

# Prior Performance and Risk Management

## Firm versus mechanism framing effects

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Recent theoretic development and research into risk and competitive interactions has begun to focus attention on the framing of these decisions by the top management teams (TMT) of organizations [1]. The enhancement of our understanding of how decision-makers frame strategic choices, and the effects of that framing on the choices made, particularly in the arena of risk, has become of critical importance to both researchers and practioners [e.g. 1, 2, 3, 4, 5]. Strategic risk decisions are particularly pertinent in this regard. These risk decisions include such choices as the degree of foreign exchange exposure, the amount of research and development undertaken, the credit risk taken on accounts receivable, and so forth. The better understanding that we can attain on the “organizational mind’s” [6] extrapolation of past and current contexts into their future decision-making perspective the more capable we will be of predicting their risk behaviors and the outcomes thereof.

The propensity of decision-makers to seek or evade risks under various organization contexts is of critical importance to organizational researchers, organizations, and indeed society in general, as such decisions can have dramatic impacts on both short term and long term performance of these organizations and the world in which they exist. The extents to which managers systematically avoid inherent risks, or take unnecessary ones, can sub optimize, or jeopardize the financial position of shareholders, employees, and creditors. These issues are especially poignant in situations where decision-makers have readily available tools to manipulate the organization’s level of risk when the management of these risks has direct implications to firm performance. Such conditions may tempt managers to behave in a manner contrary the interests of the organization.

Prior theoretical and empirical research suggests that a firm’s relative prior performance is a critical determinant in managerial risk taking behavior. However, these studies have indicated that the relationship does not tend to be linear in nature and also do not necessarily follow the financial diction of “High Risk, High Reward” [7].

This paper proposes that, by applying the framework of the Behavioral Agency Model [1] and incorporating Decision Regret [8] we will obtain a more accurate, and complete, perspective on the relationship between prior performance and strategic risk behavior. While behavioral models have traditionally been used to describe the actions and decisions of individuals, it has been suggested that they may also be useful in explaining the behavior of firms [9]. It is also important to note that the BAM model is influenced by elements of prospect theory. This is significant in that findings from other studies have provided a great deal of support for hypotheses based on differential referent points caused by relative performance position [9].

Based on these premises, the referent point of prior performance should have significant effects upon major strategic decisions such as the management of risk, however this referent point may indeed be characterized as having two elements rather than one. Prior examinations of referent dependent decision models tend to equate the referent to current performance with some

adjustment factor to reflect changes in performance over time [10]. In these models decision makers adjust their risk preferences in response to an assessment of performance relative to some performance referent. In general, these studies of decision making with regard to risk preferences have taken a largely historical perspective in that they use current performance (accumulated in the recent past) to gauge present satisfaction and thus motivate choices regarding risk. However, a key referent for gauging satisfaction is aspirations [e.g. 11, 12], which by definition is future looking.

By including the recent trend in performance this research seeks to incorporate the idea that decision-makers extrapolate into the future to assess their likely position should they continue with the same strategic position and determine alterations to current strategic positions. Furthering our knowledge of this contextual assessment will help to develop our understanding in two of the five fundamental questions of strategic management as proposed by Rumelt, Schendel, and Teece [13]; Why do firms differ? How do firms behave?

### **Theoretical Development**

Traditionally theorists have followed the finance model of risk behavior where firms accept higher levels of risk to obtain higher rates of return. Theoretically, however, researchers have recognized the necessity of differentiating concepts of strategic risk from financial risk [14, 15, 16, 17]. Strategy researchers have had mixed results when trying to confirm the risk-return relationship with regard to strategic risk. This was, in part, because of their tendency to use measurements based on financial risk models [17].

Strategic management studies, such as Bromiley's [10] study of 288 manufacturing firms, have actually found a negative risk-return relationship. Meanwhile others have found that the relationship is more of a "U" shaped relationship with higher and lower performing firms taking more risk than firms performing closer to the mean [18]. Bowman speculated that higher performing firms would tend to take higher quality risks while lower performing firms took on low quality risks. Also, he postulated that firms performing close to their industry's mean tended to take lower levels of risk and thereby maintained their profit levels over time. This created a problem for strategic risk researchers in that their findings were substantially different from those of researchers in their neighboring fields of finance and industrial organization economics.

This apparent paradox became a focal point of studies for strategy researchers specializing in the behavioral theory of the firm [e.g. 16, 19], and the related prospect theoretic field [20]. They looked at the risk/performance relationship in a different fashion. While financial model researchers looked at the effects of risk upon performance, they proposed that perhaps it was the performance that influenced the amount of risk that firms would take. Their proposals indicated that firms performing poorly relative to their competitors would seek to make adaptations involving higher risk to bring them into better alignment with the expectations of their owners [19]. This possibility did not go unnoticed by strategy researchers as they sought to explain their contradictory findings [e.g. 10, 21].

In general, prospect theory views the industry mean performance to be the target for firms performing below the industry mean. It follows that firms performing poorly would tend to be risk-seeking in nature, due to the broadened gain context [e.g. 1, 20] in which their problem is framed. Thus, it would appear that risk-seeking behavior is dependent upon both industry structural characteristics and firm specific positioning within that context [e.g. 22, 23]. It is

therefore important to note that firms will base their aspirations, expectations, and appraisals of performance upon the performance of other firms operating within a similar context.

According to Wiseman & Gomez-Mejia [1] in the Behavioral Agency Model (BAM) the trend in prior performance of the firm will also affect the framing of the risk decision. This fits well with the discussions of Collins & Ruefli [17] in their state defined model. Thus;

***Hypothesis 1:*** Firms' relative prior performance will be positively related to risk hedging behavior.

***Hypothesis 2:*** The trend in relative prior performance of the firm will be positively related to risk hedging behavior.

It is also logical that the amount of risk-seeking behavior will be directly impacted by prior performance of risk-hedging activities. As shown by Miller [24], strategic risk decisions are idiosyncratic in nature and have differential relationships to the overall risk position of the firm. Firms that are characterized by high rates of hedging, thereby considered to be highly risk-evasive, and show large levels of opportunity costs (losses in the futures trading account) will tend to reduce their levels of hedged inventory in an attempt to appropriate some portion of these potential profits. These cognitive decision factors have been referred to as "decision regret" by psychologist David Bell [8]. Decision regret is simply the impact of opportunities missed on the problem framing context of future decisions [8].

Decision regret of missed opportunities will lead decision-makers to increase their risk-seeking behavior by lowering their use of risk-evasive mechanisms. This move exposes them to greater variability in profitability, of which they are most concerned with the "chance of loss", or risk [25]. At the other end of the spectrum, firms that have large gains in their futures trading profitability will tend to maintain or increase their hedged positions. This is based upon the perception that their hedging activities and risk-evasive processes have been effective in the avoidance of loss in their overall strategic positioning. This is addressed in the argument-driven action (ADA) model proposed by Lipshitz [26]. In this perspective, the decision-maker uses past experience with the use of a particular mechanism and match it to a current or foreseen scenario. If a particular strategic maneuver was effective in increasing performance in a situation where poor performance would have been the result, he will continue, or even increase his usage of it. This is not much different than decisions relating to such products as auto insurance. The net effect of auto insurance overall is that individual car owners will pay more in premiums than the company will pay out in claims. On the other hand, individuals use this same ratio to explain why they do not insure their vehicles. This is the major impetus behind the legal requirement of insurance on vehicles.

Also, it is noted by theorists that these decisions will be focused more upon the avoidance of some negative outcome versus the bringing about of a positive one. They will therefore be more concerned with loss aversion rather than the gain context [17]. This continual adjustment and readjustment over time has been called the "decision cycles model" (DCM) [27]. Therefore the problem-framing context of decision-makers is altered by the prior effectiveness of the risk evasive mechanism over time. However, this loss evasive focus should be counter-balanced by the positive impact of the DCM model related to prior positive performance. It is also likely that trends in the performance affects of these hedging mechanisms will impact the decision framing for future usage of the tools. Thus, we hypothesize that the following relationships will exist:

**Hypothesis 3-**Relative prior profitability of the risk hedging behavior will be positively related to subsequent use of the risk hedging mechanism.

**Hypothesis 4-** The trend in relative prior performance of the risk hedging mechanism will be positively related to subsequent use of the tool.

### **Methodology**

Prior research suggests that risk-taking behavior is multi-dimensional [28], and that it is therefore important to select a measure of risk-taking behavior that is strategically critical to the focal firms. Agricultural commodities provide an opportunity to isolate these behaviors due to the typically high degree of volatility. Furthermore, many agricultural industries have fully developed, and widely used, risk hedging mechanisms that provide firms with the capability to shift their risk to speculative investors. The hedging decisions made in these markets provide a lens into a critical and substantive strategic decision in these firms.

Decisions about the usage of futures markets have been recognized to be a key strategic decision by firms [24]. These decisions can be related to currency exchange risk, time to market risk, political uncertainty risk, or even credit risk. The usage of futures markets has increased substantially over the past decade. This implies that it is not an option only available to small sectors of an industry, but capable of broad dissemination throughout the industry. Ideally, we would like to study a risk that has significant impact on the overall input/output cycle of all firms within an industry. In this respect, agricultural commodities offer an excellent picture of the relative risk positions taken by firms in the industry.

Markets for agricultural commodities offer us a unique opportunity to assess differential levels of risk acceptance and avoidance among competitive firms. Considering that price competition is the norm, and production advantages are short-lived and nominal in nature (due to ease of imitation), the willingness of firms to leave their profitability open to chance is a key differentiator in the strategic positioning between firms [e.g. 29, 30]. In markets characterized by an active, structured, and relatively liquid forward trading market (futures), risk is easily hedged away, making management discretion about the level of risk accepted a key strategic decision [30]. Two such markets were selected for the purposes of this study.

In agriculture, futures markets have been used to facilitate the shifting of risk from growers to speculators, or entities with the opposite risk position, for centuries. Markets have existed in Europe since the twelfth century at least, where sellers signed contracts that guaranteed future delivery of a product at a pre-specified price and time [31]. Agricultural commodities have been traded in the United States on a formalized market (the Chicago Board of Trade) since 1865. Processors, who tend to have the opposite risk position held by the growers, have traditionally taken the buy side transaction with respect to the hedge of the grower, thereby allowing both entities to hedge their respective risks with the same transaction.

The sample for this study is comprised of the member firms of the Florida Citrus Processors Association (FCPA), supplemented by suppliers of processed citrus juice listed in the Thomas Registry, and firms listed as processors of cocoa related products from the Thomas Registry. The citrus processors/suppliers surveyed consisted of 63 firms that process and/or sell citrus juice products and are responsible for in excess of 90% of the overall market of U.S. orange juice products.

The cocoa processors/users were selected from the listing in the Thomas Registry of cocoa related products. The original sample of 319 firms was reduced to 242 for two reasons. First, after discussions with a researcher of the cocoa markets for the United States Department of Agriculture, it was determined that two of the categories of chocolate confections initially targeted were only minor users of cocoa products. Their inclusion in the sample would be detrimental to the study due to differing levels of price risk and effect. This reduced the sample by 46. In addition, several subsidiaries were listed [31]. In that their hedging decisions would be made by the parent organization, they were not included in the sample.

The orange juice and cocoa processors were selected for reasons other than the existence of an active futures market. Key differences exist as well, that could potentially lead to greater generalizability for the study. After the selection of the orange juice sector an industry with different contextual elements was sought. The cocoa industry exhibited several important differences. First, cocoa is used in a far wider variety of products, with a large number of end producers relative to orange juice. In addition, the cocoa markets do not experience as much volatility as the orange juice markets. The geographic dispersion of cocoa growing regions leads to less weather related risk than exists in the orange juice market.

A survey was sent to each of the sample firms specifically addressed to the controller. A cover letter was attached explaining the purposes and goals of the study and emphasizing the importance to the practitioner. The controller was selected due to their access and knowledge of the accounting procedures related to hedging analysis, as well as their tendency to collect historical data necessary for this study. The anonymity of their responses was also assured. A total of 40 (63%) orange processors, and 32 (13%) cocoa processors sent in useable surveys. The overall response rate for all surveys was 24%.

## **Measures**

### *Risk Hedging Behavior.*

Adapting a measure from Kohn [32], this study used the percentage of unhedged inventory as the measure of risk seeking behavior. This measure was assessed based upon the self-reported unhedged inventory at the end of the April 1997 accounting period. This time frame was selected due to the tendency for orange juice processors to carry high levels of inventory during this period. This provides us with data at the point that firms are most vulnerable to market changes. It is also close to the end of the fiscal year for the majority of entities in the citrus processing industry. The survey specifically instructed the respondent on the method of calculation to be used (even though it is the traditional measure within the industry). The calculation requested was the amount of hedged inventory divided by the total relevant inventory (orange juice or cocoa).

### *Prior Relative Performance and Trend in Prior Relative Performance:*

Prior Relative Performance was calculated as the firms' average return on assets (ROA) over the prior 4 years adjusted for the average industry performance by subtracting the industry

average ROA from the firm ROA. This alleviates the concern for single year aberrations brought up by Bromiley [10]. Relative Performance Trend was calculated as the slope coefficient of a regression line estimate for the self-reported return on assets from 1993 through 1996. This measure was then adjusted by subtracting the industry mean trend from the individual firm value. This calculation is an adaptation of growth measures used by numerous authors in the field of strategy and economics [33]. The four-year trend (1993-1996) was selected because orange juice processors characteristically analyze their trends over this time frame. This is evidenced by the typical data supplied (five years, including current year) on performance numbers presented in annual statements of the firms. ROA was self-reported, and respondents were instructed to segregate out those returns related to the product being hedged. This helped to eliminate any corruption of the data with inclusion of returns to other products sold by the entity.

#### *Relative Risk Hedging Performance and Trend in Relative Risk Hedging Performance:*

The performance of the hedging mechanism was also measured using self-reported data. An overall loss in futures trading, however, is not indicative of a loss for the firm in that the nature of the hedge would imply an equal sized gain in the product being hedged. On the other extreme, a gain in the futures market would indicate an equal sized loss within the product being hedged. Also, it is important to note that the size of the loss/gain in futures is relative to the overall loss/gain of the firm on that particular product. If the loss/gain constitutes a significant impact relative to the overall performance of the firm, then it will tend to have a larger impact on the way the problem is framed.

Therefore, the measure needs to be adjusted to the level of impact that it exerts relative to the overall performance of the firm. Thus, the measure calculated was the loss/gain of hedging as a percentage of the overall Return on Assets for the firm. This effectively yields the relative impact of futures on the overall performance of the product being hedged, in that a firm's profit function can be viewed as a portfolio of returns to assets this relative measure was selected.

For the purposes of this study a 4- year average (1993-1996) was calculated to coincide with our overall firm performance measure. Also, these were centered about the industry mean (by subtracting/adding the industry mean) providing a relative measure of hedging performance. The trend measure was also calculated as it was in the relative prior performance trend measure.

*Control Variables:* Following Hoskisson, Hitt, Johnson & Moesel [34], this study controlled for size of firm by using the average number of full time employees (relevant product only) over the time period of the data collected. Controlling for industry [35] was accomplished by adjusting all measures by centering them on their industry mean. Though both industries selected are agricultural in nature, they vary significantly in environmental context.

### **Analysis and Results**

After analysis to determine the normality of the distributions of the variables (normality plots, histograms, & kurtosis/skewness statistical analysis) to be studied, it was determined that one variable, the size measure, would need to be logarithmically transformed. The post-transformation distribution was further analyzed for its adherence to the requirements of standard regression, and was determined to be adequately normalized. The hypotheses were tested using hierarchical regression. The results of the hierarchical regression are presented in Table 1.

Table 1: Prior Hedging Performance Effects on Current Hedging Decision

Independent Variable	Model 1	Model 2			
Size- In Employees		-.451	***	.441	***
Relative ROA 93-96				.222	**
Trend in Relative ROA 93-96				.237	**
Relative Hedging Performance 93-96				.189	**
Relative Trend in Hedging Perf. 93-96				.177	**
R <sup>2</sup>		.210	***	.459	***
Adjusted R <sup>2</sup>		.199	***	.418	***

*Note:* Standardized regression coefficients are reported.

*Significance (One-tailed):* \* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ .

The results show robust support for all four hypotheses at the  $p < .05$  level. This is despite the powerful influence of our size control variable. The standardized betas do indicate that the influence of the performance of the hedging mechanism is a bit weaker than the overall firm performance parameters (level and trend).

### Discussion & Conclusions

The focus of this study was to provide evidence on the nature of the relationship between the prior performance of the firm and risk-shifting mechanisms to the future usage of these mechanisms. The findings indicated that the relative level of prior performance was significant and that the trends in those measures were also powerful predictors of future behavior. This indicates that the context considerations for risk decisions are not necessarily only tied to the grand strategy of the firm, but is also affected by decision specific context components.

Strategy researchers have often propositioned that past performance played a role in the decision-makers framing of problems [2]. It has only come about recently that the trend in that performance may play a significant role in problem framing as well [1]. Furthermore, this study implies that strategic decisions related to risk should be assessed individually in that they have differential impacts on the organization. However, there has been little effort to study these relationships either individually, or simultaneously. By using financial, behavioral, and strategic models, it is possible that we will begin to better understand the relationship between prior performance and risk. This study fills that void and strongly indicates the importance of context in all risk decisions within the firm.

While the findings are not overwhelming, they do suggest that these relationships are complex in nature and they may indeed interact within the decision-making process. For

example, the performance of the risk-shifting mechanism may interact with the trend in prior performance. It would also be of interest to test the model in other industries and using larger data sets. This study further indicates the multifaceted nature of this relationship and while the complexity may be problematic the importance of improving our understanding of risk phenomena is essential.

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