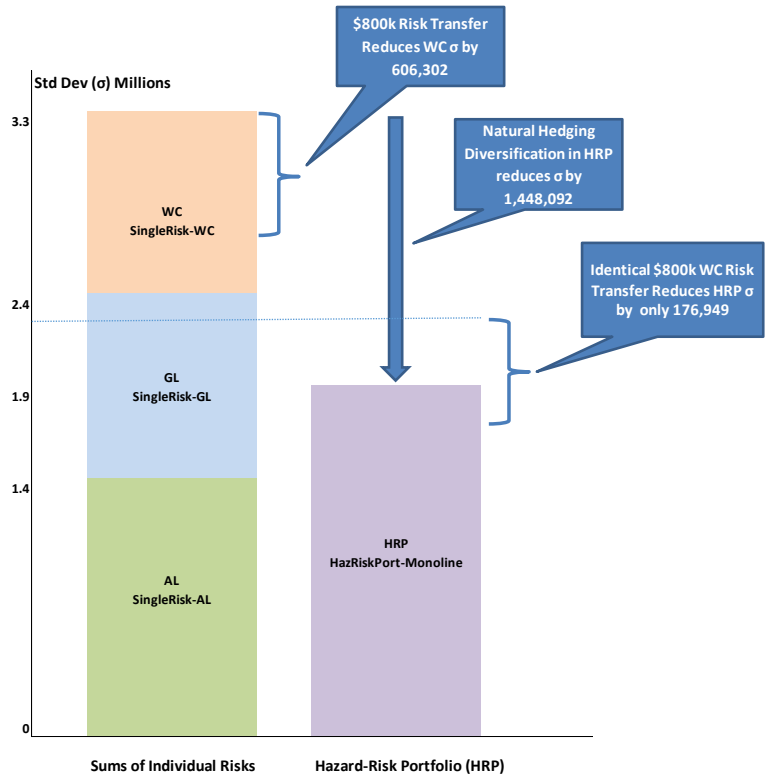
The objective of this exercise is to gain an understanding of how diversification plays a role in risk reduction.

People may prefer to view risks one at a time; it is a simple way to analyze and treat risks. When we take the perspective of a risk manager, however, it is necessary to consider the more complex portfolio (HRP) perspective. Being responsible for managing the hazard-risk-portfolio, the corporate risk manager's budget reflects the combined effect of all three risks, net of any effects from risk transfers. That is, the risk management department "feels" the impact of the combined hazard-risk-portfolio.

Figure 15. Diversification and RF-Efficiency

The chart below shows a graphical representation of the sum of risk (σ) (see Figure 13). The column, "Sum of Individual Risks", adds the risk (σ) of AL, GL, and WC. The column, HRP, displays the risk (σ) of the hazard-risk-portfolio. The solid blue arrow reflects the reduction in risk via diversification (a.k.a., natural hedging) amongst the three hazard risks.

The blue brackets indicate risk reduction achieved by hedging (via an insurance risk transfer) the WC risk. By creating identical WC insurance policies that cost $800,000 on ***SingleRisk-WC*** and ***HazRiskPort-Monoline*** worksheets (0% loadings), one can compare the relative efficiency of hedging the entire left tail of a risk versus hedging one component of a risk-portfolio. The reduced RF-Efficiency of hedging the WC component of the HRP is due to offsetting natural hedging occurring within the hazard-risk-portfolio.[42]



Using the "one risk at a time" perspective, we might be convinced that our hazard risk level (σ) is the sum of AL (σ) + GL (σ) + WC (σ) = 3,341,184. Figure 13 introduced us to the concept that the hazard-risk-portfolio contains less risk (σ) than the sum of WC, GL and AL risks due to the diversification from combining those three risks together to form the HRP. The risk (σ) within the unhedged HRP is 1,893,091. The blue arrow in Figure 15 is a graphical representation of the natural hedging (i.e., diversification) that occurs when evaluating the three hazard risks as a portfolio.

We learned (hopefully) in Exercise 5 that directly hedging the hazard-risk-portfolio was more efficient than hedging its component elements. Why is it so? Hedging individual components (e.g., WC) of a distribution offsets some of the natural hedging that occurs. If we inspect the data, we can readily locate such an example. Simulated year #7781 has a WC loss that exceeds $5.4 million but AL and GL losses combine for less than $50,000.

[42] The risk reduction associated with the WC risk transfer would be identical (in both cases) if all risks in the HRP were perfectly positively correlated.

Hence, this sample year illustrates a case where WC losses are in the extreme left tail of the WC distribution (greater than the 98% of simulated WC loss-years), but from the perspective of the HRP, it is a slightly better (smaller) than average year (loss); the $5,520,133 HRP loss in year #7781 is just below the mean HRP loss of $5,843,942.

Thus, hedging individual risks within the HRP generates inefficiency because such hedges use some of their resources to offset losses (like the WC loss in year #7781) that are not part of the left tail of the hazard-risk-portfolio; and as we learned in the practice exercise, it is more efficient to hedge events in the left tail of the distribution rather than events that are near the mean of the distribution. That is the essence of the advantage for the multiline policy. The multiline policy enables us to target solely the left tail of the HRP distribution. That is, the multiline policy doesn't lose efficiency in risk reduction through offsetting natural hedging[43].

Exercise #6A Instructions (Natural hedging and RF-Efficiency)

Tasks: Step1: Use Goal Seek to design a $50,000 WC risk transfer on SingleRisk-WC. Measure the risk reduction (i.e., reduction in WC σ) and RF-Efficiency. Step2: Use Goal Seek to design a $50,000 WC risk transfer on HazRiskPort-Monoline. Measure the risk reduction (i.e., reduction in HRP σ) and RF-Efficiency. Compare the results to evaluate the loss in efficiency.

Constraints: For this exercise, use an assumed premium loading of 0%.
Suggestions/hints: Be sure to turn off the GL and AL risk transfers when working on HazRiskPort-Monoline.
Working Tabs: RiskFinTool. SingleRisk-WC and HazRiskPort-Monoline

The blue brackets in Figure 15 illustrate the efficiency loss of hedging a component (WC) of the HRP. For this part of Exercise 6, we will replicate the same set of steps as those used to produce Figure 15, but we will use a slightly smaller budget ($50,000). Create two WC policies per the instructions and evaluate what happens to the reduction in risk (σ) and relative efficiency of a WC risk transfer when viewed from the perspective of its impact on the HRP. It might be helpful to compare the results to those displayed in Figure 15. If desired, one can replicate exactly the results in Figure 15 by creating identical $800,000 WC insurance policies (be sure to use 0% loadings for this exercise).

Thus far, all of our HRP findings are based upon the model we used to generate the data. For example, the unhedged HRP risk (σ) of 1,893,091 is based upon the assumption that our risks are modeled correctly. Our hazard risk data were generated through simulation with each risk being produced independently of the others. That process reveals an implicit assumption that there is no systematic relationship between our hazard risks. Is that accurate? What if our firm were a transportation company like UPS? Would we still expect AL and WC losses to be independently generated? Or would we expect most of our employee injuries to arise out of automobile accidents – suggesting a highly positive correlation between AL and WC risks?

[43] Inspecting year #7781 during Exercise #3 and Exercise #5 illustrates this difference.

For this part of Exercise 6, we will force strong negative and positive correlation among two of the risks to examine how changes to risk correlations impact the natural hedging within the HRP. Recall that the solid blue arrow in Figure 15 illustrates the risk reduction in the HRP due to natural hedging. Let's examine how that changes as we alter our assumptions about risk correlations.

Exercise #6B Instructions (changing correlations in HRP)

Step6B-1: Sort the column of AL losses from smallest to largest. Be certain to sort only the AL loss data. Sort the column of WC losses in the opposite way (from largest to smallest). Be certain to sort only the WC loss data. Review the HRP Summary Statistics to assess how natural hedging within the HRP changed.

Step6B-2: Leave the column of AL losses sorted from smallest to largest. Sort the column of WC losses from smallest to largest. Be certain to sort only the WC loss data. Review the HRP Summary Statistics to assess how natural hedging within the HRP changed.

Suggestions/hints: Be sure to turn off the GL and AL risk transfers when working on HazRiskPort-Monoline. Download a fresh copy of the RiskFinTool when done with this exercise – or if a mistake is made during the exercise.
Working Tabs: RiskFinTool. HazRiskPort-Monoline

Follow the instructions to first sort AL & WC risks in opposite directions. Then evaluate how changing the risk correlations impacted the natural hedging within the HRP. Then explore the case of the transportation company (like UPS or Federal Express) where we would expect a highly positive correlation between the AL and WC risks. Sort the AL and WC risks in the same direction, and then evaluate how positive risk correlations impacted the natural hedging within the HRP.

Exercise #6B-1 - Question(s) for reflection or discussion:

1. After sorting the AL & WC risks in opposite directions, what happened to the natural hedging within the HRP?
2. Which risk do you believe is now most responsible for driving the tail risk (σ) of the hazard-risk-portfolio? To check your answer, try re-running the test in Exercise 3 with the sorted data.

Exercise #6B-2 - Question(s) for reflection or discussion:

3. After sorting the AL & WC risks in the same direction, what happened to the natural hedging within the HRP?
4. Which risk do you believe is now most responsible for driving the tail risk (σ) of the hazard-risk-portfolio? To check your answer, try re-running the test in Exercise 3 with the sorted data.

Challenging question(s):

5. Sort all three HRP risks from largest to smallest and examine the summary statistics. Calculate a correlation matrix Explain the results.
6. Calculate the correlations amongst the hazard risks prior to any sorting and after each sort. Build corresponding correlation tables.
7. After each sort, optimize risk financing of the HRP with a $120,000 budget constraint (as we did in Exercise #4). Under what conditions was risk financing most efficient: zero correlation; WC & AL risks negatively correlated; WC & AL risks positively correlated? Why?
8. As correlations amongst the risks change, how does that impact the RF-Efficiency advantage of the multiline policy?

Exercise #7 – Retention levels

The objectives of this exercise are to analyze various retention levels and assess the impact of retention level on:

- The firm's retained range of risk costs (i.e., best case, worst case, and expected risk costs);
- The cost and efficiency of risk transfer.

Exercise #7 Instructions (vary retention levels)

Tasks: Compare the impact on the risk manager's budget of four (4) different retention levels:

- 100% retention;
- "Large" retention = 1 std. dev. larger than the mean loss;
- "Average" retention = mean loss;
- "Small" retention = 1 std. dev. less than the mean loss.

Also calculate the loadings ($) kept by the insurer as part of each risk transfer.

Constraints: For this exercise, use an assumed premium loading of 30%.
Suggestions/hints: Note that in this exercise we assume the firm's risk tolerance is driving the evaluation of retention levels. There is no budget constraint for this exercise, so there is no need to use Goal Seek.
To see the impact to the budget, be sure to add the costs of risk transfer to the best case, mean, and worse case outcomes (and VaR if applicable). Loadings ($) can be calculated multiple ways. One way is: Loadings ($) = Insurance Premiums – Expected Loss Costs.
Working Tabs: RiskFinTool. HazRiskPort-Multiline

For this exercise, we will vary our retention levels when hedging the HRP using a multiline insurance policy. Start with the default scenario of 100% retention. Then vary the risk financing structure by gradually decreasing the retention from "Large" to "Small": first, set the "Large" retention to one standard deviation more than the mean loss level; then set the "Average" retention to the mean loss level; and lastly, reduce the "Small" retention to one standard deviation less than the mean loss level. At each step, document the following:

- The risk financing structure;
- The risk financing costs (with a 30% loading);
- The impact on the risk manager's budget. This means not only documenting the range of loss outcomes, but also incorporating the risk financing costs.
- The total amount of loadings ($) paid to the insurance company as part of the risk transfer.

Evaluate the tradeoffs between retention and transfer. While doing so, compare the differences in the mean impact on the budget to the loadings ($) paid to the insurance company.

Exercise #7 - Question(s) for reflection or discussion:

1. If you were the risk manager, which retention level would you chose? Motivate your answer.
2. How much expected profit would you be willing to give to an insurance company in order to transfer the risks from your balance sheet to the insurance company's? How does that answer change as you consider different sized balance sheets? How does that answer change as you consider balance sheets with different leverage/liquidity?

Exercise #8 – Operationalizing firm risk tolerance (HRP's impact on EPS)

The objective of this exercise is to evaluate retention levels based upon the firm's risk tolerance. We'll describe a scenario where a Chief Financial Officer (CFO) defines the firm's risk tolerance by constraining the impact of unplanned, retained HRP costs on the firm's EPS to no more than 1%. We will then need to design a risk financing structure that addresses the firm's stated risk tolerance.

Company Profile: Costanza-Cartman Inc. (CCI), is a cheese and sausage (primarily bratwurst) manufacturer based out of Sheboygan, Wisconsin. The founding partners, G. Costanza and E. Cartman, met at a regional polka festival during the summer of '69 and decided to start a new company to pursue their shared passions. Apart from a misguided (and failed) venture into a cow-themed clothing line during the early 90's, CCI has steadily grown into a significant purveyor of high-end cheese and sausage products throughout the U.S. as well as in select international markets.

Case Background: CCI's new CFO, Ms. Simpson, has been evaluating a proposal to significantly increase the firm's retentions for hazard risks and ultimately conduct a captive feasibility study. The proposal was submitted by CCI's risk manager, S. Griffin. Mr. Griffin is responsible for managing CCI's hazard risks.

Ms. Simpson responded positively to the proposal. She agrees that increased retentions can increase efficiencies that will improve CCI's bottom line without unduly threatening CCI's balance sheet. She further agrees that increased retentions combined with the proposed cost-of-risk allocation will reduce moral hazard costs and drive employee incentives to promote a culture of risk management throughout the organization – ultimately reducing long-run costs associated with hazard risks.

Case Problem: Ms. Simpson understands that significantly increasing retentions will require capital to establish sustainable funded loss reserves[44]. Thus, Ms. Simpson asks Mr. Griffin to prepare a plan that will meet the following guidelines as efficiently as possible.

Establish a single, funded loss reserve to cover CCI's hazard-risk-portfolio (i.e., GL, AL, & WC). The initial reserve should be sufficiently large to be adequate for next year's HRP loss experience with 70% confidence. Ms. Simpson is using a 70% confidence level for two reasons:

1. She ultimately wants to establish a sustainable loss reserve. Starting with a 70% confidence level means that in most years, there will be excess capital that will help the reserve fund build to an adequate level over time.
2. Once her budgets are established, she does not want to incur "significant surprise expenses". Surprise demands for capital impair her ability to execute the capital budgeting plan.

Mr. Griffin clarifies "significant surprise expenses" as follows:

- Significant means more than 1% of CCI's EPS.
- "Surprise" costs are defined as any retained losses in excess of the planned, funded reserve.

All other costs (i.e., the funds to establish the reserve and insurance expenses) would be planned and thus, be incorporated into the budget.

Our job is to assist Mr. Griffin in meeting the guidelines. Thus, our task is to develop a risk financing structure that:

[44] The sustainable funded loss reserves would also support the formation of a captive should CCI choose that route after conducting the feasibility study.

- Maximizes risk financing efficiencies by minimizing loadings ($) paid to insurers;
- Constrains retained losses in excess of the reserves to no more than 1% of forecast EPS;
- Incorporates a planned, funded retention level that will equal or exceed next year's HRP losses with 70% confidence.

Case Facts and Assumptions:

Use the following facts and assumptions to facilitate the analysis.

- EPS is forecast to be $3.60/share;
- Outstanding shares = 100,000,000;
- Premium loadings = 40%;
- The funded loss reserve should be rounded ***up*** to the nearest $100,000 increment.

Exercise #8 Instructions (HRP's impact on EPS)

Tasks: Determine the size of the initial funded loss reserve. Design an insurance risk transfer that meets the guideline that any retained losses in excess of the reserve must be no more than 1% of forecast EPS.

Constraints: For this exercise, use an assumed premium loading of 40%. Round the funded loss reserve up to the nearest $100,000.
Suggestions/hints: Calculate the size of the funded loss reserve (Hint: You can use VaR to help you. Use it carefully! Ask yourself if the reserve should be larger or smaller than the mean HRP loss). Then calculate the maximum size of a "surprise" loss. Then use those two pieces to help you design a risk financing structure.
Working Tabs: RiskFinTool. HazRiskPort-Multiline

Exercise #8 - Question(s) for reflection or discussion:

1. Why was the multiline policy tool used for the solution to this case exercise instead of the monoline policy approach?
2. The solution for this exercise was generated with the assumption that the simulated risks gave us complete and perfect information about the HRP. How might your approach to a solution change if you remove this assumption? For example, what if we aren't certain about our distribution assumptions for the hazard risks (i.e., we allow that we may have modelling error)? What if the GL risk is viewed as dynamic?

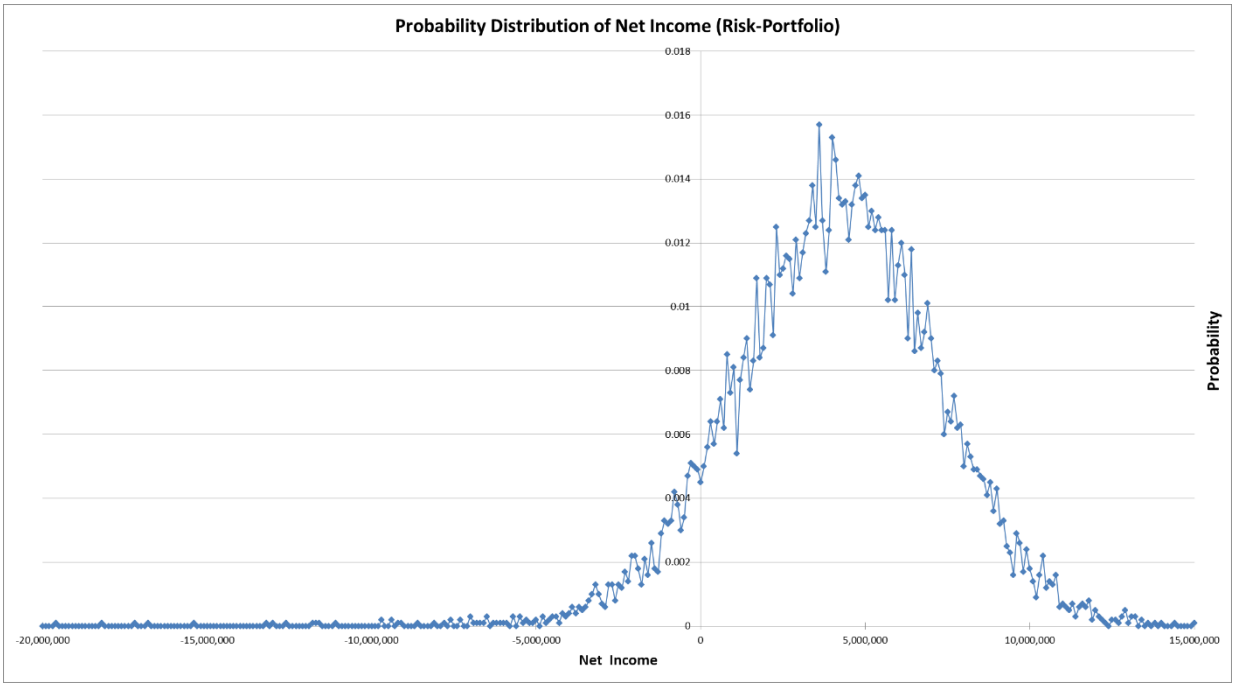
Discussion: "siloed" RM versus ERM

This section is designed to help us shift our perspective from the traditional "siloed" approach to a more holistic, enterprise risk management (ERM) approach. That is, we need to shift our thinking from being focused on managing hazard risks to managing all the firm's risks.

The value proposition for corporate risk management is theoretically driven by managing the total risk of the firm (i.e., the firm's earnings volatility) rather than individual risk components that contribute to the firm's earnings volatility. Firms with smooth cash flows have lower contracting costs, expected tax liabilities, and financial distress costs, suggesting that managing the total risk of the firm adds value.[45] Thus, if we want to use risk financing to support value maximization, we need to look beyond the hazard-risk-portfolio and consider all of the firm's risks, the firm's risk-portfolio (RP).

Figure 16. The risk-portfolio (RP)

The risk-portfolio graph below shows the firm's distribution of earnings[46]. Similar models of risk-portfolios have been used in practice by insurers/reinsurers to discuss strategy in Board meetings and with shareholders. The theoretical value proposition for corporate risk management comes (primarily) from mitigating the tail risk of the risk-portfolio. As tail risk is mitigated, the benefits of additional risk management decline and the costs of further risk mitigation increase. Thus, there is a theoretical optimum level of risk management.



In this assignment, we've already made one change in perspective; we've transitioned from thinking about risks one at a time to viewing them as a portfolio, the hazard-risk-portfolio. We made this shift in perspective because looking at just one risk leaves us ignorant of other hazard risks and the natural hedging that occurs within the portfolio of hazard risks. Our exercises showed that ignoring the natural hedging within the HRP can lead us into making sub-optimal decisions as risk managers.

[45] Academic articles covering this theory include Mayers and Smith (1982) and Smith and Stulz (1985).
[46] The risk-portfolio may also be viewed as Earnings at Risk (EaR). See the ARM 54 text, Risk Management Principles and Practices, 2nd Edition, pages 4.19-4.21.

Similarly, focusing on the HRP leaves us ignorant of the other risks outside the "silo" of hazard risks (e.g., FOREX, commodity risk, etc.). By focusing on just one silo of risks, we are once again left ignorant of the natural hedging occurring between the risks within our silo (e.g., the HRP) and other risks throughout the organization. This myopic perspective can also lead to sub-optimal risk management decisions.

Lufthansa offers an example where its finance department actually increased the total risk of the firm by implementing a "well-motivated" hedge on one of the risks within its silo. In 1984, the finance department at Lufthansa, a German airline, implemented a hedge to mitigate its foreign exchange-rate risk. Lufthansa had just purchased a number of aircraft from Boeing. The contract was valued in $U.S. and payment was to be made upon the delivery of the planes. Lufthansa "… hedged this exposure by acquiring a forward contract for $ 1.5 billion. Thus, if the dollar strengthened, the firm would lose on its aircraft contracts (which would cost more in D-marks than when the deal was struck) but gain on the forward contract. On the other hand, if the dollar weakened, the firm would lose on its hedge but gain on the aircraft."[47]

From the silo of Lufthansa's finance department, this hedge makes a lot of sense; the hedge was designed to reduce exchange-rate risk. This is an excellent example of a department effectively identifying, analyzing, and treating one of the risks within its silo. If all we were concerned about was the effectiveness of risk management within the finance department silo, then the analysis would end here. If our objective is to maximize firm value, however, we need to be concerned about managing risk to Lufthansa's earnings. Thus, our analysis of this risk management strategy needs a broader perspective.

That broader perspective reveals that Lufthansa's earnings were highly, positively correlated to the relative strength of the dollar. When the deutsche mark was strong, Lufthansa's ticket prices were less attractive and operating expenses were relatively high. Thus, a strong deutsche mark yielded low profits. Conversely, when the deutsche mark was weak, Lufthansa's earnings grew. Thus, the contract to purchase Boeing airplanes was, in effect, a 'natural hedge' that helped stabilize Lufthansa's earnings irrespective of which direction the exchange rate (i.e. deutsche mark to dollar rate) moved. So with this new, broader risk management perspective, we are better able to evaluate Lufthansa's hedging decision. The implemented exchange-rate hedge counteracted a 'natural hedge,' and by doing so, it actually had the unintended effect of increasing Lufthansa's earnings volatility.

The ERM approach seeks to aggregate all of the firm's risks into a single portfolio to facilitate risk management decisions. This broader ERM perspective enhances a firm's ability:[48]

- to recognize and leverage natural hedges;
- to prioritize which risks need hedging (or other treatment);
- to evaluate which hedging instruments add value most efficiently.

Exercise #9 – Enterprise Risk Management (ERM)

This section is designed to help us examine the role of the Chief Risk Officer (CRO), who is responsible for managing firm risk. To facilitate our analysis, we assumed all of the firm's risks fall into one of the following two categories:

- The firm's core risk. Core risk is often viewed as the risks retained to achieve the firm's operating margin. Auto manufacturers would consider the design, engineering, manufacturing, marketing and distribution of automobiles as their core risks. These are the risks the firm has a comparative advantage in retaining; retaining

[47] Bishop (1996) details this Lufthansa case.
[48] See Eckles, Hoyt, and Miller (2014) for discussion of the economic impacts of adopting the ERM perspective.

these risks is exactly why the firm is in business; they drive profits. Thus, core risks are not typically hedged.[49]

- The firm's non-core risks:
    - The three hazard risks that comprise the HRP (AL, GL, WC);
    - Three financial risks (FOREX, Commodity, and Asset Valuation).

The combination of core risk and non-core risks makes a portfolio of all firm risks. This portfolio is referred to as the firm's risk-portfolio, and its distribution may be considered the firm's distribution of net income (see Figure 16). Use ***RiskFinTool.Risk-Portfolio*** to aid in responding to this exercise's questions.

Exercise #9 Instructions (ERM)

Question #1: Which two non-core risks are most responsible for driving the left tail of the risk-portfolio? How did you arrive at your answer?

Question #2: What happens when you hedge only the FOREX risk? Why?

Question #3: Recall class discussion about the risk management value proposition for publicly-traded firms. Think about how risk management drives firm value. Which single $50,000 hedge would generate the most value? Which single $50,000 hedge would generate the least value? Motivate each answer.

Constraints: For this exercise, use an assumed premium loading of 40%.
Working Tabs: RiskFinTool.Risk-Portfolio

Exercise #9 - Question(s) for reflection or discussion:

1. Which risks should be prioritized for risk financing?
2. How might a CRO use this model to answer questions such as:
    a. Which hedging instruments are most useful in mitigating firm risk?
    b. To what extent should we hedge any non-core risk?
3. Consider how such a model can inform strategic questions.
    a. How would diversifying our product mix and/or distribution channels impact the firm?
    b. Can we or should we adopt risk-adjusted performance metrics (RAPMs)?

[49] Financial institutions serve as a notable exception. For example, P&C insurers commonly use reinsurance to hedge a portion of their core risk.

Exercise #9 - Discussion opportunity:

1. Evaluate the case against using such a model to direct risk financing strategy. The following potential concerns may be useful:
    a. Modelling error;
        i. Correlations;
        ii. Dependencies;
    b. "Delusional exactitude;" or "Beware of geeks bearing models;" or "Do you know what you don't know?"[50]
2. Evaluate the rebuttal. What are your concerns with NOT using such a model to direct risk financing strategy?
    a. One can attempt to explicitly control for modelling error:
        i. Using statistical tools;
        ii. Holding additional capital in reserves as a buffer to the impacts of modeling errors;
        iii. Being conservative in your application of the model's findings. This is essentially acknowledging that using a model to develop a point estimate doesn't require one to use the point estimate to guide strategy – one may be more conservative than the point estimate.
    b. One can build a model that has errors, and continuously improve one's understanding by learning from those errors over time. Alternatively, one may choose to remain ignorant of the risk-portfolio. Don't fall prey to a false choice! The alternative to modeling risk is not a world devoid of modeling error. The alternative is ignorance.
        i. Ignorance of, and inability to exploit, natural hedges;
        ii. Inability to learn from evaluating the model's performance (whether good or bad performance) over time.

[50] This series of phrases in quotations are paraphrases of quotes by (in order) Sir David Cox, Warren Buffet and Donald Rumsfeld.

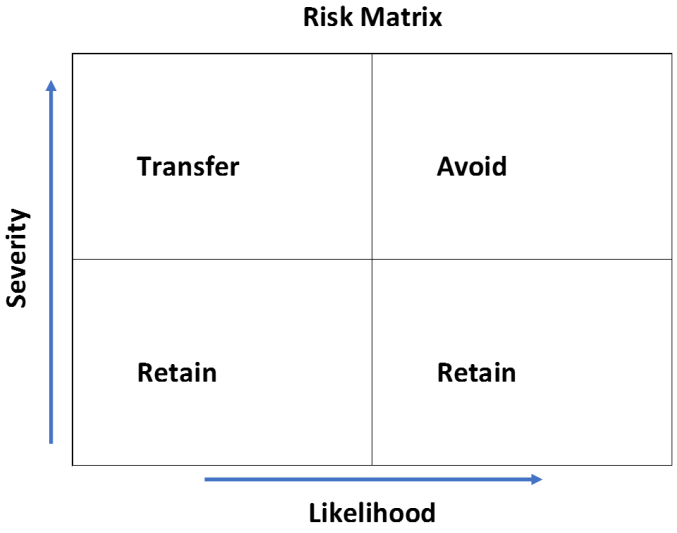
Appendix A – Highlighted assignment assumptions & notes

The assignment and the ***RiskFinTool*** seek to find the right balance between realism and usefulness as a teaching tool. Thus, numerous assumptions have been made to facilitate learning in this assignment. Some highlighted examples are listed below:

1. **Insurance-style risk transfer with annual aggregate limits and deductibles/retentions:** The primary risk financing tool utilized in this assignment is an insurance-style risk transfer with an annual aggregate deductible and an annual aggregate limit of coverage. This restriction makes it simpler for students to understand both the risk transfer's cost and its impact on the risk.
2. **A Risk Transfer's "Expected Cost" equals expected indemnification cash flows:** The insurance-style risk transfers are priced (i.e., the Expected Cost of Insurance Risk Transfer is calculated) solely based upon the expected indemnification cash flows provided by the risk transfer. The assignment does allow for the risk transfer's price to be increased based upon an optional fixed loading percentage to reflect expense, profit, risk premia and other loadings.
    - One may notice that there is no increase in risk premia charges for purchasing limits well in excess of the maximum loss. While it may be more realistic to incorporate additional risk premia charges for increased policy limits in excess of the maximum loss, the value of the additional realism is deemed to be more than offset by the costs of complexity.
3. **RiskFinTool** is not protected. This allows students to see the Excel formulas and experiment with edits to formulas. If a student becomes worried that changes made damaged the tool in any way, the student may simply re-download ***RiskFinTool***. The exercises in this assignment are sufficiently independent from one another so there is little (or no) cost from starting over with a fresh copy of ***RiskFinTool***.
4. **Risk distributions and correlations:** The data are simulated firm-year observations generated as random draws from assumed distributions. To produce the simulated data, each risk is assumed to have a known distribution and parameters. For example, the WC risk is assumed to be normally distributed with a known mean and standard deviation. Further, the risks' distributions are generated independently, implying no known correlations between the risks. These modelling assumptions can include significant flaws (a.k.a. modelling error) that may lead to incorrect inferences (e.g., the modeled risks might overstate the extent of natural hedging). It is important to be aware of, and control for potential sources of modelling error. To enable a teachable moment regarding modeling error, this assignment does include exercises designed to challenge assumptions about risk correlations and highlight their potential impact on inference.
5. Core Risk is defined (on the ***Risk-Portfolio*** worksheet) as operational results apart from other, specified risks. Conceptually, core risks are those that firm believes it has a comparative advantage in bearing (e.g., making and selling widgets). Thus, core risks are the risks that drive the long-run value of the firm. Hence, the "Risk-Portfolio" is the combination of all risks of the firm. It is the result (i.e., net income) realized by the firm.

Appendix B – Risk Matrix and the Prouty Approach[51]:

It is generally recommended to consider risk transfer for risks with low probability and high severity. Intuition suggests risks with low severity (e.g., broken plates at a restaurant) can be easily retained, whereas risk transfer is better suited for infrequent, severe events (e.g., a tornado).



The Prouty Approach

Loss Severity	Loss Frequency: Almost Nil	Slight	Moderate	Definite
Severe	Transfer	Reduce or prevent	Reduce or prevent	Avoid
Significant	Retain	Transfer	Reduce or prevent	Avoid
Slight	Retain	Retain	Prevent	Prevent

[51] The Prouty Approach is from the ARM 56 text, Risk Financing, 6th Edition, page 1.15.

Appendix C – Tips on targeting the left tail, right tail, or center of a distribution:

Below are instructions for targeting a specific area of a risk's distribution. You are encouraged to review the Practice Exercise (WC) as the instructions for that exercise walk you through the steps with sample data. For reference, however, the basic steps will be repeated here.

Please note that when using Goal Seek, the cell to be changed by Goal Seek must not contain a formula. Goal Seek will return an error if the cell it is to modify contains a formula instead of a value. So if you want to set the retention equal to the mean of the risk, be sure to copy/paste values rather than using the equal sign "=" to create a cell reference.

Targeting the left tail of a distribution (with a budget constraint):

1. Set your Annual Aggregate Retention to a "reasonably high" level to start.
    a. It doesn't need to be precise because if you're targeting the left tail, you will eventually ask Goal Seek to adjust the Annual Aggregate Retention level to meet your budget constraint.
    b. The risk's mean plus one (or two) standard deviations should work as a "reasonably high" level to start your retention.
2. The key to targeting the left tail is to make sure your limit of coverage is sufficient to cover the most severe outcomes.
    a. Set the Insurance Limit of Coverage to a level that is sufficiently large to cover the risk's worst case event.
    b. Remember that for these exercises, there is no cost associated with coverage limits that exceed the risk's worst case event[52].
3. Use Goal Seek to move your retention level until your budget restriction is satisfied.
    a. Once Goal Seek has adjusted your retention level, confirm your limits are large enough to still cover the worst case events for your risk. If not, increase your limits and use Goal Seek again. If so, you've designed a financing structure that will "chop off" the left tail.
    b. In some cases, there are tools that will confirm you've successfully "choped off" the left tail. On certain tabs (i.e., SingleRisk-WC, SingleRisk-AL, SingleRisk-GL, HazRiskPort-Multiline) you are directly hedging the risk being graphed. Thus, you can confirm your success in the following ways:
        i. Inspect the graph of the hedged risk for visual confirmation.
        ii. Inspect the worst case for the hedged risk (i.e., the Net of Risk Transfer column). If you've targeted the left tail correctly, the worst case of the hedged risk should not exceed the Annual Aggregate Retention level.
    c. A common mistake made by students is setting the Annual Aggregate Retention to a positive rather than negative value. A positive value for the Annual Aggregate Retention will not allow Goal Seek to find a solution.

Targeting the left tail of a distribution (without a budget constraint):

1. The left tail includes the most severe outcomes. Thus, set your Annual Aggregate Retention to your desired retention level.
2. Set the Insurance Limit of Coverage to a level that is sufficiently large to cover the risk's worst case event.

[52] See Figure 7, Calculating the Expected Cost of Insurance Risk Transfer. As noted in appendix A, there are tradeoffs between realism and facilitating learning. While it may be more realistic to incorporate additional risk premia charges for increased policy limits in excess of the maximum loss, the value of the additional realism is deemed to be more than offset by the costs of complexity.

Targeting the right tail of a distribution (with a budget constraint):

1. The right tail includes the least severe outcomes. Thus, set your Annual Aggregate Retention to 0.
2. Use Goal Seek to move your Limit of Coverage until your budget restriction is satisfied.

Targeting the center of a distribution (with a budget constraint):

1. Set your Annual Aggregate Retention to the mean of the risk's distribution.
2. Use Goal Seek to move your Limit of Coverage until your budget restriction is satisfied.

Appendix D – Creating simulated risks via random draws from a distribution:

When working with the normal distribution, one can readily answer the following types of problems:

- Given a normal distribution (i.e., mean and standard deviation), calculate the probability that outcomes will be below the value, x.

A simple example would be:

- Given WC losses for ABC Company are normally distributed with a mean of $3,600,000 and a standard deviation of 900,000, what is the probability that WC losses will be below $4,500,000?
- To solve this problem in Excel, try using the normal distribution function (NORM.DIST) with the parameter, Cumulative set equal to 1.

Our approach to simulate risks is very similar; we'll do the same problem but go in the opposite direction. Let's use the same simple example to illustrate:

- Given WC losses for ABC Company are normally distributed with a mean of $3,600,000 and a standard deviation of 900,000, what are the losses if the probability was randomly determined to be 0.84?
- To solve this problem in Excel, try using the inverse of the normal distribution function (NORM.INV).

Go to the Risk-distributions tab of the Excel tool. Here you will see the formulas that were used to simulate the risks in this assignment. We use the RAND() function to create a random number (between 0 and 1) that we then use as the randomly generated probability. We then use the inverse of the distribution function to determine what the losses would be given the randomly generated (cumulative) probability. We can copy the formulas down to create 10,000 years of simulated WC loss data.

Optional Exercise D - Simulate a new WC risk via random draws from a distribution

Simulate a normally distributed WC risk with a mean of $8,000,000 and a standard deviation of 2,000,000.

Working Tabs: RiskFinTool.Risk-Risk-distributions

Optional Exercise D - Question(s) for reflection or discussion:

1. Why did we set the parameter, Cumulative equal to 1?
2. Why were random number generators created for each risk? What would happen if we used the same column of random numbers for every risk?
3. How could we create simulated risks that have specific correlations with one another?
4. What's the purpose of the scale multipliers?

Instructor's Manual

We designed the set of Risk Financing Simulation Exercises to help students learn. We welcome the opportunity to assist other instructors with adopting these exercises for use with their students. Please do not hesitate to contact the authors should you have any questions.

This instructor's manual includes:

- **Quick start guide**
  - Recommended steps for quickly getting 'up and running' with these exercises.
- **Suggested implementation approaches the authors have found effective**
  - Introducing the assignment to students
  - Giving students a helpful guide
  - Challenging students
- **Highlighted opportunities to incorporate the exercises into the curriculum**
  - Risk Financing
  - Corporate Risk Management
  - ERM
  - Synergies with data analytics courses
  - Address learning goals related to Excel
- **Assessing individual student learning**
  - Modified data sets
  - Modified assignment exercises
  - Discussion topics
- **Student response forms.**
  - Template assignment forms you can give students to submit their responses to assigned exercises.
  - Student Feedback Survey. Allow students the opportunity to give feedback on the value of the assignment and the quality of the instructions.
- **Answer key to all exercises using the default set of simulated risks**
  - Answers provided for the template assignment forms to facilitate grading
  - These answers may be useful in reducing the time and effort required for an instructor to become familiar with the exercises.
  - Instructors have the option to share these answers with students to help them confirm (as practice) that they are executing the exercise(s) correctly. An instructor could then assign (for grade) slightly different tasks or use a different set of simulated risks.

Quick Start Guide

The following recommended steps are intended to reduce the time and effort needed to become familiar with these exercises and implement them in your course(s).

The assignment seeks to find the right balance between realism and usefulness as a teaching tool. Thus, numerous assumptions have been made to facilitate learning in this assignment. For example, we assumed all risk transfers were insurance-style risk transfers with annual aggregate deductibles and limits. While you get familiar with this assignment, please see Appendix A of the instructions for an overview and discussion of key assumptions.

1. Get familiar with the content of the exercises.
    a. Start reading the Risk Financing Simulation Exercises instructions.
    b. During the practice exercise, follow along in Excel to get familiar with the Excel tool.
    c. During exercises 1-9, follow along using the answer key (Appendix B in this instructor's manual) to quickly get familiar with the exercises.
2. Select 1-2 exercises to incorporate into your course. There's no need to take on all 9 exercises at once. Once you determine which exercises work best for your course, you have the option to tailor the instructions and Excel tool for your course.
    a. The Excel tool's tabs work independently from one another. Thus, you can delete the tabs that aren't relevant to the exercises you want.
    b. Similarly, the instructions can easily be edited to include only the exercises you want. We do recommend you keep the practice exercise in the instructions as this helps students get comfortable working with the Excel tool.
3. Use the default data set to begin. We define the default data set as the set of simulated risks provided with the Excel tool. Specific elements of the default data set are referred to in the instructions. Thus, students will want to use the default data set when going through the instructions and the practice exercise. In addition, the default data set is used to build the enclosed answer key to the exercises.
4. Create your own simulated risks as desired. You can assign students exercises that use the default data set, a custom data set, or both. You may also assign students the task of building their own simulated risks. Please refer to Appendix D of the instructions for documentation of how the risks were simulated for these exercises.

Suggested Implementation Approaches

Below are recommendations based upon our experience with this assignment.

- When introducing the assignment to students, make the students spend some time reading the instructions and figuring some things out on their own in Excel. Encourage them to use the Excel help features.
    - Briefly demonstrate how to complete some of the practice exercise in class (e.g., using Goal Seek to target the middle and left tail of the distribution).
    - Then assign the practice exercise and exercise #1 to be completed and submitted in order to force the students to work through the instructions.
    - After exercise #1 is submitted, give them help and incentives (i.e., an opportunity to improve their grade). For example, allow the students to revise and resubmit their responses to exercise #1 for extra credit. We've found that working with the students in class often means referring them back to the instructions for the answer(s) they seek.
- Students always appreciate time you spend with them in class to help them get started on these exercises. This is especially true if students don't feel comfortable working in Excel.
- When assigning exercises 2-9, different approaches can be taken with varying levels of difficulty. Below are a couple of examples.
    - In a corporate risk management class of one of the co-authors of these exercises, the instructor assigns only two exercises. Because the students have widely varying analytical skill sets, the instructor chooses to offer the students a guide:
        - Students are given part of the answer key (just some of the numerical answers) for the default data set for the assigned exercise(s). Their assignment, however, does not use the default data set; instead, a new set of simulated risks is used each semester. Thus, students can learn ***how*** to complete the exercises by using the default data set and comparing their results against the answer key.
    - In a risk financing class, the instructor goes through all 9 exercises and spends considerable time reviewing and discussing the findings. Further, this course is an elective for Business Intelligence / Data Analytics majors. Thus, this presents an excellent opportunity to really challenge the students:
        - Students simulate their own risks, write a paper to respond to one or more discussion/challenge question(s), simulate risks with specified dependencies, take turns presenting to the class their findings from a given exercise, etc.

Opportunities to Incorporate Exercises into the Curriculum

These exercises can be incorporated into an RMI curriculum in various ways.[53]

- Corporate Risk Management (CRM) – As risk financing is an integral component of the risk management process, these exercises offer several useful applications in a CRM course.
- Enterprise Risk Management (ERM) – These exercises highlight the shift from managing one risk at a time to holistically managing the firm's risk-portfolio. The instructions include discussion to highlight the advantages of ERM. These exercises offer a simulated risk-portfolio, enabling students to explore a variety of ERM concepts.
- Risk Financing – These exercises combine theory and practice to augment the content of risk financing courses (e.g., using ARM 56 as a text).
- Synergies with data analytics – These exercises are used as part of a course that satisfies requirements for both, RMI majors and Business Intelligence / Data Analytics majors.
- This assignment can also be useful to address learning objectives related to developing student skills with Excel.

Strategies to Assess Individual Student Learning

Given that assigned homework is subject to rampant student "collaboration" (i.e., sharing of answers), strategies to assess an individual student's learning are useful to consider. We've found that class discussion reveals much about how the students are learning from these exercises. However, below are some tips that create more objective measures for assessment of individual student engagement with the material.

- Keep the data fresh for assigned homework. As noted above, you can create your own simulated risks as desired (e.g., a new set each semester or different sets for different groups of students). You can assign students exercises that use the default data set, a custom data set, or both. Instructions for creating new simulated risks can be found in Appendix D of the instructions.
- Reuse your assigned exercises on exams, with a small change. Simply change an element of the exercise (e.g., the budget or expense loading) to create a different problem for the students to answer on the exam. Allow students to use their laptops for this portion of the exam. This approach is useful to validate if the student did the homework and learned how to use the Excel tool.
- The "Question(s) for reflection or discussion" can be used as topics for exam questions or short papers.

[53] While designed for use in undergraduate courses, these exercises should work similarly well in graduate courses.

Appendix A – Student Response Form

Below are forms you can give students for submitting their answers to assigned exercises. The forms also include hints and clarifications where appropriate. At the end is a form that enables students to offer you feedback on how valuable the assignment was and how it could be improved.

Risk Financing Simulation Exercises

Student Response Form

Instructions:

1. Submit per the assignment's instructions your typed responses to the questions from the assigned exercises;
2. Please offer your feedback on this assignment in the survey (at bottom).

Student Name(s):

Responses to questions from assigned exercises

E1–1: What section of a risk's distribution (i.e., right-tail, center, or left-tail) should be targeted to achieve optimum efficiency (i.e., maximizing risk reduction per dollar spent on a hedge) from hedging?

E1–2: What was the maximum reduction in risk (i.e., change in σ) you were able to achieve, given your budget constraint?

E1–2: What was the RF-Efficiency you were able to achieve, given your budget constraint?

Right tail	
Center	
Left tail	

E2–1: What was the premium loading percentage you used?

E2–2: Which years' P&C industry performance did you use to generate that estimate for premium loadings?

E2–3: How did the incorporation of premium loadings impact your ability to reduce this risk (σ), given your budget constraint?

reduction in σ without loadings	
reduction in σ with loadings	

Student Name(s):

Responses to questions from assigned exercises

E2–4: How did the incorporation of premium loadings impact RF-Efficiency, given your budget constraint?

RF-Efficiency without loadings	
RF-Efficiency with loadings	

E3–1: What was the risk reduction (i.e., reduction in σ) and RF-Efficiency you were able to achieve, given your budget constraint? To obtain answers for the first three rows, use the field, On/Off, to turn on just one insurance policy at a time.

Risk	Budget Allocated	Reduction in σ	RF-Efficiency
AL	**$40,000**		
GL	**$40,000**		
WC	**$40,000**		
Combined (HRP)	**$120,000**		

Risk reduction should be measured net of diversification. Thus, use the difference between the Total HRP Losses and Net of HRP Risk Transfer.
Note: Save the design for these risk transfers as you will use them again in a later exercise (#5).

E3–2: Which single insurance policy is reducing hazard risk most?

E3–3: Which risk (or… the left tail of which risk) is most responsible for driving the tail risk (σ) of the hazard-risk-portfolio? Which risk is second?

E4–1: Based upon your answers from the previous exercise, briefly describe how you will approach trying to achieve optimum efficiency with a $120,000 budget (i.e., how will you try to maximize reduction of hazard risk per dollar spent on hedging hazard risks).

E4–2: How did you allocate your hedging budget across the three risks? What was the maximum reduction in risk (σ) and RF-Efficiency you were able to achieve, given your budget constraint?

Risk	Allocation (increments of $10,000)
AL	
GL	
WC	
Combined (HRP)	**$120,000**

Risk	Reduction in σ	RF-Efficiency
Combined (HRP)		

Note: Save the design for these risk transfers as you will use them again in a later exercise (#5).

Student Name(s):

Responses to questions from assigned exercises

E5–1: What was the maximum reduction in risk (σ) and RF-Efficiency you were able to achieve, given your budget constraint?

Budget Allocated	Reduction in HRP σ	RF-Efficiency
$120,000		

E5–2: Provide an overview of the results from exercises #3 through #5. Document the impact of each option to the risk manager's budget. Thus, when documenting the HRP net of risk transfer, evaluate what the firm "feels" in each scenario – adding the costs of any risk financing where applicable.

	100% Retention No risk transfer	Net of risk transfer (HRP) Plus the cost of the risk transfer ($120,000)		
	Total Losses HRP	Exercise 3 ($40k/risk=$120k)	Exercise 4 ($120k/3risks)	Exercise 5 ($120k Multiline)
Best Case	-1,114,196			
Mean	-5,843,952			
Worst Case	-29,874,419			
Std Dev (σ)	1,893,091			
5% VaR	-9,100,940			

E5–3: Which risk financing approach is more efficient – insuring several hazard risks individually? Or directly insuring the hazard-risk-portfolio with a multiline policy?

Student Name(s): First Last

Responses to questions from assigned exercises

E6A–1: What was the reduction in risk (σ) and RF-Efficiency for the two $50,000 WC insurance policies?

	Reduction in σ	RF-Efficiency
SingleRisk-WC		
HazRiskPort-Monoline		

E6B–1: Highlight the AL loss data (starting with the cell containing "AL"). Then sort the AL data (and only the AL data) from smallest to largest. Then sort the WC loss data from largest to smallest. Document the change in the HRP distribution.

E6B–2: Leave the AL data sorted from smallest to largest. Then sort the WC loss data from smallest to largest. Document the change in the HRP distribution.

	Prior to Sorting	B-1 After Sorting Opposite	B-2 After Sorting Same
	Total Losses HRP	**Total Losses HRP**	**Total Losses HRP**
Best Case	-1,114,196		
Mean	-5,843,952		
Worst Case	-29,874,419		
Std Dev (σ)	1,893,091		
5% VaR	-9,100,940		

Student Name(s): First Last

Responses to questions from assigned exercises

E7–1: Provide an overview of the results from Exercise #7. Document the risk financing structure. Document the impact of each option to the risk manager's budget. Thus, when documenting the HRP net of risk transfer, evaluate what the firm "feels" in each scenario –adding the costs of any risk financing where applicable.

		Risk Financing Structure and Risk Financing Costs		
	100% Retention **No risk transfer**	**"High" retention** **1 Std. Dev. above Mean**	**"Avg." Retention** **Mean**	**"Low" retention** **1 Std. Dev. below Mean**
Retention	Unlimited			
Limit of coverage	N/A			
Loading %	0%	30%	30%	30%
Expected Cost Insurance	$0			
Impact to RM budget **Summary Statistics Net of risk transfer (HRP) Plus the cost of the risk transfer ($ variable)**				
Best Case	-1,114,196			
Mean	-5,843,952			
Worst Case	-29,874,419			
Std Dev (σ)	1,893,091			
5% VaR	-9,100,940			

E7–2: How much of the risk transfer cost were loadings (e.g., to cover insurer expenses and profit)?

	100% Retention No risk transfer			
	Total Losses HRP	**"High" retention** **1 Std. Dev. above Mean**	**"Avg." Retention** **Mean**	**"Low" retention** **1 Std. Dev. below Mean**
Loadings ($)	$0			

Student Name(s): First Last

Responses to questions from assigned exercises

E8: What risk financing plan best meets the CFO's guidelines?

Plan Component	Answer
Size of the funded loss reserve.	
Maximum size of a "surprise" loss	
Retention of risk transfer	
Limit of risk transfer	
Expected Cost of Insurance Risk Transfer	

E9–1: Question #1: Which 2 non-core risks are most responsible for driving the left tail of the risk-portfolio? How did you arrive at your answer?

E9–2: Question #2: What happens when you hedge only the FOREX risk? Why?

E9–3: Question #3: Recall class discussion about the RM value proposition for publicly-traded firms. Think about how RM drives firm value. Which single $50,000 hedge would generate the most value? Which single $50,000 hedge would generate the least value? Motivate each answer.

Student Feedback Survey - **Risk Financing Simulation Exercises**

Please type responses, print your feedback, and submit a hardcopy separately to assure anonymity.

Feedback Insert Score Ex: 4	5 ~~~~~~~~~~~~~~~~~~ 4 ~~~~~~~~~~~~~~~~~~ 3 ~~~~~~~~~~~~~~~~~~ 2 ~~~~~~~~~~~~~~~~~~ 1 Strongly Agree Neutral Disagree Strongly Disagree Agree
_____	Overall, I would say this assignment's approach to teaching risk financing concepts was effective.
_____	The instructions were clear. If you disagree, please note what exercise numbers you found most confusing:
_____	The Excel file was clear and fairly easy to use/navigate to complete this assignment. If you disagree, please note what tabs/areas you found most confusing:
_____	In class instruction and discussion helped me with this assignment.
_____	I found the reflection/challenge concepts interesting.
_____	I would recommend you offer a similar assignment the next time you teach this course.
_____	I got value from this assignment.
Did you find the assignment to be valuable learning experience? Why or Why not?	

What was the most interesting/useful thing you learned while completing these exercises?
How would you suggest this assignment be improved?

Appendix B – Answer key using the default set of simulated risks

Below is the answer key based upon the default data set and the student response forms provided above. This answer key is intended to lower your costs of understanding what these exercises reveal and using these exercises in your course(s).

As noted above, it may be useful to share some of these answers with students to "give them a guide" as they work on developing solutions to assigned exercises. When we use this approach:

- We provide only a limited portion of the answer key (just some of the numerical answers) using the default data set for the assigned exercise(s).
- We create new simulated risks for the data set that is used for graded assignments. Thus, students can learn ***how*** to complete the exercises by using the default data set and comparing those answers to the answer key.

Risk Financing Simulation Exercises

Answer Key Using Default Set of Data

Responses to questions from assigned exercises
The answer key has been removed from the published article. The answer key is available to instructors upon request. Please email the authors for an Instructor's Guide that includes the answer key.

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