

## **CORPORATE MANAGERS' RISKY BEHAVIOR: RISK TAKING OR AVOIDING?**

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### **Abstract**

This study reports on five experiments that investigate professional corporate managers' risky behavior across decision settings in which various forms of financial data are evaluated. Specifically, managers decisions to take or avoid risk are investigated when evaluating data in the form of profits, losses, revenues, costs, and expenditures. The results indicate that, with one exception (i.e., clear financial losses), a greater tendency towards risk avoidance exists when managers evaluate many forms of financial data. These results provide evidence on managerial risky behavior across decision contexts and suggest that managers use inclusive "mental accounts" in their decision processes.

### **INTRODUCTION**

This paper investigates the risk behavior of professional corporate managers. Of specific interest is the extent to which managers exhibit risk taking or risk avoiding behavior when making decisions with a variety of financial data, and whether the form of the data used in the decision process affects managers' risky behavior. The study utilizes Prospect Theory and the concept of mental accounts to facilitate the analysis.

One of the most widely accepted descriptive models of risky choice is Prospect Theory, proposed by Kahneman and Tversky [6]. A central feature of Prospect Theory is the notion of a reference point. The theory states that decision makers utilize a reference point, such as one's current status or some other psychologically significant point, and code decision alternatives as either gains or losses relative to that point. Decision alternatives with outcomes above the reference point are viewed as gains, while outcomes below that point are viewed as losses. Prospect Theory predicts that decision makers will generally be risk avoiding when choosing between alternatives that fall above the reference point, and risk taking for alternatives below that point. Considerable empirical support exists for this reflection effect [3] [6] [7] [17] [18] [19].

As Kahneman and Tversky [6] note, a critical factor in predicting risk behavior is understanding the manner in which choice problems are coded (i.e., gains versus losses). This is especially relevant in a specialized professional context such as corporate financial decision making since managers are exposed to many different types of financial data in a variety of decision contexts. For example, managers may consider the costs associated with a venture, the gross revenues generated, the cash expenditures required, and so on. When investment alternatives are evaluated using such data, a manager's decision to take or avoid risk may be affected if the form of the data results in the manager coding the alternatives as either above or below a reference point. For example, costs may be viewed as a reduction in one's current wealth position. If viewed in this light, Prospect Theory predicts that the manager will exhibit greater risk taking when choosing between competing investments described in terms of relevant costs.

However, Kahneman and Tversky [7] and Thaler [15] [16] also suggest that "mental accounts" can impact decision framing. That is, a decision maker may combine different types of information considered relevant to a given decision in one mental account, and assign other information considered irrelevant to the task to other mental accounts. A decision maker's frame of reference may be affected by the type of information included in an

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account. For example, when evaluating the cost of an investment project, a manager may also infer the revenues the investment may generate. If the revenues are included in the same mental account as the costs, an inferred positive net return could place the manager in a gain frame, resulting in risk avoiding behavior.

In effect, Prospect Theory and the concept of mental accounts suggest that the manner in which financial data are coded can affect managers' risky behavior. However, managers' coding and resulting tendencies to take or avoid risk when making decisions with various forms of financial data is an empirical issue that must be investigated. As a consequence, this study examines managers' risky behavior across a number of decision contexts in which various forms of financial data are considered. In doing so, the study provides evidence on the risk taking and avoiding behavior of managers and suggests the manner in which managers code various forms of financial data.

Five experiments are conducted that examine managers' risky decisions when using data in the form of profits, losses, revenues, costs, and expenditures. Profits and losses are net amounts which should clearly put managers in a decision frame that is above and below their current status, respectively. That is, profits clearly increase a manager's current wealth, while losses clearly decrease their wealth position. Given this to be the case, we expect risk avoiding behavior when managers evaluate the profits that result from competing decision alternatives, and risk taking behavior when they must choose between alternatives that result in losses. However, when managers evaluate the costs or cash expenditures associated with a project, their decision frame and resulting risky behavior is less clear. If they use a separate mental account for such items, risk taking would be evident since costs and expenditures decrease a manager's current wealth. However, if they utilize a more inclusive mental account, combining not only the costs or expenditures relating to a project but also any inferred revenues the project may generated, a gain frame would likely occur resulting in risk avoiding behavior. As Lipe [11] indicates, many discussions of mental accounts suggest that expenditures may be considered to be losses if the perceived benefits derived from those expenditures are not included in the same mental account, and would not be considered as such if the benefits are included in the same account. She notes, however, that little or no empirical work has been conducted on this issue.

Current behavioral decision theory suggests that decision makers are flexible and adaptable problem solvers that implement decision strategies considered appropriate for the task encountered [1] [8] [12] [9] [14]. We argue that professional corporate managers, through their training and experience, consider costs and expenditures to be a necessary ingredient in the generation of revenue for their job related decisions. As a consequence, even though expenditures and costs represent reductions in a current asset position, it is likely that managers will typically utilize a more inclusive mental account and infer revenues to exist along with costs and expenditures in the same mental account. Therefore, while the effects are not likely to be as strong as when decision alternatives are clearly above a reference point, managers should also exhibit a tendency towards risk avoidance when evaluating decision alternatives on the basis of costs or expenditures, as long as they may realistically infer revenues generated from the project.

Results across the five experiments indicate that corporate managers clearly exhibit risk avoiding behavior when data are in the form of profits and revenues, and risk taking behavior when data clearly refer to financial losses. In addition, there appears to be a greater tendency towards risk avoidance when managers make decisions on the basis of costs and expenditures. This suggests that managers use more inclusive mental accounts when making investment decisions, inferring potential revenues along with the costs or expenditures related to a project. As such, the data provide evidence on both managerial risky behavior and on the potential use of more comprehensive mental accounts by decision makers. Note that a tendency towards risk avoidance with costs and expenditures, as well as with profits and revenues, points to a greater underlying tendency towards risk avoidance on the part of financial managers across a broad range of financial decision contexts. This is especially true since managers are typically not faced with a situation in which they must choose between decision alternatives that result in losses. These data, therefore, provide support for an often cited assumption of risk avoidance in financial decision contexts [2] [5].

## **OVERVIEW OF THE EXPERIMENTS**

A total of seventy-two experienced corporate financial managers participated in the study. The managers had an average of 21.6 years of corporate work experience and had been in their current position for about 6 years. They held positions of significant decision making responsibility within their firms, such as CFO, Treasurer, or Vice President of Finance (see Appendix A). Seventy subjects were male and two were female.

To obtain the subject group, a listing of potential subjects was first generated from Dun and Bradstreet's Million Dollar Directory. Small to medium sized manufacturing companies with annual sales of \$1 to \$200 million were randomly selected from six New England states, and the name of the most senior executive responsible for financial matters was noted. To assure an adequate response rate, each of the executives was personally contacted by phone to solicit their cooperation. During this conversation, the study was explained in general terms. Of the 119 executives contacted, 96 agreed to participate. A version of the instrument was mailed to these 96 managers, along with a cover letter, a stamped envelope, and a return postcard indicating that they would like to receive a copy of the final results. Completed instruments were received from 72 subjects.

Five different experiments were conducted to investigate the managers' risk taking behavior when using different forms of financial data. The general form of the experiments involved a choice between two competing capital investment alternatives. One alternative reflected a risky option, while the other was certain or less risky. The managers chose one of the two alternatives and rated their strength of preference for that alternative on a five point preference scale. The preference scale could therefore be combined with the alternative selected to create a ten point transformed preference rating, with 1 (10) indicating a strong preference for the certain (risky) alternative. Examples of the format used to gather the managers' decisions are presented in Appendix B.

Each manager provided responses for the various experiments, and the decision scenarios were alternated so that they responded to a gain scenario in experiment one, a loss scenario in experiment two, and so on. The general instructions for each booklet specifically directed the managers to consider each choice scenario independently. It was emphasized that there were no correct or incorrect responses, rather, that they should use their professional judgment. The subjects were instructed to put themselves in the position of the corporate executive responsible for making the decision under consideration. Twenty corporate executives, faculty, and business students participated in pretesting the experimental instrument. The pretests indicated that the amounts used for the financial data presented were realistic for the management group investigated (i.e., managers in small to medium sized firms). In addition, the pretest indicated that the scenarios were perceived by the subjects in the way intended, and that the instructions were clear and unambiguous.

For comparison purposes, the first experiment involves a situation similar to an often cited framing experiment conducted by Tversky and Kahneman [17] [18]. The subsequent four experiments involve decision contexts with alternative forms of financial data that are often utilized by corporate managers. In these experiments, managers consider data in the form of profits, losses, revenues, costs, and expenditures. As such, these experiments investigate managers' risky behavior across a range of decision contexts. Note that while some prior research [10] [13] provides evidence of managerial risk behavior in certain tasks, those studies generally investigated gambles that were characterized in terms of profits or losses. Other forms of information commonly used in financial contexts, such as costs and expenditures, were not typically considered. A summary of the decision scenarios investigated here is presented in Table 1, while the results of all the experiments are summarized in Table 2.

## EXPERIMENT 1: FRAMING

### Overview

Experiment one is based on the classic "lives saved, lives lost" scenario of Tversky and Kahneman (see [17] and [18] for a description of their specific manipulation). A between subjects design was employed, where one group of managers was exposed to the save (gain) frame, while another group was given the loss frame. Managers in both experimental groups were told that, "Due to difficult economic conditions, your division is facing an expected loss of \$600,000 for the next quarter. You are considering two different alternatives to confront this situation." Managers in the gain (save) experimental group were told that "The first course of action would result in a sure savings of \$200,000. For the second option, you estimate that there is a 1/3 probability of saving the entire \$600,000 and a 2/3 probability of saving nothing". Managers in the loss experimental group were told that "The first course of action would result in a sure loss of \$400,000. For the second option, you estimate that there is a 1/3 probability of losing nothing and a 2/3 probability of losing the entire \$600,000." Of course, the first alternative in both conditions is identical in terms of its final outcome, as is the second. According to Expected Utility Theory, artificially framing the alternatives in terms of savings or losses should have no effect on judgments. However, Prospect Theory predicts that the majority of managers will choose the sure outcome in the gain condition, exhibiting risk avoiding behavior, and the probabilistic alternative in the loss condition, exhibiting risk taking behavior.

**TABLE 1**  
**Summary Of Decision Alternatives For Each Experiment**

**Panel A: Experiment One - Framing**

<b>Save</b>	<b>Loss</b>
A: Save \$200,000 for sure.	A: Sure loss of \$400,000.
B: 1/3 probability of saving \$600,000. 2/3 probability of saving nothing.	B: 1/3 probability of losing nothing. 2/3 probability of losing \$600,000.

**Panel B: Experiment Two - Profits and Losses**

<b>Profit: Set One</b>	<b>Loss: Set Three</b>
A: 60% chance of a \$520,000 profit. 40% chance of no profit.	A: 60% chance to lose \$390,000. 40% chance to lose nothing.
B: Sure profit of \$312,000.	B: Sure loss of \$234,000.

  

<b>Profit: Set Two</b>	<b>Loss: Set Four</b>
A: 60% chance of a \$290,000 profit. 40% chance of a \$130,000 profit.	A: 60% chance to lose \$375,000. 40% chance to lose \$230,000.
B: Sure profit of \$226,000.	B: Sure loss of \$317,000.

**Panel C: Experiment Three - Profits and Expenditures**

<b>Profit</b>	<b>Expenditure</b>
A: Sure profit of \$420,000.	A: Certain expenditure of \$420,000.
B: 75% chance of \$570,000 profit. 25% chance of no profit.	B: 75% chance of \$570,000 in expenditures. 25% chance of no additional expenditures.

**Panel D: Experiment Four - Revenues and Costs**

<b>Revenue</b>	<b>Cost</b>
A: \$575,000 certain revenues.	A: \$250,000 certain costs.
B: 30% probability of \$365,000 in revenues. 70% probability of \$665,000 in revenues.	B: 30% probability of \$460,000 in costs. 70% probability of \$160,000 in costs.

**Panel E: Experiment Five - Profits and Costs**

<b>Profit</b>	<b>Cost</b>
A: 70% probability of \$465,000 in expected profits 30% probability of \$155,000 in expected profits	A: 70% probability of \$465,000 in expected costs 30% probability of \$155,000 in expected costs
B: 70% probability of \$384,000 in expected profits 30% probability of \$344,000 in expected profits	B: 70% probability of \$384,000 in expected costs 30% probability of \$344,000 in expected costs

**TABLE 2**  
**Summary Of Risky Behavior Of Corporate Managers Across Experimental Scenarios**

**Percentage Of Managers Selecting Risk Avoiding And Risk Taking Alternatives**

Experimental Condition	Risk Taking	Risk Avoiding	Comments
<b>Panel A: Experiment One - Framing</b>			
Save	37.1%	62.9%	Greater risk avoidance.
Loss	75.0	25.0	Greater risk taking.*
<b>Panel B: Experiment Two - Profits and Losses</b>			
Profit: Set One	21.6%	78.4%	Greater risk avoidance in both profit scenarios.*
Profit: Set Two	21.1	78.9	
Loss: Set Three	75.7	24.3	Greater risk taking in both loss scenarios.*
Loss: Set Four	73.7	26.3	
<b>Panel C: Experiment Three - Profits and Expenditures</b>			
Profit	11.8%	88.2%	Greater risk avoidance.*
Expenditure	37.8	62.2	Greater risk avoidance.
<b>Panel D: Experiment Four - Revenues and Costs</b>			
Revenue	21.6%	78.4%	Greater risk avoidance.*
Cost	38.2	61.8	Greater risk avoidance.
<b>Panel E: Experiment Five - Profits and Costs</b>			
Profit	13.5%	86.5%	Greater risk avoidance.*
Cost	51.4	48.6	Split in risk behavior.

\*Chi-square tests indicate difference between risk taking and risk avoiding proportions is significant at  $p < .01$  level.

## Results

The percentage of managers in each experimental condition exhibiting risk taking or risk avoiding tendencies is presented in Table 2, panel A. The managers' choice of risky or certain alternatives did, in fact, depend upon the experimental condition. Managers were much more likely (75% vs. 25%) to select the risky alternative when the choice was presented in terms of losses, as predicted by Prospect Theory ( $p=.003$ ; all significance levels based on chi-square tests unless otherwise indicated). In the gain condition, a greater number of managers chose the certain outcome (62.9% vs 37.1%), indicating risk avoidance, although the results failed to reach statistical significance ( $p=.128$ ). However, those managers who selected the certain outcome were more likely to have been in the gain condition ( $p=.020$ ), while managers selecting the risky outcome were more likely to have been in the loss condition

( $p=.027$ ). In addition, the more discriminating transformed preference ratings yielded significant differences between the gain and loss conditions (4.49 versus 6.86,  $t=3.42$ ,  $p=.001$ ), indicating that managers in the gain condition more strongly preferred the certain alternative, while managers in the loss condition preferred the risky alternative.

In summary, these results indicate framing effects that are generally in line with Prospect Theory and prior empirical work [17]. Artificially changing the frame of the decision problem resulted in a change in the financial managers' decisions, even though the alternatives were essentially identical in both groups. Risk avoiding tendencies were observed when alternatives were framed as gains, while risk taking occurred when managers were required to choose between alternatives that involved financial losses.

## **EXPERIMENT 2: PROFITS AND LOSSES**

### **Overview**

Experiment two investigated managers' risk taking and avoiding tendencies when outcomes are expressed clearly in terms of options above (i.e., profits) and below (i.e., losses) a zero reference point. Using a within subjects design, each manager responded to four different decision scenarios (two profit and two loss). Therefore, the experiment provides data on whether a given manager will exhibit risk avoiding tendencies in some situations and risk taking in others. (One-half of the manager pool was randomly selected to provide responses to this experiment.)

The managers were presented with four sets of investment choices. They were told that "Within each set, the effects on profit or loss for two investment alternatives are given. As the corporate executive responsible for making these decisions for your division, please select the alternative you would prefer to invest in for each investment set." They were also told to consider each set of investments independently. One of the two profit (loss) scenarios had a chance of no profit (loss), while the other did not (see Table 1, panel B). For example, one profit scenario (set one) indicated that alternative A had a 60% chance of making \$520,000 in profit, and a 40% chance of making no profit, while alternative B would yield a sure profit of \$312,000. Another decision scenario (set two) requested a choice between alternative A, which had a 60% chance of making \$290,000 in profit and a 40% chance of \$130,000 in profit, and alternative B, which resulted in a sure profit of \$226,000. Similar scenarios were given for the two loss decision contexts, although the numbers were slightly altered so that the managers would not make direct comparisons to the profit scenarios (see Table 1, panel B, sets three and four). In all cases, the expected value of alternative A and B within a decision scenario was identical.

### **Results**

The results of experiment two are presented in Table 2, panel B. As can be seen, the percentage of managers exhibiting risk avoiding behavior in the two profit conditions was 78.4% and 78.9%. These were significantly greater than those exhibiting risk taking in the two groups. In addition, the two loss conditions revealed significantly more risk taking behavior, with 75.7% and 73.7% of the managers selecting the risky alternative. The reversal of risk behavior between the gain and loss scenarios is clear and unambiguous. Thus, we see risk taking behavior exhibited by managers when they are presented with losses, and risk avoiding behavior by those same managers when the alternatives are potential gains. (The transformed preference measure corroborates the results reported in this and subsequent experiments, and is therefore not reported.) These results provide strong support for risk avoiding and risk taking behavior in contexts that involve alternatives clearly above or below a reference point of zero. Whether such risk taking effects occur across financial contexts, where data often used by managers may make the coding of alternatives less clear, is considered in the next three experiments.

## **EXPERIMENT 3: PROFITS AND EXPENDITURES**

### **Overview**

In many decision contexts, financial managers evaluate alternatives that are not presented strictly in terms of gains or losses. Rather, decisions may be made when data are in the form of revenues, costs, expenditures, etc.

This, and the subsequent two experiments, explore risky behavior when using these different constructs. It is reasonable to expect that revenues, like profits, would be considered in the gain domain, resulting in risk avoiding behavior. Risky behavior when evaluating costs and expenditures is less clear. As previously noted, if managers consider expenditures in a separate mental account, Prospect Theory predicts risk taking since the expenditures would likely be seen as a reduction in the status quo. However, managers may consider expenditures in a more inclusive mental account, in which the benefits (i.e., revenues) derived from the expenditures may also be inferred and included in the same mental account. An inferred profit would result in an overall gain frame, and a prediction of risk avoidance. In essence, the risky behavior exhibited by managers when making decisions with these different forms of financial data is an empirical issue that is open to question. However, given managers' training and experience with financial data, a more inclusive account is likely to be used, resulting in a tendency towards risk avoidance in contexts in which potential revenues can be realistically inferred from the expenditures made.

A between subjects design was employed in experiment three, with one-half of the managers responding to a profit scenario and one-half given an expenditure context. In the profit group, the managers were told that "Product A is an established product with stable demand. If this alternative is selected, it will result in a sure profit of \$420,000. Product B is also being considered. This a new product, with uncertain demand. Your staff has determined that, based on market research, you have a 75% chance to earn \$570,000 and a 25% chance that you will earn nothing if product B is marketed." The managers should have a greater incentive to select the risky option since the expected value of the risky outcome (\$427,500) is above the riskless outcome. Any preference for the sure profit will therefore provide strong evidence of risk avoidance.

Managers in the other experimental condition were asked to choose between two alternatives, where the data were in the form of cash expenditures. In this experimental scenario, two alternative programs of research and development were considered, each requiring different expenditures. The dollar amounts and probabilities were the same as those utilized in the profit condition. The managers were told that either alternative would achieve their objectives. It was indicated that the first alternative requires spending an additional \$420,000 beyond what is already being spent on R&D, while in the second alternative there is a 75% chance that they will be required to spend an additional \$570,000, and a 25% chance that the current expenditures will be adequate, requiring no additional expenditures (see Table 1, panel C for a summary of the options presented). Note that to increase the realism of the task, the experimental context differs in this and the subsequent experiments. While context differences may affect risky choice, managers do not make risky decisions in a vacuum. Rather, their decisions with this type of data are made in contexts similar to those investigated here.

## Results

Table 2, panel C presents the percentage of managers selecting the risky versus the certain alternative in each experimental condition. In this experiment a majority of subjects (74.6%) opted for the certain outcome across both conditions, while 25.4% selected the risky outcome ( $p < .001$ ). Thus, there appears to be a clear tendency for risk avoidance. Behavior in the profit condition clearly indicates risk avoidance with about 88% of the managers selecting the certain profit, while only about 12% chose the risky alternative ( $p < .001$ ). An examination of behavior in the expenditure condition also indicates a tendency towards risk avoiding behavior. Approximately 62% of the managers selected the certain expenditure, versus 38% selecting the probabilistic expenditure. While not achieving statistical significance ( $p = .14$ ), this result is distinctly different from the results noted in the loss conditions of previous experiments.

Expenditures directly reduce a managers' current asset position. If only the expenditure data are considered in a mental account, expenditures would be viewed as a reduction from such a position and therefore induce risk taking. However, the results reported here suggest that managers use a more inclusive mental account in their decision processes. Given their training and experience, managers likely view expenditures as essential to generating revenues, resulting in a net profit. Therefore, they appear to not only consider the expenditure data provided in the decision scenario, but to also infer generated revenues from those expenditures in their mental accounts, resulting in an inferred overall profit reflecting a gain frame. Such a frame would lead to greater risk avoidance, as found here. These results suggest that managers may exhibit risk taking only if choice alternatives are stated in terms of clear financial losses.

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## EXPERIMENT 4: REVENUES AND COSTS

### Overview

This experiment concerns the evaluation of investment alternatives defined in terms of the revenue or cost associated with a venture. The alternatives in both the revenue and cost conditions yielded a net profit of \$325,000. However, managers in the revenue condition received data primarily in terms of the revenues generated from the investments, while managers in the cost condition received data primarily in the form of the costs associated with the investments. Once again, the managers chose between one of two projects. In the revenue condition, managers were told that, "You are considering investing in either project A or project B. Since the demand for product A is stable, it is sure to provide you with revenues of \$575,000, while the revenues achieved under project B will depend on the level of demand. If demand is low, revenues will be \$365,000. If demand is high, revenues will be \$665,000." They were then told that "Market research indicates that there is a 30% probability that demand will be low, and a 70% probability that demand will be high. Costs are primarily fixed, and will be \$250,000 which ever project you select." Given that costs were stated as \$250,000 for both projects, the expected net profit was \$325,000 in both cases.

In the other experimental condition, the focus was on the costs of the alternative projects. Managers receiving this scenario were informed that the cost of project A was \$250,000 with certainty, while project B's costs varied depending on the price of materials. There was a 70% probability of \$160,000 in costs, and a 30% probability of \$460,000 in costs for project B. Managers were then told that the revenues generated were \$575,000 for both projects. Therefore, both alternatives offered an expected net profit of \$325,000, the same as in the revenue condition.

### Results

The results are presented in Table 2, panel D. In the revenue condition, 78.4% of the managers selected the certain outcome, while 21.6% selected the risky prospect, indicating clear risk avoidance ( $p=.001$ ). Risk behavior in the cost condition is also in the direction of risk avoidance. About 62% of the managers chose the certain alternative, while 38% selected the risky alternative, although the difference is not statistically significant ( $p=.17$ ). Instead of observing a reflection of risk avoidance for revenues and risk taking for costs, it appears that risk behavior in the cost condition is similar to that in the revenue condition. An examination of the proportion of managers selecting the risk avoiding alternative across conditions also supports this claim, with no significant difference between the revenue and cost conditions (78.4% vs. 61.8%,  $p=.258$ ).

In summary, behavior was strongly risk avoiding when data were presented in terms of revenues, and risk avoiding tendencies were also evident with data in the form of costs. Similar to expenditures in experiment three, the cost data in this experiment do not appear to induce a below reference point frame that results in risk taking. Rather, the tendency toward risk avoidance may be explained by managers' use of a more inclusive mental account. These results, taken in conjunction with the previous experiment, suggest an overall tendency toward risk avoidance on the part of financial managers across a variety of decision contexts. It appears that alternatives must strictly concern clear financial losses for strong risk taking to occur.

## EXPERIMENT 5: PROFITS AND COSTS

### Overview

One-half of the managers in this experiment received a profit condition, and one-half received a cost scenario. The profit scenario involved a choice between producing two different products, each of which was expected to result in different levels of profit due to varying demand conditions. Managers were told that their "market research has investigated the demand for the products, and it indicates that there is a 70% chance of high demand, and a 30% chance that demand will be low, for both products. However, the profits generated from the products differ depending upon the demand level." They were told that "if demand is high, product A will yield a profit of \$465,000, while if demand is low, profit will be \$155,000. Profit for product B will be \$384,000 if demand is high, and \$344,000 if demand is low." In both instances, the expected value is \$372,000, but the standard deviations are



\$142,100 and \$18,300 for products A and B, respectively. Selecting the alternative with the smaller (larger) variance would indicate risk avoiding (taking) behavior.

Managers in the cost condition were told that in order to comply with government regulations, their company is considering different procedures to remove waste materials from their production process. They could choose between two different disposal methods. They were told that "an outside consultant has determined that, given [their] level of production, there is a 70% chance that alternative A will cost \$465,000, and a 30% chance that costs will be \$155,000. Costs for alternative B have a 70% chance to be \$384,000, and a 30% chance of being \$344,000." The amounts and probabilities are the same as those used in the profit condition.

## Results

The proportion of managers choosing each alternative for the two experimental groups is presented in Table 2, panel E. In the profit condition, behavior is clearly risk avoiding. Over 86% of the financial managers selected the low risk alternative, while only about 14% opted for the high risk alternative ( $p < .001$ ). Choices are evenly split in the cost condition, with about 51% and 49% selecting the high and low risk alternatives, respectively ( $p = .866$ ). Consequently, there is no support for overall risk taking with cost data.

Once again, profits are framed as gains, and induce significant risk avoiding behavior. While cost data resulted in more managers exhibiting risky behavior than when they were presented with profit data, a clear majority of managers were still not risk taking. It is interesting to note that the split in risk behavior found in this experiment's cost condition occurred in the context of disposing waste material in order to comply with government regulations. It is likely that managers would be less inclined to infer potential benefits (i.e., revenues) from such costs. As a consequence, there would be a greater likelihood that only the cost data would be considered in the managers' mental accounts, resulting in greater risk taking as compared to the cost and expenditure conditions in the prior two experiment's.

## CONCLUDING REMARKS

The purpose of this study was to investigate the risky behavior of professional financial managers across a range of decision contexts. Five experiments were performed which investigated managers' behavior when evaluating data in the form of profits, losses, revenues, costs, and expenditures. The results indicate a greater underlying tendency towards risk avoidance on the part of financial managers. That is, while risk taking occurred when managers dealt with clear financial losses, risk avoidance predominated across a range of contexts that involve data commonly encountered by those managers. When alternatives are presented in the form of revenues or profits, managers exhibit strong risk avoidance. In addition, when alternatives are presented in the context of costs or expenditures, risk behavior also tends toward risk avoidance. The only context in which risk taking was observed was when choice alternatives were presented in terms of clear financial losses, reflecting negative numbers. Given that managers typically do not have to choose between different alternatives that would result in losses, it appears that risk avoidance will predominate across a wide variety of financial contexts.

In addition to providing evidence on managers' risky behavior, the results reported here also provide information on the type of mental accounts expert decision makers use in their decision processes [15] [16]. As previously indicated, a decision maker may form a mental account which includes only a specific type of data, or he/she may utilize a more inclusive mental account in which various types of data are gathered and combined. The type of mental accounts used can have a profound effect on risky decision making; however, the type of accounts used by decision makers is an empirical issue that must be investigated. The experiments reported here, especially those concerning costs and expenditures, suggest that financial managers use a more inclusive mental account in their decision processes. That is, managers appear to not only consider expenditure or cost data in a mental account, but they also appear to infer and include generated revenue in the account. An inferred positive profit in a mental account would reflect a gain domain and risk avoidance, as found in the present study. In effect, managers appear to generally frame choices in terms of the potential gains that may arise from their decisions. Consequently, they generally tend toward risk avoidance, unless alternatives clearly reflect negative outcomes (e.g., clear financial losses that reflect negative numbers).

As with most behavioral studies, generalizations of the results must be tempered by the fact that the experiments conducted are, at best, an abstraction of the environment actually faced by the decision maker. More

work needs to be performed in managerial contexts to determine the generalizability of the findings reported here. In addition, the type of mental accounts used by decision makers in other task domains should be examined. While considerable support exists for Prospect Theory's predictions that risk avoiding (taking) will occur when decision alternatives are framed as gains (losses) [3] [6] [7] [17] [18] [19], the type of mental account used by the decision maker can affect the manner in which decision alternatives are framed [15] [16]. Investigations into the type of mental accounts used by decision makers across task domains, and their resulting effect on risky behavior, is a fruitful area for future research.

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## Appendix A Demographic Data

### Position Within Firm

Title	Number of Subjects
Chief Financial Officer	18
Treasurer	20
Vice President, Finance	16
President	4
Executive Vice President	5
Controller	4
Other	5

	Mean	Standard Deviation
Total Number of Years of Work Experience	21.61	9.03
Number of Years at Current Position	6.06	4.77

## Appendix B

### Examples Of The Format Used To Elicit The Managers' Decisions

#### Loss Condition From Experiment One

Due to difficult economic conditions, your division is facing an expected loss of \$600,000 for the next quarter. You are considering two different alternatives to confront this situation. The first course of action would result in a sure loss of \$400,000. For the second option, you estimate that there is a 1/3 probability of losing nothing and a 2/3 probability of losing the entire \$600,000.

The choice you are faced with may be represented as follows:

Option A: Lose \$400,000 for sure.

Option B: 1/3 probability of losing nothing, and a  
2/3 probability of losing \$600,000.

Which option would you select?

A: \_\_\_\_\_ B: \_\_\_\_\_

Please place an X in the space that best indicates the degree to which you prefer the chosen alternative.

weakly prefer the chosen alternative			strongly prefer the chosen alternative

**Appendix B (CONT'D)**  
**Examples Of The Format Used To Elicit The Managers' Decisions**

**Profit Condition From Experiment Three**

As manager of capital investments for your division, your task is to evaluate various investment proposals. You are considering investing in equipment to produce one of two different products. Product A is an established product with stable demand. If this alternative is selected, it will result in a sure profit of \$420,000. Product B is also being considered. This is a new product, with uncertain demand. Your staff has determined that, based on market research, you have a 75% chance to earn \$570,000 and a 25% chance that you will earn nothing if product B is marketed.

The choice you are faced with may be represented as follows:

Alternative A: A sure profit of \$420,000.

Alternative B: A 75% chance of a \$570,000 profit, and  
a 25% chance of no profit.

Which alternative would you select?

A: \_\_\_\_\_ B: \_\_\_\_\_

Please place an X in the space that best indicates the degree to which you prefer the chosen alternative.

weakly prefer the chosen alternative			strongly prefer the chosen alternative

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