To the Graduate Council:

I am submitting herewith a dissertation written by Craig A. Turner entitled "Betting the Farm: The Effects of Prior Performance on the Framing of Strategic Risk Decisions." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

Thomas J. Dean, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Associate Vice Chancellor and
Dean of Graduate School

Betting the Farm: The Effect of Prior Performance on the Framing of Strategic Risk Decisions

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ABSTRACT

The purpose of this study was to address the effects of prior performance on strategic risk decisions of the firm. Strategy researchers have traditionally sought to focus on the impacts of strategic risk decisions, such as Research and Development, Diversification, Credit Risk, and Financial Risk, on performance. The findings have been inconclusive and many times contradictory. This research is based on the premise that the prior performance of the firm and the outcomes associated with the risk decision involved will effect decisions related to the risk. Therefore, this dissertation seeks to provide insight into the question what is the nature of the relationship between the prior performance of firms and their strategic risk decisions?

Using a sample comprised of 72 firms (40 juice processors and 32 cocoa processors) this study collected firm performance data from 1993-1996 (Return on Assets), hedging ratio (1997), and the effect of prior hedging on

ROA (1993-1996). The findings indicate that the prior performance was indeed positively associated with higher usage of risk-evasive mechanisms. While the hypothesized moderating effect of trend in performance was not found to be statistically significant, a significant direct effect was supported. Additionally, the prior performance of the risk-evasive mechanism showed weak support at best for a positive relationship. This is truly a comforting find for those who study and teach in the field of finance.

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CHAPTER 1

INTRODUCTION

"The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk: the notion that the future is more than a whim of the gods and that men and women are not passive before nature."

(Bernstein, 1996: pg. 1)

Issues relating to the propensity of organizations and their decision-makers to either seek or evade risks have recently become a topic of interest for researchers (Wiseman & Gomez-Mejia, 1998; Collins & Ruefli, 1996; Finkelstein & Hambrick, 1996; Pablo, Sitkin, & Jemison, 1996). These questions are especially poignant in situations where decision-makers have capabilities and tools available to reduce, or even negate, the potential risk. The degree to which managers choose to avert risk, may well provide a chance for management researchers to better understand contextual determinants of firm behavior (Miller, 1997; Finkelstein & Hambrick, 1996; Lumpkin & Dess, 1995). This may be particularly evident when the decision relates to critical resource factors, such as key raw materials for production, access to markets, or demand volatility.

One such environmental context is that of agricultural firms (Ward & Behr, 1983). In response to high levels of risk associated with agricultural industries, they have developed and adopted various risk-shifting mechanisms. These mechanisms come in the form of "futures contracts" and/or "options" which provide risk-shifting (to speculators) opportunities for firms in an industry to "hedge" their factors of production (Labys & Granger, 1970). These tools allow managers to reduce their exposure to market uncertainties and thereby stabilize performance expectations (Winters & Sapsford, 1990).

Futures contracts are arrangements by which an entity promises the future delivery of a pre-specified amount of a product at a specific price. This hedges, or negates, the risk of the producer of the product against losses in the value of the specified amount of the product during the time period required to make delivery of the product (Brown, 1982). The extent to which firms use these mechanisms is a major strategic issue. Ansoff & McConnell (1990) have defined a strategic issue as "a development which is likely to have a significant impact on the performance of a firm" (1990:pg. 491). Hedging strategies also fit the prescribed idea of a "big decision" needed to allow analysis of strategic actions of a firm in that it definitely impacts

how a firm relates to its competitive environment (Barney, 1994). It can also be said that hedging decisions affect the corporate, business, and functional elements of strategy (Capon, Farley, & Hoenig, 1996). Therefore, the hedging decision is a powerful tool for management to determine the degree of risk exposure that their firm will accept.

In addition, an effective hedging strategy is capable of limiting the number of parameters upon which the firm competes. For instance, a firm that possesses superior brand recognition is capable of hedging away all risks related to raw material acquisition. This leaves the firm in a position to receive profits relating to their superior brand recognition, while eliminating their exposure to supply price risks. These hedges can be set up to protect the firm from external shocks on either the supply side, or the market side, using distinctly different techniques to accomplish the desired hedge. This allows a firm to earn rents from its competitive advantage without the risk of depleting these rents due to changes in the commodity markets.

Studies in the strategic group and competitive behavior field have postulated that individual firms, even though operating in the same strategic group, take on different levels of risk (Cool & Schendel, 1987). Further support for

this premise has been found by finance researchers who have found that the use of hedging tools differ amongst firms competing within the same industry (Bardhan, 1989). This study suggests that the acceptance of higher levels of risk may be associated with levels of "misfit" with the competitive environment (Donaldson, 1999). This misfit may be due to changes in the technical environment (outdated technology), political environment (North American Free Trade Agreement), or even the natural environment (climatic changes).

The differences in firms' propensity to engage in risk hedging activity has led to contradictory findings within the finance and strategic management fields. This has been particularly evident in the literature relating to the effects of the firm's prior performance on risk taking behavior (Kahneman & Tversky, 1979; Bowman, 1980; Bowman, 1982; Bromiley, 1991; Ruefli, 1990; Miller & Leiblein, 1996). While some of this difference can be explained by the use of "Beginning of Period Measures", commonly used in finance, versus "End of Period Measures", traditionally used in strategy (Baucus, Golec, & Cooper, 1993), there remains unexplained discrepancies in the behavior of firms. Researchers from both fields have begun to supplement their theoretical perspectives with those from behavioral

theorists to try to better explain firm behavior with respect to their risk decisions (Daniel, Hirshleifer, & Subrahmanyam, 1998; Wiseman & Gomez-Mejia, 1997).

One of the primary contributions realized form the infusion of behavioral models has been the inclusion of prior performance referents into strategic theories. A firm's relative (to similar firms) performance levels has been proposed to be a primary referent point by which firms "frame" their risk decisions. Recently, however, it has been postulated that perhaps the firm's prior trend in performance is the important referent point in the "framing" of firm's risk decisions (Wiseman & Gomez-Mejia, 1998). This leads to the research question that this paper seeks to answer: What is the nature of the relationship between the prior performance of firms and their strategic risk decisions?

This paper proposes to apply the framework of the Behavioral Agency Model (BAM)(Wiseman & Gomez-Mejia, 1998) coupled with elements of prospect theory (Kahneman & Tversky, 1979; Barney, 1994) to provide a better perspective from which to view 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 (Barney, 1994). It is also important to note that the BAM model is influenced by elements of prospect theory. However, while prospect theory proposes that firms will frame their decisions using the *relative level* of the firm's prior performance (relative to competitors), the BAM model suggests that the *trend* in prior performance will impact strategic risk decisions. 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 (Barney, 1994).

Based on these premises, the referent point of prior performance should have significant effects upon major strategic decisions such as the management of risk. This study will include both the firm's relative prior performance and their trend in prior performance as variables of interest. This should provide a more complete understanding of the overall relationship. The basic model to be followed in this paper is laid out in Figure 1.

Essentially this model asserts that the relative level of performance will have direct effects on the risk hedging decision made by firms. In addition, the relative performance of the particular risk hedging mechanism will

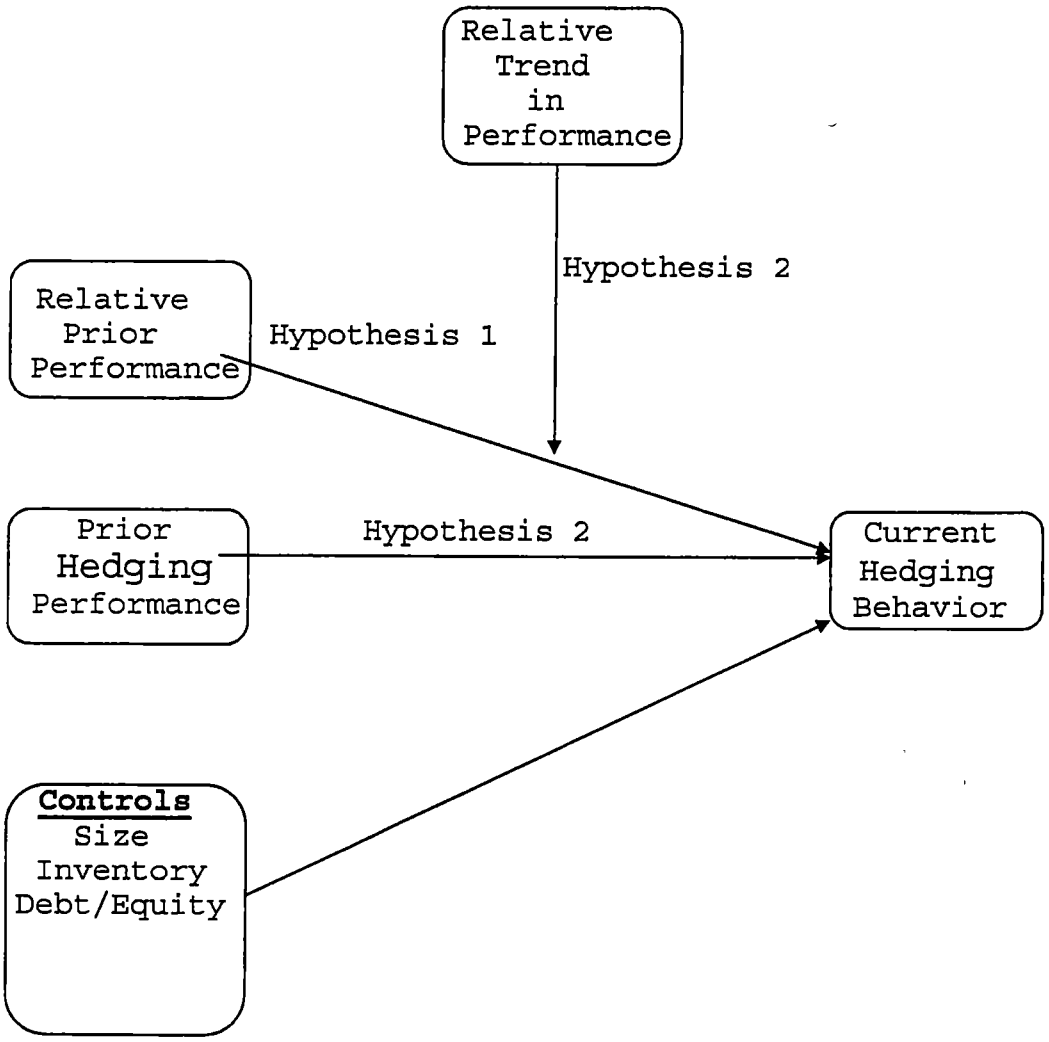


Figure 1:
Conceptual Model to be Tested

impact its future usage. Finally, the relationship between the relative level of performance and the risk-hedging behavior will be moderated by the trend in relative performance for the firm.

The effect of a firm's prior performance referent on the degree to which they avert, or accept risk has significant implications for researchers in the field of strategy. It provides additional knowledge relating to the traditional field of competitive strategic decision making and the emerging research topic of biases in strategic decision making (Schwenk, 1995). Furthering our knowledge of this relationship will also help to develop our understanding in two of the five fundamental questions proposed by Rumelt, Schendel, and Teece (1994); Why do firms differ? How do firms behave?

This study should provide practical applications for managers as well. For example, better understanding of this relationship will help large diversified firms anticipate tendencies of their divisions to accept or evade risk. Creditors of low performing firms will be concerned with proper control mechanisms to avoid unnecessarily high levels of risk-seeking behavior. Meanwhile, shareholders of high performing firms will tend to be focused on how to limit

downside risk, but not at the expense of foregoing possible upside opportunities. Creditor banks and lending institutions will find the relationships interesting in that they rarely consider the relative competitive position of the firm when establishing their covenants. Finally, providers of trading markets will be interested in noting contexts that lead to a higher usage of their products by producers.

This dissertation is designed to further develop our models relating to strategic risk. It will also provide valuable insights on the relationship between strategic risk and the traditional views of financial risk. It is important for these differences and similarities to be addressed in that our overall understanding of this relationship may well contain contextually determined elements of both. It is hoped that the issues studied in this paper will further our understanding of this important relationship.

Definitions

Categorical Position- A firm's position in an ordered set of categories with respect to the entire set of ordered categories. (Collins & Ruefli, 1996)

Hedge (Hedging)- Using the description proposed by Blau (1944) hedging is "futures trading (that) enables traders who want to minimize their value risks in the cash market to "neutralize" these risks by assuming opposite risks in the futures market". For the definition's sake, cash markets are treated as all other markets outside of the futures market (Blau, 1944; Fink & Feduniak, 1988).

Loss Aversion- preferring options that avoid losses all together over those that limit the size of the loss. (Wiseman & Gomez-Mejia, 1998)

Prospect- perceived probability of success. (Collins & Ruefli, 1996)

Risk Aversion- preferring lower risk options at the Expense of potential returns. (Wiseman & Gomez-Mejia, 1998)

Strategic Risk- Following Collins and Ruefli (1996), the strategic risk for each firm is defined by "(1) the probability of (the) firm moving from its present category of relative performance to a lower ranked category and (2) the magnitude of that move."(Collins & Ruefli, 1996; 56).

Chapter 2

Literature Review

Early Research

Research on risk can be traced back to the time of the Renaissance. In the year 1654 Chevalier de Mene, a gambler and mathematician, posed a challenge to Blaise Pascal to solve a mathematical problem. This problem, how to properly divide the stakes of an incomplete game of chance between two contestants when one is ahead, had confounded mathematicians for over 200 years. Pascal's response to this challenge led to the theory of probability which has allowed people to use mathematics models to guide their decision making process based on their predictions of the future (Bernstein, 1996).

During this same time period many of the central tenets of risk management related to business had already, or would soon be, developed. As of the late 1500's the first recorded agricultural commodity trading center had been developed in Amsterdam. Although simplistic, stock certificates, or rights of ownership to future commodities were bought and sold (Baer & Saxon, 1949). By the early 1700's life insurance annuities were first introduced,

facilitated by the calculation of life expectancy probabilities. Also during this time period, Jacob Bernoulli discovered the Law of Large Numbers, which became the enabling force behind such modern phenomena as opinion polling and stock selection (Bernstein, 1996). But, even with these tools the question of why people differed in their risk propensity remained unanswered.

Finance Perspective

Risk, as viewed through the lens of finance, has traditionally been related to the variance of a firm's returns around its expected return. This perspective is best exemplified in the primary contribution of the finance literature to our understanding of risk, the Capital Asset Pricing Model (CAPM) (Collins & Ruefli, 1996). According to Collins & Ruefli (1996) the model is a simplification of a concept presented by Markowitz (1952) by three researchers (Sharpe, 1964; Lintner, 1965; Black, 1972). Despite some detractors (Fama & French, 1992; Roll & Ross, 1994) CAPM continues to be the primary model used in financial research and practice.

Put simply, CAPM describes the relationship between risk and the required return, where a security's required

return is based upon a risk-free rate (usually estimated as the return on the S&P 500 index) plus a premium for systematic risk of the security (Van Horne & Wachowicz, Jr., 1995). Systematic risk is the change in returns of the firm attributable to changes in the overall market while unsystematic risk is the balance of variability after market changes are considered (Van Horne & Wachowicz, Jr., 1995). The measure of systematic risk of the firm obtained by the model is the firm's beta. This measure is often used in the determination of overall market risk in investor portfolio management. It is also a widely held belief that unsystematic risk, the variation of returns around the beta line (for the portfolio), can be reduced or eliminated by efficient diversification (Van Horne & Wachowicz, Jr., 1995).

As mentioned previously, there are detractors of the CAPM. Fama & French (1992) were unable to use the CAPM to accurately predict realized returns over a 50-year period. Roll & Ross (1994) also failed to find a relationship between average returns and calculated betas. Nevertheless, the lack of a superior measure has led researchers to continue the use of CAPM as their risk proxy (Dunkin, 1995; Collins & Ruefli, 1996). While the theoretical bases for the CAPM model are not called into question, its practical

use is. This is particularly true with respect to strategic risk. However, to the degree that firms are capable of making decisions that alter their beta, the CAPM can theoretically influence strategic risk.

Recently, researchers in finance have begun to incorporate psychological elements into their models in an effort to explain the non-rational market reactions found in their studies (Daniel, Hirshleifer, & Subrahmanyam, 1998). Their findings have indicated that psychological biases play two primary roles in the non-rational behavior of financial markets: 1) Overconfidence tends to lead to informed traders losing money on average, and 2) Biased self-attribution (of past gains) has a tendency to lead the investor to overconfidence.

These findings would indicate that usage and pricing of financial instruments do not behave in the way predicted by the traditional financial theorists. They do not reflect *only* the rational market valuation based on publicly available knowledge. Therefore, individuals, and firms, do indeed apply their own idiosyncratic perspective to the valuation. These valuations may well have profound effects on decisions relating to strategic risk such as diversification and hedging. This bodes well for combining theoretical bases from other disciplines, such as Management

and Psychology, with Finance theory to better understand the decision patterns of organizations and individuals.

Behavioral Perspective

Issues relating to how organizations and individuals behave when faced with decisions involving risk have been of interest to organizational scientists for decades (Cyert & March, 1963). Of particular importance to this paper are the developments focusing on the effects of prior performance of the firm, and those on risk decisions (Kahneman & Tversky, 1979; Singh, 1986; Lant & Montgomery, 1987; March & Shapira, 1987; March, 1989).

Behavioral researchers propose that a firm's perspective of its prior performance will be determined by the organization's aspiration level for performance. I am using the term aspiration level as defined by Greve (1998; 59), "the border-line between perceived success and failure and the starting point of doubt and conflict in decision making". This is theoretically similar to the premise of a "satisficing" level of performance as discussed by Simon (1976). Simon denotes this satisficing point as being the level at which managers will initiate problem-solving activities to address the insufficient performance of their

organizations. Interestingly, Simon viewed this as being purely based upon a firm's historical performance where the focal point for determining the "satisficing" level of performance was not related to the performance of other, similar firms. This provided an explanation for why firms sometimes maintain substandard practices and strategies even in the face of superior performance by other firms.

Numerous studies have supported the idea that an inverse relationship exists between performance relative to the firm's aspirations, and risk taking behavior by the firm (Kahneman & Tversky, 1979; Bowman, 1982; Singh, 1986; Lant & Montgomery, 1987; March & Shapira, 1987; Bromiley, 1991). Surveys of managers indicate that they tend to take on fewer risky projects when their performance is perceived as higher than aspirations (Singh, 1986). Other studies have provided empirical evidence that firms performing below their aspired levels tend to take on relatively higher levels of risk (Grinyer & McKiernan, 1990; Bromiley, 1991; Bolton, 1993). Therefore, it is pivotal that we understand the effects of aspiration levels on decision-making processes related to risk.

Aspiration levels are made up of two primary components, the social and historical (Greve, 1998). It is the combination of these that determine the framing of the

risk decision by an organization. The social aspect is conceived as being the performance of competitor firms, while the historical relates to the firm's past performance. The level of their relative importance will be crucial in the determination of risk preferences of the firm. While the behavioral school addresses the historical component, proponents of social comparison theory bring the social component into the equation.

Social comparison theory (Festinger, 1954; Cyert & March, 1963) proposes that firms will compare their performance relative to that of other organizations operating in similar markets. That similarity may be based upon the physical location of the firms (Baum & Lant, 1993), industry membership (Haveman, 1993), or size (Davis & Greve, 1997). Various subgroups exist as well. For instance, industry membership may be further segregated into firms exhibiting similar production techniques, relevant markets, or products (Reger & Huff, 1993). Of primary importance for this study, firms with similar performance characteristics within these groups tend to focus on the same performance referent points, either they compare themselves to other firms or their own historical performance (Haveman, 1993; Davis & Greve, 1997).

Empirical evidence has confirmed that the firm's historical performance significantly contributes to the establishment of aspiration levels (Levinthal & March, 1981). However, Lant's (1992) study showed that the determinants of aspirations varied by level of relative performance. For example, a firm whose performance is around median, or below it, will tend not to target the higher performing firms when establishing their referent group (Wood, 1989). This would imply that their aspirations tend to be based on median performance for the industry.

The contention that determinants of aspiration levels differ across varying levels of performance is important. This study will base its conceptualization upon the use of the historical referent point for higher and lower performing firms and a socially derived performance referent point for those performing close to the mean.

Behavioral theorists have also addressed the issues of prior performance of particular strategic decisions upon subsequent decisions relating to those decisions. In particular prospect theory addresses these issues in one of the biases noted by Tversky & Kahneman (1974), that of "availability", where historical instances are noted to influence decisions. It is proposed that these historical precedents will influence the decision apart from the

rational decision making elements related to utility functions.

The impacts of these historical precedents are felt in both of the major elements of the evaluation of "prospects". First of all they are initially part of the editing cycle. This is where the decision-maker, be it a firm or an individual, assesses the relative effect of past decisions on past results. The higher the effect, the more weight the decision-maker places on the operative decision parameter. This may be related to a current asset position, or can even be influenced by the predetermined expectations of the decision-maker. Secondly, the evaluation phase is impacted by historical biases. This is found in the establishment of the value function, which is weighted by a probability function based upon prior performance.

One possible basis for the establishment of these probabilities is noted in the work of March & Shapira (1987), as they proposed that past experiences with risky decisions seemed to create an aura of exceptional skill in handling of risk in the decision-maker. Managers who think themselves to bring a superior capability to handle risk may well be basing their assessment on past performances and negate the old adage that past performance is not indicative of future results.

Strategic Management Research

Risk has long been a relevant issue for researchers in strategic management and related fields. Early researchers tended to take the traditional view held by their counterparts in the field of finance using measures based on the capital assets pricing model (CAPM) for market risk and accounting risk, based upon variance of returns (performance) to assess the firm's strategic risk position. These measures were borrowed from these neighboring fields with little regard for their nomological value in describing the phenomena of interest, strategic risk (Collins & Ruefli, 1996). This was due in part to the ease, availability, and prior acceptance of these measures as proxies for strategic risk. As noted by Collins and Ruefli(1996), this apparent lack of nomological validity did little to thwart the use of the CAPM model and beta in strategy research, and authors were quite prolific and somewhat successful in the use of these measures (Aaker & Jacobson, 1987; Montgomery & H. Singh, 1984; Lubatkin & O'Neill, 1987; Barton & Gordon, 1988).

During the 1980's strategy researchers began to study the relationships between risk (as measured by variance) and

performance with some rather confounding results. They were not finding the predicted positive relationship between risk and performance (Conrad & Plotkin, 1968; Fisher & Hall, 1969; Brigham, 1985). In a landmark study using ex-post return on equity and its variance over a two-period, cross-sectional time frame, Bowman (1980) not only failed to confirm the positive risk-return relationship, but actually found a significant negative relationship between the two. By adjusting both risk measures and performance measures by the industry mean, Bowman created a 2 by 2 matrix with high and low cells for each of the measures. Using simple, non-parametric analyses, Bowman indeed found a negative relationship between 56 of his sample's 85 industries, while finding a positive relationship in only 21 (the other 8 showed no significant relationship).

In a later paper, Bowman (1982) offered a theoretical proposition to explain his findings. First, he proposed that managers of firms that perform exceptionally were also likely to be skilled decision-makers, thereby allowing them to avoid risky investments while still maintaining high profitability. Secondly, he proposed that managers of relatively low performing firms would be faced with pressures to improve their firm's relative position and

would be more likely to take on higher levels of risk to accomplish that end.

These mixed findings brought a renewed interest to the study of this perplexing relationship. In an interesting study based upon Bowman's findings, Fiegenbaum and Thomas (1986) found that Bowman's results were not stable over time, indicating that perhaps environmental factors played a role in the relationship. In particular, their study indicated that firms in industries that could be characterized as stable were likely to follow the positive risk-return relationship prescribed by the finance literature. They also found that firms in industries characterized as unstable were more apt to replicate Bowman's findings of a negative risk-return relationship.

In a later study, Fiegenbaum and Thomas (1988) developed proposals based on prospect theory (Kahneman & Tversky, 1979) to explain the difference in findings. They divided the firms within an industry into those performing above the industry mean and those that perform below the industry mean using the rationale that firms will target the industry mean performance. By segregating the industry like this, they found that firms that performed above the industry targets tend to exhibit the positive risk return relationship, while those that performed below the industry

target exhibit the negative risk return relationship found by Bowman (1980).

These findings implicated the possibility that behavioral elements may underlie these relationships. Managerial and owner aspirations became an important part of the model. One study of interest showed that performance below targeted levels led to an increased propensity for firms to take on higher levels of risk, and that risk was characterized by a negative risk-return relationship (Singh, 1986). In other words, managers of poorly performing firms tend to make riskier, and in most cases, less profitable decisions.

It is also important to note that the avoidance of a significant loss appears to be a fundamental consideration by which risk evasive activity can be ascertained (Collins & Ruefli, 1996). Firm level differences in the use of risk evasive mechanisms should allow us to better assess the risk proclivity of firms operating under differing profitability regimes and contexts. This relationship is hinted at in a study by Greve(1998) of strategic change in the radio broadcasting industry. Greve found that the managers tend to base their strategic change decision upon their performance relative to the aspired targets. The study also confirmed that these aspired targets were based on both

historical performance and social aspirations. These findings indicate that indeed there is a relationship between recent organizational experiences and the perception of opportunities to change.

Another area of organizational experience drawing the interest of theorists relates to the recent changes in performance of the firm on strategic decisions. In their paper proposing the behavioral agency model of managerial risk taking, Wiseman and Gomez-Mejia (1997) bring yet another element into this process. Using prospect theory and behavioral theories of the firm, they propose that results of recent strategic changes may indeed alter the way the risk problem is "framed". Problem framing is defined as "a choice situation as a potential loss or a potential gain relative to some reference point, such as current wealth or aspirations for wealth" (Wiseman & Gomez-Mejia, 1998). In their article, they suggest that the trend of performance will be the determining factor affecting the level of risk management that firms will undertake. This is not unlike the perception of Collins & Ruefli (1996) relating to the definition of strategic risk. They propose that the strategic risk for each firm is defined by:

"(1) the probability of (the) firm moving from its present category to a lower ranked category and (2) the magnitude of that move."(Collins & Ruefli, 1996; 56).

By combining the logic used by Wiseman and Gomez-Mejia (1998) with that of Collins and Ruefli (1996), a firm's trend (in this case downward) would increase the probability of a move into another category (in this categorization, as in the one proposed by Collins & Ruefli (1996) we use relative performance). This is supportive of organizational theorists who propose that organizational change will not be initiated until poor performance triggers it (Chandler, 1962; Child, 1972). However, incremental adaptations will still occur during a period of deteriorating returns until the "satisficing" point is crossed leading to dramatic, quantum change in the firm's strategic position (Miller & Friesen, 1984). As noted by Donaldson (1999), there is statistical support for the effect of prior performance on strategic changes in a firm (Chandler, 1962; Williamson, 1964; Child, 1972), however, there has been little formal theoretical development within this framework. This dearth is most evident in the lack of consideration for changes in performance over time.

As rents to firm's competitive advantages erode due to technological change, substitution, or imitation, managers may seek other strategic parameters by which to maintain expected levels of return until additional advantages can be developed (Choi, 1996). One such strategic parameter that would allow for high levels of discretion in a strategic choice is that of strategic risk. In that strategic risk can be addressed in an incremental way, it can be adjusted on a minute incremental scale such that it is effectively continuous. This can allow managers to "nibble away" at problems. Then they can assess the impact of the changes made and find the optimal point of efficiency (Beach, 1997). It is emphasized by Braybrooke & Lindblom(1963) that decision-makers will be more focused on moving away from problems than toward optimality. This suboptimality is based on perceptions of improvement, or the diminishing of losses related to the level of performance of the firm.

This leads to the consideration of the risk evading mechanism's prior performance impact on the framing of the risk problem for the firm. The perceived utility related to usage of risk evasive measures will be in part derived from prior gains, or losses related to their use. As proposed by Collins & Ruefli (1996), the focal perspective most apt to be taken is that of loss aversion. Therefore, it is possible

that prior losses will have a more dramatic impact on how the risk evasive mechanism is viewed strategically. David Bell (1983) proposed a model in which "decision regret" would be a key determinant of future risk decisions. As noted by Bernstein (1996), even though decision makers know that it is not possible to pick the highest profitability point to establish their hedge, they will still tend to look at losses as opportunity costs to the extent that the maximum profits exceed those of the hedged value. The effects of these decisions will be considered when similar decisions are made in the future. For example, if an investor sold a stock at $100 per share on one day to facilitate the purchase of another stock and then the market for the original stock rose the next day, while the new stock dropped, this would have ramifications on the decision-making process for subsequent trades. It is likely that the investor will be slower to relinquish long-term investments in the future (Bernstein, 1996).

This theoretical proposition has come under a framework known as the argument-driven action (ADA) model. The ADA model distinguishes itself from the normative model in that it views the level of uncertainty as the motivating force for decision-makers. As Beach (1997) points out, when the assessment of a situation indicates further uncertainty the

decision-maker will seek to use tools that have been effective in the past to alleviate, or reduce the uncertainty. This is not inconsistent with prospect theory, merely supplemental, as prospect theory focuses its framing on recognition. Recognition is a point in contextual memory that has relevance to a current scenario. This provides a basis from which a decision-maker can attach probabilities of success, or failure of a particular strategic action based upon prior occurrences of the same situation. This is also quite similar to what Simon (1979) referred to as a "policy" when a similar goal is being pursued by the course of action (Beach, 1997).

This paper will seek to meld three aspects of prior performance of the firm into an overall prior performance referent: (1) The performance of the firm relative to competitors, the trend in relative performance of the firm, and the prior performance of risk evasive techniques.

Chapter 3

Theoretical Model and Hypotheses

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 those of risk in such areas as financial risk (Bettis, 1981; Jemison, 1987; Shapira, 1995; Collins & Ruefli, 1996). 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 (Collins & Ruefli, 1996).

Strategic management studies, such as Bromiley's (1991) 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 (Bowman, 1982). 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 (Cyert & March, 1992; March & Shapira, 1987) and the related prospect theoretic field (Tversky & Kahneman, 1986). 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 (March & Shapira, 1987). This possibility did not go unnoticed by strategy researchers as they sought to explain their contradictory findings (Bromiley, 1991; Fiegenbaum & Thomas, 1986).

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 (Tversky & Kahneman, 1986; Wiseman & Gomez-Mejia, 1998) 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 (Bowman, 1980; Fiegenbaum & Thomas, 1988). 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.

This comparison is made at an ordinal level according to Collins and Ruefli (1996). Their basic focus on risk relates to the potential for dropping "categorically" to a lower level of performance. Basically they contend that a firm performing at a level of sixth out of seven firms (first being the best performer) has little downside risk in that their only move downward would be to seventh. This is proposed to have an impact on the decisions made by the firm such that their perception of gain context versus downside risk differs from the perspective held by the firm that is fourth in comparative performance. The difference in this perception should therefore lead firms performing relatively lower to take risks that would be considered too high by

firms performing categorically higher. Thus, firms that are poor performers (in past performance) would tend to accept greater amounts of risk than would relatively superior performers.

Another group of organizations that deserve researchers' attention is that of firms performing in a superior fashion within an industry. The resource based view of the firm indicates that to the degree a firm possesses superiority of assets, they will be capable of earning rents (Barney, 1994). The broader their base of superior assets, the greater their capability to earn profits. It would also follow that as firms establish superior capabilities across a broader range of assets, they would also tend to be more risk-averse in areas where volatility of price could erode the financial returns to their competitive advantage (Dierickx & Cool, 1989). Hence, firms earning higher than normal returns due to superior capabilities will be more likely to attempt to control external sources of risk which threaten to negate, or diminish the effects of such an advantage. This effectively buffers the source of their competitive advantage, thereby assuring continuity of the rents accruing to these advantages.

The recent proposal on the importance of downside risk by Collins and Ruefli (1996) also speaks to the likelihood of risk avoidance by high performing firms. The concept that downside risk relates to the probability of dropping categorically, *and* the magnitude of the possible drop, supports the idea that the higher a firm's relative performance the more risk averse they will tend to be. A firm that is the second highest performer out of seven firms in an industry would view a risk decision differently than the aforementioned firm that is the sixth ranked performer. As they viewed the same risk decision as the sixth ranked firm, they would tend to have a higher level of downside risk in their perception, offsetting the similar gain context. This would lead them to avert the risk to a higher degree than the lower performing firm. Thus;

***Hypothesis 1*- Relative performance level will be positively related to current risk hedging behavior.**

Even though they consider their position relative to competitors within their context, firms will also consider temporal changes in that position as well in their assessment of the problem (problem framing) (Wiseman & Gomez-Mejia, 1998). Bateman and Zeithaml (1989) found that the

future outlook of decision makers, or the framing of the problem, is strongly altered by the powerful psychological impacts of the firm specific changes with relationship to its contextual environment. We would anticipate firms performing below the industry average performance, but improving on a consistent basis, would view their risk problem quite differently than those performing poorly with no sign of improvement, or declining. Donaldson (1999) proposes that firms tend to consider their position in the business cycle when making risk decisions. Firms that are improving in performance are considered to "fit" with their environment, while those with a downward trend are considered to be "misfit" with the environment. He proposes that firms improving their performance will tend to be risk averse, while those declining will be risk seeking.

It is also important to consider that firms which perform relatively higher than their competitors on a consistent basis tend to base their assessment of their performance upon their own prior performance. In other words, the expectations of their owners, or owner aspiration, is predicated upon their past levels of success (March & Shapira, 1987; Webber & Milliman, 1997). As long as performance is maintained at their anticipated levels the management will remain risk averse as prescribed by agency

theorists (Donaldson, 1961; Williamson, 1964). However, if the firm's performance drops below the expected level, even if they are still performing higher than their competitors, pressures from the principals will dictate adjustments to their strategic positions to bring earnings back in line with expectations. This pressure will influence the context in which the risk problem is framed (Kahneman & Tversky, 1979; Greve, 1998) and thereby effect the decision-maker's risk position. By the very nature of problem framing, its basis in the knowledge store of the firm, the direction and magnitude of past performances will strongly impact the viewpoint of decision-makers. It is therefore anticipated that the impact of trend on the risk decision will be non-linear in nature:

> ***Hypothesis 2*-The relative trend in performance will moderate the relationship between prior relative performance and risk hedging behavior. The effect will be such that the impact of trend will be greater for relatively high performing firms than for relatively low performing firms.**

Table 1 provides a categorization of the anticipated interaction effect.

Table 1:
Categorization of Hypothesized Moderating Effect of Trend in Performance on the Relationship Between Prior Performance and Hedging Behavior.

	Relative Performance Level	
	Low	**High**
Upward Trend in Performance	**Moderate Risk Hedging (3)*** **Seeks to Continue Progress** **Referent Pt.- Social**	**High Risk Hedging (4)*** **Seeks to isolate advantages** **Referent Pt.- Historical**
Downward Trend in Performance	**Low Risk Hedging (1)*** **SEEKS TO DRAMATICALLY ALTER PERFORMANCE** **Referent Pt.- Social**	**Moderate Risk Hedging (2)*** **SEEKS TO REGAIN LOST PERFORMANCE LEVEL** **Referent Pt.- Historical**

*** Relative Ranking of Expected Risk Evasive Behavior (1-4, Highest risk hedging behavior = 4)**

Finally, the amount of risk-seeking behavior will be directly impacted by prior performance of risk-hedging activities. As shown by Miller (1998), 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(1983). Decision regret is simply the impact of opportunities missed on the problem framing context of future decisions (Bell, 1983).

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 (Fishburn, 1984).

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 (1993). In this perspective, the decision-maker uses past experience with the use of a particular mechanism and matches 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 (Collins & Ruefli, 1996). This continual adjustment and readjustment over time has been called the "decision cycles model" (DCM)(Connolly, 1988). 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. Thus, I hypothesize that the following relationship will exist:

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

Chapter 4

Methodology

Recent studies in the field of strategy have shown that it is important to disaggregate risk into distinct operational risk categories. For example, Wiseman & Catanach (1998) found that credit risk and liquidity risk exhibited a negative relationship with performance while interest rate risk showed a positive effect. Therefore this study seeks to select a crucial input and market related risk measure by which to assess the relationship between prior performance and risk decisions.

Decisions about the usage of futures markets have been recognized to be a key strategic decision by firms (Miller, 1998). 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 explosively over the past decade (Stoffels, 1994). 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 (Kenyon & Clay, 1987; Hammer, 1988). 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 (Hammer, 1988). Two such markets are those for frozen concentrated orange juice (FCOJ) and Cocoa.

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 (Bernstein, 1996). Bernstein (1996) also noted that agricultural futures markets existed in Japan in the early

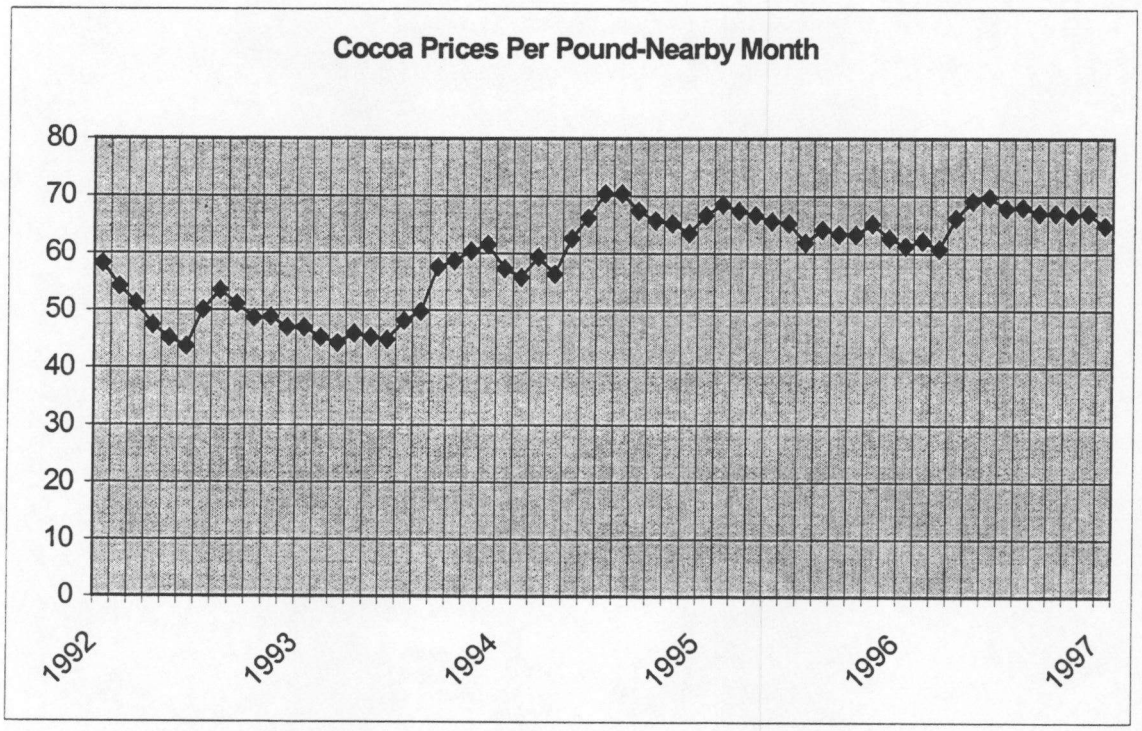
17th century. Agricultural commodities have been traded in the United States on a formalized market (the Chicago Board of Trade) since 1865. It is important to note that traditionally processors, who tend to have the opposite risk position held by the growers, have taken the buy side transaction with respect to the hedge of the grower, thereby allowing both entities to hedge their respective risks with the same transaction.

An example of this relationship would be as follows: In August a grower of oranges is concerned that the price expected from the crop on the tree might drop between the current period and January, when the crop is to be harvested. The current market price is $1.00 per pound of solids (traditional pricing quantity). Rather than risk the drop in price, the grower opts to sell a quantity of the crop on the futures market at the $1.00 a pound price (usually a risk premium is either paid or received by the parties involved). As January approaches, the basis price indeed goes down to $ .80 per pound of solids. At that time the grower receives the current market price ($ .80) from the processor and liquidates the hedging contracts that were sold by buying them back on the market at $ .80 per pound of solids. This nets a gain of $ .20 per pound of solids, thereby yielding the grower the originally desired return of

$1.00 per pound of solids ($ .80 received from processor + $ .20 profit on futures transaction). Had the market price increased to $1.20 per pound of solids, the grower would receive $1.20 from the processor. However, when settlement of the hedged futures position occurred, a net loss of $ .20 would be realized leaving the grower in the same position as the first case, receiving $1.00 per pound of solids for the portion of the crop that was hedged.

Hedgers are risk-averse and seek to shift their risk to speculators via the futures market. They seek to stabilize their profits by removing the effects of changes in price over the period of time that they must hold the product, either the growing period for the farmer, or the production time coupled with the storage period for the processor. One only has to look at the volatility of futures prices for frozen concentrated orange juice and cocoa products over time, as depicted in Figure 2, to appreciate the significance of this decision.

The sample for this study is comprised of the member firms of the Florida Citrus Processors Association (FCPA), supplemented by other suppliers of processed citrus juice listed in the Thomas Registry , and firms listed as



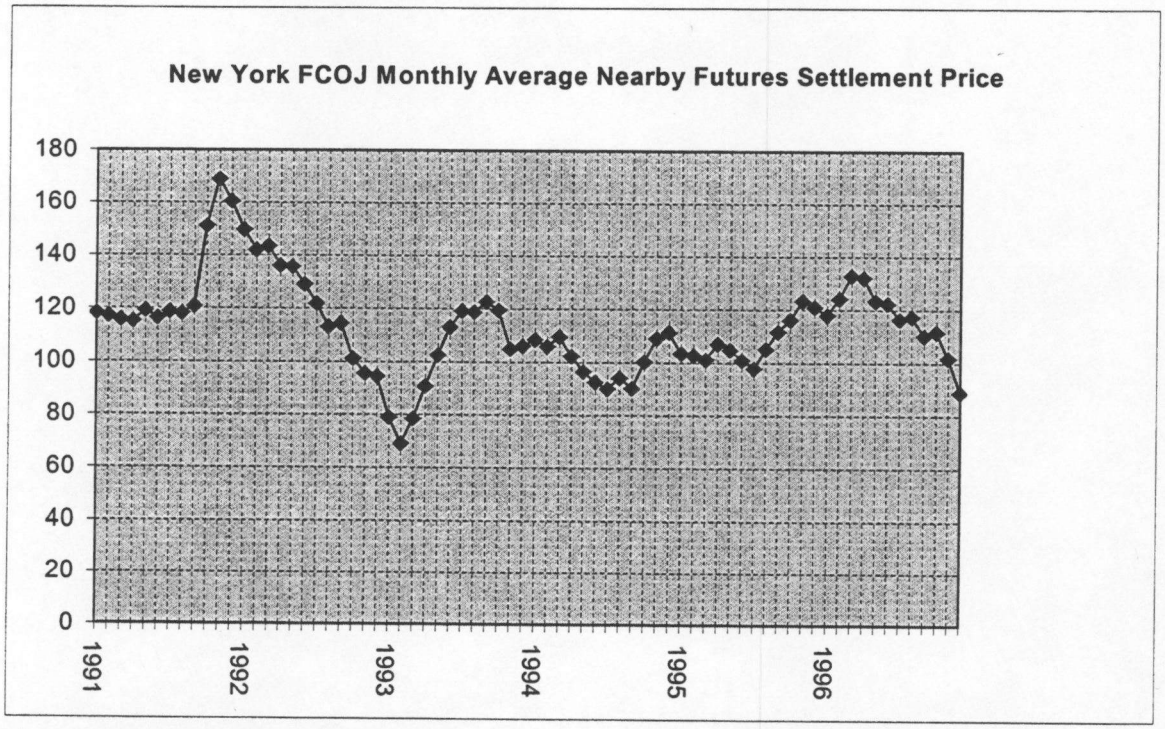


Figure 2: Market trends in OJ & Cocoa Products

processors of cocoa related products from the Thomas Registry. The citrus processors 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 of all, 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 are not characterized by the extreme level of volatility, at least to the degree that the orange juice markets have been (Figure 2). Finally, the geographic dispersion of cocoa growing regions leads to less weather related risk than exists in the orange juice market.

Interviews

In an effort to validate the importance, variability, and usage of hedging mechanisms, a set of four interviews with the primary hedging decision makers of citrus processors were held. The interviews were selected from this industry due to personal relationships with many of the key decision-makers for firms within this industry. The interviews were held in a semi-structured method, allowing for open-ended discussion of the decision-maker's perception. Firms selected for interviewing were selected for their variance in size, structure (cooperative, public, private, and subsidiary), market (private label versus brand), and performance. I only knew of the existence of a corporate wide hedging program at one of the firms. I was

aware that the vast majority of firms within this industry participated in hedging to some degree.

The findings indicated that hedging was indeed a major strategic decision for all of the firms. This was evident from the involvement of the chief executive officer (CEO) in the establishment of trading guidelines in all four firms. Furthermore, the CEO was involved in the execution of daily trades for three of the four firms. In the remaining firm, the CEO established the policy for the firm on a bi-weekly basis. However, during times of heightened levels of risk (such as weather developments), the CEO becomes more involved in the process and individual trade decisions.

The importance of this strategic decision is also shown in the resources allocated to the scanning of information related to the market. CEO's tend to scan areas of strategic importance heavily (Daft, Sormunen, & Park, 1988). All four firms showed significant commitment of assets, both human and physical, to the monitoring of the hedged position of the firm. Two had full time employees exclusively monitoring and enacting the firm's hedging strategy. In one of the cases the individual was a Ph.D. noted for his research in the technical movements of the market. All four firms had at least a 15-minute delayed system of monitoring

the price fluctuations on the market. Two had real-time data forwarded to them by satellite dishes.

Another indication of the importance is the security around the decision-making process and the implementation of the decision. In all but one case (the smallest firm), multiple decision-makers were involved in the establishment of the hedging policy. This reduces the potential for individual managers with a high tolerance for risk taking an extreme chance. Furthermore, in two of the firms, an outside member of the board of directors was involved in the hedging strategy decision. One of these two firms was the subsidiary firm in the sample, while the other had a recent history of "bad hedging strategy". The firms interviewed also shared the same tendency in the implementation of the hedging strategy (placing of trades). All but one firm had security in place that kept individuals from making large hedging moves unilaterally. In one case all trades had to be confirmed by another member of the decision making team, while in two others a minimal trade could be made unilaterally. Also of interest, the lowest ranking member of the decision making team (and authorized traders) for any of the three firms utilizing multiple decision makers held the title of vice-president. This indicates that the

decision is viewed as extremely significant due to the dedication of the firm's top decision-makers time to it.

Finally, the area of competitive secrecy was evidently critical in all firms. The interviews all began with the subjects reiterating the importance that the information being discussed was confidential in nature. The managers were reluctant to divulge information about their processes during the early stages of the interviews (average length of interview was 2½ hours), but generally were more comfortable as they began to understand the nature of the study to a greater degree.

During the interview they were asked to what degree they knew their competitors' hedging positions. In all cases they were extremely curious about their position relative to their competitors. They were also interested in how other firms were making these decisions. This indicates that not only is secrecy desired, but also these firms are successful in concealing their decisions and the processes by which they reach them. One way that their position is concealed is via the use of multiple trading brokers. All subject firms use multiple brokers, some as many as five, to make it difficult for competitors to assess their position. Two of the firms use multiple accounts at the individual brokers as well, to further complicate espionage.

With relationship to the variables in question in this study, the interviews provided support for some of the assertions, however others were almost vehemently denied. This was primarily related to the prior hedging performance relationship. In all firms interviewed, the interviewee denied that the prior performance of the hedging mechanism was instrumental in the determination of its future use. As many of them pointed out, the nature of the hedge would indicate that losses in the hedging instrument would be offset by gains in the underlying commodity sold. However, intriguingly one of the managers returned to this question, on his own, well after originally asked. His comment at that time was that he would "personally" feel that his performance was not maximizing profits for his firm if he felt that the loss was extreme.

With respect to the effects of their prior relative performance all but one of those interviewed acknowledged that it was a consideration in their hedging decision. However, it should be noted that they were very sketchy in their attempts to explain how they incorporated it into their decision. The one that did not feel that prior relative performance contributed to the hedging decision was associated with the firm characterized by the lowest level of relative performance.

The concept that the relative trend in performance would be a significant determinant of level of hedging was supported by the interviewed decision-makers. Once again, the decision-maker that represented the low performing firm did not feel that it was a consideration. The key issue here is the term *relative* in that the decision-makers indicated that they compared the trend in their performance to the overall industry trend.

Pre-Test

Orange Growers-

The survey was initially pre-tested using a peripheral industry (orange growers that use futures hedging). The selection of this industry was made based on the usage of the same hedging mechanism (FCOJ contracts) and similarity of personal contacts within the industry. A sub-sample of the focal sample of processors was not chosen due to the possibility of reduction in an already small sample. The sample for the pre-test was a convenience sample of 30 growers in the Orlando metropolitan area. There were 16 of the sample that received hand delivered copies of the survey during the period from January 29th, 1999 and February 1st, 1999. Of these, eleven of the controllers were available to

discuss the survey and what it would require of them. It was during this period that the importance of anonymity versus confidentiality surfaced. Only two of the respondents indicated a willingness to divulge the information requested in a confidential fashion, however, all eleven were willing to reply anonymously. After this, I informed the other five that their responses would be kept in an anonymous manner, with none of their data traceable to them or their firm. After this, a new cover letter (assuring anonymity) was sent with the survey to fourteen other citrus growers in the Orlando area on February 2nd, 1999. These were mailed in the Orlando area (self-addressed stamped envelope included) to facilitate rapid mail delivery.

Response to the survey was quite strong, with a total of 18 responses. The initial set of responses arrived by the 8th of February and consisted of eight responses. Five additional responses arrived by the end of the week. A postcard reminder was sent on February 10th, followed by a phone call on the 15th of February. All responses were received by the 19th.

Cocoa Processors/Users-

An additional pre-test was run on the cocoa industry sample. This was done on a random sample of 30 of the base

sample of 242. The cover letter (assuring anonymity) was sent with the survey on February 3rd. A similar time cycle of reminders followed, with the exception that no phone follow-up was used. An additional copy of the survey was sent ten days after the postcard reminder in lieu of the phone follow-up. A total of 10 responses were received within the four-week cycle. This response rate of 33.3% provided the evidence that an adequate sample could be obtained from the survey.

The pre-tests primary contributions were the validation of the availability of the data, the likelihood of adequate sample, and the clearness of the survey instrument. The adaptations (anonymity vs. confidentiality; better description of hedging performance measure) indicated by this process, increase the accuracy and reliability of the measures employed in this study.

Sampling

A survey (Appendix 2) was sent to each of the sample firms specifically addressed to the controller of the firm. A cover letter (Appendix 1) 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 surveying procedure followed the suggestions outlined by Mangione (1995), with the exception of the fourth iteration of reminders being omitted due to expense. The survey's cover page indicated that the data would be maintained in an anonymous manner, in no way traceable to the firm or the respondent. It also allowed for requests for a summary of the findings of the study if they would enclose a card with their address included. They also received a cover letter describing the purpose of this study and potential future studies. Return postage materials were enclosed with the survey to eliminate time and expense problems that could negatively affect response rates.

The surveys for the orange juice processors were mailed on March 3rd, 1999, followed by the mailing of the cocoa surveys on March 9th. This was necessitated by the need to reword the survey instrument to request information on the cocoa market rather than the orange juice market.

Response

Juice Processors-

Response was not as rapid for the orange juice processors sample as the pre-tested growers had been. This was probably influenced by the hand delivery of some pre-test surveys. Only thirteen of the sample had responded prior to the mailing of the first post-card reminder, thirteen days after the initial mail-out. During the next eleven-day period an additional sixteen completed surveys were received. After this period, calls were placed to several of the remaining sample to solicit their participation in the study. This led to seven responses, including four faxed surveys. Another mailing of the survey was sent one week later. Two additional responses were gathered by visits to the respective offices, one filling out the survey, the other offering me access to their books to fill the survey out for them. During this time four more surveys were returned via mail. Of the overall response of 42 surveys returned, 40 were usable. The other two were not completely filled out, one due to the firm's shutdown, and the other due to unwillingness to divulge the balance of the data.

This produced an extraordinarily high response rate of 63%. The high response rate is attributable to personal relationships with the controllers within this industry established during my twelve-year career as a financial manager for one of the processors.

Cocoa Processors/Users-

The response rate of the cocoa processors/users was significantly slower than that attained during the pre-test. The initial response was 15 returned surveys within two weeks of the mailing of the surveys. After the post-card reminder, four additional surveys were returned (two weeks). The final request, with attached survey, was sent four weeks after the initial request. A total of eight surveys were returned during weeks four through six, of which only three were usable. The other five were sent back either incomplete, or simply as notification of their lack of intent to participate. These responses, combined with the ten surveys returned during the pre-test (no substantive changes to the survey were made), provided a total of 32 completed surveys for the study. This only represents a 13% response rate for this industry.

The overall response rate for all surveys sent out was 24% (72 of 305). While adequate for overall level of

response, the major difference in response rate between industries indicates that response bias may be problematic within the cocoa industry sample.

Measures

Risk Hedging-

Following Kohn (1990), this study will use the hedging percentage as its measure of risk hedging. This measure will be assessed based upon the hedging percentage 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. 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). The calculation requested was to the amount of hedged inventory divided by the total relevant inventory (orange juice or cocoa products).

Firms make a conscientious decision relating to the level of risk that they desire to accept. There are few restrictions placed upon them with regard to this decision. With the exception of loan covenants, and cooperative

agreements, there are no dictates on the decision. It therefore fits quite well into the schema of strategic risk as has been called for by Ruefli, Collins, & LaCugna (1999).

Prior Relative Performance-

This was calculated as the self-reported (via survey) performance of the firm as measured by average return on assets over a three year period from 1994-1996 (Schmalensee, 1985). This controls for single year aberrations that could potentially bias the findings. The immediate prior year performance (1996) was also used due to the anticipated tendency of firms to focus on their most recent performance. Respondents were instructed to segregate out those returns related to the product being hedged to eliminate the corruption of the data with inclusion of returns to other products sold by the entity. The firm's performance on these two measures was then centered on its industry mean (by subtracting/adding the industry mean) thereby controlling for industry. This yielded the firm's performance relative to its competitors.

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 (Nelson & Collins, 1985). 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 exacts 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. This approximates the measure proposed by Brockett, Cooper, Kwon, and Ruefli (1997) for investments in a portfolio. In that a firm's profit function can be viewed as a portfolio of returns to assets this relative measure was selected.

As with the measure of relative performance, a three-year average (1994-1996) was calculated, and the immediate

prior year (1996) was assessed in the model. Also, these were centered about the industry mean (by subtracting/adding the industry mean) providing a relative measure of hedging performance.

Relative Performance Trend-

This measure was calculated by taking slope coefficient of the line estimate for the self-reported return on assets from 1993 through 1996. This measure was then adjusted by the industry mean trend (mean subtracted if positive, and added if negative). This measure is an adaptation of the measures used by numerous authors in the field of strategy and economics (Orr, 1974; Dess & Beard, 1982; Dean & Meyer, 1996).

Control Variables

Size-

Following Hoskisson, Hitt, Johnson & Moesel, 1993), 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. This is particularly relevant when consideration of the Social Comparison Model is employed. Davis and Greve (1997) suggest that firms will

use competitive firms of like size to develop their aspiration perspectives.

Industry-

Though both industries selected are agricultural in nature, they vary significantly in environmental context. Therefore, it is important to control for inter-industry differences (Dess, Ireland, & Hitt, 1990). Also, as with the control of size, Social Comparison Theory implicates industry as providing a focal point for aspiration levels (Haveman, 1993). To control for industry the hypothesized independent variables were adjusted for industry by subtracting (if industry mean was positive), or adding (if industry mean was negative) the industry mean value to the firm's performance on that particular variable. The measures controlled in this manner were Return on Assets (1994-1996 & 1996), ROA Trend (1993-1996), and Hedging Performance (1994-1996 & 1996).

Inventory Level-

The level of risk will differ for each firm as the time horizon needed to sell its inventory goes up, so does its risk. Therefore, firms with short-term inventories will tend to encounter less potential for losses due to

volatility in the market. Firms with longer-term inventories are subject to greater risk of loss due to price fluctuation. This measure was calculated as the number of months sales in inventory at the end of the April accounting period. This period was selected due to the seasonality of the orange juice industry. The majority of the crop has been processed by that time and inventories are generally at their maximum. This approximates the time of maximum risk exposure for the firms. The cocoa industry is not as seasonally sensitive due to the broad geographical growing regions.

Debt/Equity Ratio-

High levels of debt will tend to place increased demands on a firm's level of profitability. The increased expense due to increased interest expenses tends to raise what is referred to as the "satisficing level" of performance by the firm (Donaldson, 1984). This requires the firm to accept higher levels of risk in order to attain the higher profitability target (Donaldson, 1999). It is also possible that debt covenants may exist that preclude this behavior by demanding hedging protection of inventory used for collateral. Firms were specifically instructed to only fill out the survey if their hedging ratio exceeded any

required level. This would imply that their hedging behavior is discretionary.

Chapter 5

Analysis and Results

The summary statistics and the correlation matrix are presented in Table 2. The average hedging ratio for the sample was just short of 50%. This provides further evidence that the hedging of inventory is an important strategic practice of firms. Furthermore, the standard deviation of 29.15 indicates that there is a great deal of variability in the use of this mechanism.

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 (Neter, Wasserman & Kutner, 1990).

In addition hedging percentage, all ROA measures, the trend in ROA, and hedging performance were adjusted for industry mean levels. Therefore, the measure is more indicative of a firm's position relative to its counterparts in the industry.

Table 2: Correlations and Descriptive Statistics[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8
1. Hedge Position 1997 [c]	0.00	0.29	1.00							
2. Size-# of Employees[b]	5.32	1.54	.46 ***	1.00						
3. Debt/Equity Ratio	2.04	1.52	.01	-.11	1.00					
4. Inventory Level	3.11	1.24	.61 ***	.62 ***	-.13	1.00				
5. ROA-Avg. 94-96[c]	0.00	0.06	.31 ***	.07	-.15	.05	1.00			
6. ROA-1996[c]	0.00	0.07	.38 **	.03	-.10	.01	.92 ***	1.00		
7. ROA-Trend 93-96[c]	0.00	0.02	.33 ***	-.07	.01	.07	.03	.30 **	1.00	
8. Hedging Perf.-Avg. 94-96[c]	0.00	0.12	.40 ***	-.01	.04	.19	.26 **	.37 ***	.54 ***	1.00
9. Hedging Perf.-1996[c]	0.00	0.13	.33 ***	.10	.03	.22	.19	.31 ***	.54 ***	.77 ***

[a] N=72

[b] Natural Logarithm

[c] Adjusted for industry mean

Significance (Two-tailed):

*** p<.01

** p<.05

Validity and Reliability

Miller (1998) recently proposed the validity of using the hedging percentage as a proxy for strategic risk in the strategy literature. The finance literature has traditionally viewed the use of hedging mechanisms to be a vehicle by which a stable stream of returns can be accomplished (Netz, 1994). This supports the notion that hedging reduces financial risk.

To determine if the hedging mechanisms in this study fit well with this construct, a correlation between the average rate of hedging between the years 1993-1996, and the volatility of returns on assets (standard deviation over the same period) was tested. The correlation between these measures was -.3146 and significant at $p>.01$. This indicates that indeed the hedging mechanism is correlated with more stability in earnings.

The use of return on assets (ROA) in risk studies is quite common (Miller & Bromiley, 1990; Miller & Leiblein, 1996). ROA is superior to return on equity (ROE) in that it does not vary over time with changes in financial leverage. The collected data were analyzed for reliability of the ROA reported by taking the samples mean value for each of the five years and comparing those means to those reported from

a secondary source. The Leo Troy Book of Financial Ratios (1998) was used to assess the sample's representativeness of the population. Though focused on primary S.I.C. codes, it provides a basis by which to ascertain if industry patterns are consistent with those of the data collected in the survey. The correlation between the orange juice portion of the data set over the five-year period was .84 when compared to the agricultural production sector. The correlation between the cocoa sector and food and kindred products was .68. Therefore, it appears that the data collected reliably reflect upon the overall population of firms with relationship to performance.

In addition, the sample was tested for response bias based on size differences between the respondents and the overall population. The Handbook of North American Industry was used to assess the comparability of the number of employees reported by the respondents and the industry averages shown in the handbook. The orange juice processor's industry average of 188 employees per firm was within the 90% confidence interval for the mean based on the respondents' average of 348. This indicates that respondent bias is not significant in this industry. The cocoa processors/users industry average of 68 employees per firm was significantly lower than the respondents mean of 1418.

Even though this is within the statistical confidence interval at the 90% level, it appears that the larger firms had greater representation than small firms did in the sample. This is further indicated by the existence of two firms with more than 5,000 employees having responded to the survey from the cocoa sample. This would indicate that two of the five (40%) largest processors were respondents. When compared with the overall response rate of 13% this would imply a bias toward large processors.

Finally, the sample was tested for representativeness of the inventory level using the Dun & Bradstreet Industry Norms and Key Business Ratios (1997 numbers). The orange juice processor respondents average of 2.9 months inventory was well within the middle quartiles as shown in the publication. However, the cocoa respondents mean of 3.2 was in the upper quartile, once again indicating the bias toward firms with higher levels of inventory (therefore, greater price risk).

Multicollinearity

As Table 2 shows, there are two highly correlated relationships indicated. The inventory measure is correlated at .62 with the size variable, and the hedging

performance measures are correlated at the .54 level with the trend variable. While both are below the .70 cutoff determined as critical by Hanushek & Jackson (1977), the regressions were run with multicollinearity diagnostics including variance inflation factors (VIF) and tolerance scores. Also, the size and inventory measures are control variables and therefore their inclusion provides a more conservative test for the independent variables important to the study. While several of the control variables indicated VIF values of 1.7, none exceeded the threshold level recommended by Neter, Wasserman & Kutner (1990) of 2.0.

Even so, it is entirely possible that these correlations will lead to instability of the betas and their significance. All regressions were checked for changes in signs, and dramatic changes in standardized beta values. While some borderline significance changes were noted, no dramatic changes took place. Also, none of the directions of the relationships were altered.

Analysis

Control Variables

The restricted model was tested by using ordinary least squares regression. The following formula was used:

$$Y = A_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where:

Controls:

X_1 = Size of Firm (Logarithmically Transformed)

X_2 = Inventory Level (Months sales in inventory)

X_3 = Debt/Equity Ratio

Dependent Variable:

Y = % of Inventory Hedged (1997 Percentage-Adj. For Industry Avg.)

The results provided strong support for the usage of the inventory level ($p<.001$). The debt/equity ratio was not significantly related to the level of hedging used by firms in the restricted model (See Table 3). The measure was, however, weakly supported in several of the unrestricted models (See Tables 3,4, & 6). The size measure employed was also non-significant in the restricted model (See Table 3). It was weakly significant in several of the unrestricted models (See Tables 3,4, & 6). The weakness of these findings is attributable to the inflated variance due to high level of correlation between the size measure and the inventory measure. Inventory was strongly significant $p<.001$

indicating that the level of risk increased as the time exposure of the inventory on hand expanded.

Lastly, while industry was controlled by adjusting the values of each firm by the industry mean, I tested for additional industry membership effects as well. A dummy variable was added to each of the equations (where variables had been adjusted by the industry mean) to ascertain the effectiveness of the control mechanism used. In all models the dummy variable did not account for significant variance. Therefore, the control employed was deemed sufficient.

The models were also run with a dummy code control on unadjusted measures for hedging, hedging performance, performance, and trend. The industry control was highly significant in all of these tests ($p<.001$). As expected this reiterates the importance of industry context on strategic decisions. Even though the industries selected could be termed agricultural, there are significant differences in their context, and these play important roles in hedging decisions.

Hypothesis 1-

Relative performance level will be positively related to current risk hedging behavior.

This hypothesis was tested by first assessing the restricted model and then the unrestricted model, including the relative return on assets measure. The change in R^2 was then tested for significance. In that a great deal of emphasis has been placed on the proper lag structure to be used (Bromiley, 1991; Ruefli, Collins, & LaCugna, 1999), the model was tested using two, relatively short time frame measures. The prior year performance and the three-year average (1994-1996). The three year average lessens the likelihood of single year aberrations in performance (Bromiley, 1991), however, the referent point of the prior year's performance should be more intensely scrutinized by decision-makers. The current year results were excluded due to the time point of the dependent variable (hedging percentage) being prior to, and sometimes after the fiscal year cutoff.

The formulas for the regressions are as follows:

$$Y = A_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \qquad (1)$$

$$Y = A_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \qquad (2)$$

Where:

Controls:

X_1 = Size of Firm (Logarithmically Transformed)

X_2 = Inventory Level (Months sales in inventory)

X_3 = Debt/Equity Ratio

Independent Variables:

X_4 = Return on Assets- Industry Mean ROA

Dependent Variable:

Y = % of Inventory Hedged (1997 Percentage-Adj. For Industry Avg.)

The results of the hierarchical regression are presented in Table 3.

Table 3.
Relative Prior Performance Effects on Current Hedging

Independent Variables	Model 1		ROA Avg. '94-'96 Model 2		ROA 1996 Model 3	
Inventory Level	.538	***	.541	***	.549	***
Size-ln Employees	.134		.118		.120	
Debt/Equity	.091		.133	*	.131	*
ROA Measure			.292	***	.386	***
R^2	.391	***	.474	***	.538	***
Adjusted R^2	.364	***	.443	***	.510	***
R^2 Change			.083	***	.147	***

Note: Standardized regression coefficients are reported.
Significance (One-tailed): *p<.10. **p<.05. ***p<.01.

The results tend to suggest that decision-makers are more focused upon recent performance than upon averages over time. This provides some support for the relationship as proposed by Bromiley (1991) wherein the risk decision in

period t+1 is related to performance in period t. However, this study is based on a risk decision toward the *end* of period t, therefore the proper frame according to this study would be t-1.

It is important to note that there is potential for a spurious finding. For example, in a declining commodity market, firms that are characterized by higher levels of hedging will, by definition of the hedge, outperform those firms that have lower hedging percentages. It is important to note that over the time periods studied the market was volatile, but was relatively neutral in trend. Also, the results were consistently in the same direction and significant regardless of the lag structure used.

Hypothesis 2-

The relative trend in performance will moderate the relationship between prior relative performance and risk hedging behavior. The effect will be such that the impact of trend will be greater for relatively high performing firms than for relatively low performing firms.

This hypothesis suggested that there would be a significant interaction between the performance of the firm and the trend in performance for the firm, on the risk evasive behavior of the firm. The performance measure selected was the 1996 ROA for the firm due to the indication from the findings related to hypothesis 1. The model was tested using hierarchical regression, adding the measure for trend in performance in Step 2 followed by the inclusion of the interact term in Step 3. The interact term was calculated by multiplication of the two interacting variables. The variables were transformed to eliminate negative values (by adding a constant) creating values characteristic of the anticipated relationships noted in Table 1.

The four year trend, 1993-1996, was selected in that 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 (Interview, Partner-KPMG). Once again, the current year (1997) performance was not included. The progression of the hierarchical steps were as follows:

$$Y = A_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad (1)$$

$$Y = A_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \quad (2)$$

$$Y = A_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_7 X_4 X_5 + \varepsilon \quad (3)$$

Where:

Controls:

X_1 = Size of Firm (Logarithmically Transformed)

X_2 = Inventory Level (Months sales in inventory)

X_3 = Debt/Equity Ratio

Independent Variables:

X_4 = Return on Assets 1996- Industry Mean ROA 1996

X_5 = Performance Trend adjusted for industry mean (Slope Coefficient for ROA 1993-1996)

Dependent Variable:

Y = % of Inventory Hedged (1997 Percentage-Adj. For Industry Avg.)

The results of the hierarchical regression are reported in Table 4.

The results indicate that while the trend in performance significantly impacts the hedging percentage, it does not have an interactive relationship with prior performance. This indicates that decision-makers respond to them independently versus collectively. Further confirmation of the direct relationship of trend to hedging

Table 4.
Hierarchical Regression Testing Moderation Effect of ROA Trend on the Relationship Between Relative ROA and Hedging.

Independent Variable	Step 1	Step 2	Step 3
Inventory Level	.549 ***	.507 ***	.517 ***
Size-ln Employees	.120	.162 *	.147 *
Debt/Equity ln.	.131 *	.122 *	.126 *
ROA 96	.386 ***	.320 ***	.491 **
ROA Trend		.214 ***	.389 **
ROA 96 X Trend			-.279
R^2	.538 ***	.578 ***	.582 ***
Adjusted R^2	.510 ***	.546 ***	.543 ***
R^2 Change		.040 **	.004

Note: Standardized regression coefficients are reported.
All ROA related numbers adjusted for industry mean.
Trend & ROA adjusted to remove neg. values. Constant added.
Significance (One-tailed): *p<.10. **p<.05. ***p<.01.

behavior is provided on Table 5. These results further implicate a direct relationship between both relative level of performance and the relative trend in performance. It is important to note, however, that the small sample size may not supply adequate power to discern the existence of an interact effect. While not statistically significant at the p<.10 level, it was quite close. Further research using larger samples would provide a clearer picture of the relationship.

Table 5:
Results of Analysis of Categorization of Trend & Prior Performance on Hedging Behavior

	Relative Performance Level	
	LOW	HIGH
Upward Trend in Performance	Hypothesized Rank-(2) Percent Hedging: % Above Industry Mean: -2.4% Actual Rank- (3)	Hypothesized Rank-(4) Percent Hedging: % Above Industry Mean: 12.3% Actual Rank- (4)
Downward Trend in Performance	Hypothesized Rank-(4) Percent Hedging: % Above Industry Mean: -17.5% Actual Rank- (4)	Hypothesized Rank-(3) Percent Hedging: % Above Industry Mean: 7.1% Actual Rank- (2)

* Relative ranking of expected risk hedging behavior (1-4, highest risk hedging behavior = 4)

Hypothesis 3

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

The final hypothesis postulated that the usage of the hedging mechanism would be positively related to the prior performance of that mechanism. Once again I tested the same lag structures that were assessed in the ROA model, the prior year hedging performance and the three-year average hedging performance. In addition, I included the trend measure assessed in the model for hypothesis two in that the prior results indicated a significant relationship to hedging behavior. The regression equations tested were:

$$Y = A_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \qquad (1)$$

$$Y = A_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon \qquad (2)$$

Where:

Controls:

X_1 = Size of Firm (Logarithmically Transformed)

X_2 = Inventory Level (Months sales in inventory)

X_3 = Debt/Equity Ratio

Independent Variables:

X_4 = Return on Assets 1996- Industry Mean ROA 1996

X_5 = Performance Trend adjusted for industry mean (Slope Coefficient for ROA 1993-1996)

X_6 = Performance of Hedging Mechanism-% effect on ROA (adjusted for industry mean)

Dependent Variable:

Y = % of Inventory Hedged (1997 Percentage-Adj. For Industry Avg.)

The results are shown on Table 6.

Table 6.
Prior Hedging Performance Effects on Current Hedging Decision

Independent Variable	Model 1	Hedge Perf. '94-'96 Model 2	Hedge Perf. 1996 Model 3
Inventory Level	.507 ***	.478 ***	.474 ***
Size-ln Employees	.163 *	.177 **	.157 *
Debt/Equity ln.	.122 *	.113 *	.108 *
ROA 1996	.320 ***	.291 ***	.288 ***
ROA Trend 93-96	.214 ***	.162 **	.125 *
Hedging Performance Measure		.116	.187 **
R^2	.578 ***	.586 ***	.600 ***
Adjusted R^2	.546 ***	.548 ***	.564 ***
R^2 Change		.008	.022 **

Note: Standardized regression coefficients are reported. All ROA related numbers adjusted for industry mean. Significance (One-tailed): *p<.10. **p<.05. ***p<.01.

As with the prior performance in ROA, the data tends to support a short-term frame of reference for decision-makers with regard to their prior hedging performance. The three year average received no statistical support whatsoever. The prior year hedging performance was related at the p<.05 level. Two things make it difficult to assess the relevance of this finding. First, the multicollinearity issue with the trend measure makes analysis uncertain. Second, as pointed out by Bromiley (1991) it is possibly attributable to a one

year aberration in the measure. Due to the lack of consistency between the three-year average and single year measure, further research will need to be done to validate the findings.

Post-Hoc Analysis

In that the theoretical support for the consideration of relationship between trend in performance and the risk decision were discussed in the literature review, it is important that the findings of this data be discussed. As Table 4 indicated in Step 2, the data showed significant ($p<.01$) support for a direct relationship between the trend in performance *and* the relative level of performance on the hedging behavior of firms in the sample. The R^2 of this step was .58, an increase of .04 (significant at $p< .05$) over the restricted model. This would tend to support, as well as supplement, the BAM model as proposed by Wiseman and Gomez-Mejia (1998). The data point out the need to consider both of these parameters when trying to assess how decision-makers frame their risk decisions.

It is important to note that all regressions were tested for significant outliers. One observation was flagged on all of the equations. While well within the four standard deviation cutoff, the models were run without this

outlier and the significance of the results remained consistent.

Chapter 6

Discussion & Conclusions

Summary of Findings

The focus of this study was to provide evidence on the nature of the relationship between prior performance and the risk decisions made in organizations. The hypotheses suggested that the prior relative performance, the trend in that performance, and the risk specific prior performance, would impact the risk decision. More specifically, trend was hypothesized to interact with the relative performance, while relative performance and risk specific prior performance were hypothesized to have direct effects.

Strategy researchers have often propositioned that past performance played a role in the decision-makers framing of problems (Finkelstein & Hambrick, 1996; Rasheed, & Datta, 1993). It has only come about recently that the trend in that performance may play a significant role in problem framing as well (Wiseman & Gomez-Mejia, 1998). Furthermore, some have suggested that strategic decisions related to risk should be assessed individually in that they have differential impacts on the organization (Wiseman & McNamara, 1998). However, there has been little effort to

study these relationships either individually, or simultaneously.

Drawing primarily from a convenience sample of an industry in which the researcher worked (with risk management responsibility) for twelve years, a data set characterized as highly strategic in nature was collected. Indeed, this data is so sensitive that firms do not even want their historical data known. The findings from this data give us an excellent perspective on the nature of the relationship between prior performance and a major risk decision.

Relative Performance

The findings of this study were supportive of a behavioral perspective with relationship to prior relative performance's impact on risk behavior. Tests on the individual industry sector did indicate that the support was very strong within the orange juice processing portion of the sample, and somewhat weaker ($p<.05$) in the cocoa sample. However, the overall sample provided quite consistent results indicating strong statistical support of this relationship.

As suggested in the hypothesis, the higher performing firms tended to hedge their risk more. Theoretically this behavior protects the firm from risks that could reduce

their rents appropriated from their relative competitive advantage. Hedging effectively negates their downside risk of moving downward toward a lower level of performance due to alterations in the marketplace that are out of their control (Miller & Leiblein, 1996; Collins & Ruefli, 1997).

Conversely, firms characterized by relatively low levels of performance tended to hedge little of their risk, possibly hoping for market assistance to allow them to move into a higher earning level. This suggests that lower performing firms tend to intentionally accept higher levels of volatility to help them attain higher returns relative to their competitors. This also fits well with the concepts relating to downside risk as viewed by Collins & Ruefli (1997). A firm whose capabilities and competencies are significantly weaker than those of competitors will view risk as their ally. Even though they may recognize that in the long-run they may lose even more, they take the risk to avoid the certainty of lower performance in a hedged environment. In other words, there is only so far that you can drop when you are at the bottom. So the upside appears to be quite large. Prospect theorists will find this an encouraging result of this study.

This study seems to indicate that the framing of the risk decision is quite closely aligned with decision-makers perception of prior performance. This leads to efforts to

use risk management as a competitive mechanism. This provides a fertile field for cross-disciplinary study opportunities between the finance field and the strategy researchers.

Trend in Performance

While this study did not confirm that the trend in performance had a moderating impact on the relative performance relationship to risk, it did show a moderate level of support for a direct effect. This is consistent with the prescription of the BAM model (Wiseman & Gomez-Mejia, 1998).

The findings indicated that firms that were improving their performance were more likely to avert risk, while those that were trending downward were risk-seeking in their behavior. This presents several interesting issues. If the traditional view of volatility were used, then these firms should eventually outperform firms that hedge their risk, thereby becoming higher performers. This dynamic relationship provides solid support for further study of changes in hedging behavior over time.

The lack of support for a moderating impact indicates that the relationship between trend and risk is stable across all levels of performance. Therefore, deeper theoretic development should focus on these relationships as

well as upon the antecedent conditions that lead to upward versus downward trends. Risk may well play a significant role on both ends.

Hedging Performance

While only receiving moderate support in this study, it did remain stable within the sub-models assessed. This confirmed the qualitative findings during the interviews prior to formal data collection. During the interviews, three of the four decision-makers acknowledged that the opportunity cost, or the positive performance impacted their subsequent decisions on hedging. Interestingly, two of the decision-makers were from low-performing firms, while the other suggested that his perspective of these decisions was not based on a single year's performance. This would imply that perhaps there is an interactive relationship between hedging performance and relative prior performance on the hedging decision of firms. Furthermore, there may be importance in looking at the trend of performance of the hedging mechanism as well.

Also, these findings provide further evidence that risk decisions are viewed individually and not in an organization-wide context. Therefore, researchers must focus on each individual decision, understanding its

strategic positioning for the firm. For instance, the CEO was moderately involved in the hedging decision in 92% of the firms sampled. In 39% of the sample, outside members had input into the hedging decision. This points out the importance of establishing the strategic significance of the risk variable being assessed to determine the level of the decision-maker to study.

Limitations

There are several limitations to this study. First, the sample is limited to two industries, one of which has a significant respondent bias issue. While the representativeness of the orange juice processors is not in question due to the high response rate, concerns relating to the cocoa sample may have some merit. As noted in Chapter 5, comparisons of the sample's performance were tested against the relevant industry segment to check for uniformity. These comparisons tend to indicate that the firms in the sample are relatively representative of the overall population of these firms relative to overall sample performance. However, the cocoa respondents appear to be skewed toward the larger producers. This is probably due to

the large firms having a higher likelihood of using hedging tools due to greater price risk encountered by these firms.

Secondly, in an effort to assess the generalizability of the study, I contacted firms within the metal container manufacturing industry to assess their use of hedging mechanisms. Their response indicated that they had indeed used hedging mechanisms for a period of time during a particularly volatile aluminum market. The lack of expertise in this area led them to attempt to contractually control this volatility. This led to the contact of a metals processor who verified that they indeed hedged their positions. Once again, the veil of secrecy surrounded even their historical decisions. They confirmed that issues related to the supplier power, buyer power, and capabilities determined the locus of the hedging practice within the supply chain.

It is also important to note that hedging markets are available in a large variety of financial arenas as well. Interest rates, foreign exchange, stock options, and a variety of derivatives are available to firms in all industries. Therefore, risk decisions are made on the usage, or lack thereof, of hedging mechanisms in a wide array of businesses.

Conclusion

It is hoped that this exploratory study has yielded light on this complex arena of study. 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 holds significant importance to investors, creditors, and society in general.

While one of the hypotheses was unsupported (the moderating effect of trend in performance), all of the variables in the study showed some level of influence on the hedging decision. This indicates that, to accurately represent this relationship, prior performance needs to be viewed in a multi-faceted manner. While no significant interaction effect was found, both prior relative performance and the relative trend in performance had consistent significant main effects. This significance is not only statistical in nature it is practical as well. For example, in the model including controls, relative performance, relative trend in performance, and relative hedging performance, the effects on hedging behavior were calculated using the unstandardized beta coefficients. In this model a firm that performed at a level one standard deviation (.07) over the industry mean, had an impact of

increasing their hedging by 7.9%. A one standard deviation (.02) over the relative trend mean increased hedging by 3.5%. Finally, performance of the hedging mechanism of one standard deviation (.13) over the mean led to a 5.1% increase in hedging. These numbers indicate that these are noticeable effects in the strategic maneuvers of firms.

This study also leaves questions that remain to be answered. For instance, how do the trend, risk hedging, and performance interact over time? And, what effect does prior performance in other risk decisions have on hedging decisions?

Much as a football team that is down by three touchdowns at the half tends to "open up" their offense, and "takes some chances" with their defense, businesses tend to try to improve their relative positions by taking additional risks. Conversely, the team that has the large lead has the insane predisposition to put in the "prevent defense" (though many question exactly what it prevents) and run time off the clock when on offense (avoiding big play opportunities for the defense). Once again, this study seems to indicate that businesses respond in much the same way.

It appears that the study of risk and the decisions surrounding it will be incremental in nature. As the evidence accrues the complexity seems to build. This study

provides a parsimonious model from which to continue this research.

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Appendices

Appendix 1

Date

Controller
Address

Dear (Name):

I am writing you this letter to request your participation in a study of the effects of prior financial performance on the risk positioning of firms. These effects are important to help us further our understanding of strategic decision making processes at the firm level. It will also provide you with an assessment of your risk management practices relative to others in your industry.

The attached survey should take about 45 minutes of your time. Your participation is crucial to my study. The more complete the data that I receive, the more accurate my analysis will be.

I would also like to assure you that all of your responses will be maintained in an anonymous manner. Under no circumstances will your company be connected to the data that you provide. All references to your firm will be destroyed upon completion of the data collection.

If you have any questions, please feel free to contact me at: Phone: 423-974-1674; Fax: 423-974-3163; or E-mail: cturner5@utk.edu.

Thank you for your consideration and participation in this project. If you are interested in the findings of this study, please attach a business card so that I can mail you the results.

Sincerely,

Craig A. Turner

Appendix 2a

The Survey Instrument-Orange Juice

THE UNIVERSITY OF TENNESSEE
COLLEGE OF BUSINESS ADMINISTRATION

Hedging Performance Survey

All responses to this survey will be anonymous and in no way traceable to you or your firm. Please enclose a card with your name and address if you would like to have a copy of the findings sent to you upon completion of the study (this card will be separated from your data entry to protect the anonymity of your responses).

The following questions are related to the general organizational structure of your firm:

1. Which of the following ownership structures best describes your firm?

Please Circle: **Public** **Private** **Cooperative**

2. Would your firm be considered a subsidiary?

Yes **No**

3. Have the answers given in questions 1 & 2 changed during the period from 1993-1997?

Yes **No** If yes, how: (ie. Public to Private; Parent/Sub.)

4. In what year was your firm founded? _____

5. What is the average number of full time employees involved in the production/sales/marketing of orange juice related products? _____

The following questions relate to your firm's financial performance in the OJ Market:

6. By what percentage have your OJ related sales changed from 1993-1997:

Calculate as follows: **(1997sales/avg. 1993-1996sales)**= _____%

7. What was your percentage of hedged inventory (**hedged inventory/total inventory**) of OJ related product at the end of your April accounting period during the following years?

1993: _____%

1994: _____%

1995: _____%

1996: _____%

1997: _____%

Does this ratio for 1997 exceed any requirements by lending institutions? Yes No

8. How many months sales were in inventory at the end of the April 1997 accounting period?

1997: _____

9. What was your Return on Assets (ROA) (Orange Juice products only) for the following years?

1993: _____%

1994: _____%

1995: _____%

1996: _____%

1997: _____%

10. What was the effect of hedging (in percentage) on your earnings of OJ for the following years (a hedging loss of <$100,000> on pre-hedge earnings of $1,000,000 would be -10% while a hedging gain of $100,000 on pre-hedge loss of $1,000,000 would be +10%)?

1993: _____%

1994: _____%

1995: _____%

1996: _____%

1997: _____%

11. What was your firm's debt/equity ratio in the following years?

1993: _____

1994: _____

1995: _____

1996: _____

1997: _____

12. What percentage of your raw material (oranges) used in production were produced by the firm (including cooperative participants, or company owned groves) in the following years?

1993: _____%

1994: _____%

1995: _____%

1996: _____%

1997: _____%

The following questions relate to the make-up of the hedging decision-making team:

13. How many employees are involved in hedging decisions?_____

14. How many outside members of the board of directors are involved in the decision making process? _____

15. Is the compensation of any of the hedging decision making team member directly dependent upon hedging performance?

Yes **No**

16. What percentage of the overall stock of the company is owned by members of the top management team?

_____%

17. How involved is the CEO in the hedging decisions of the firm?

1	2	3	4	5	6	7
(Not Very)			(Moderately)			(Heavily)

18. Did the firm maintain multiple accounts at any of the brokerage firms?

Yes **No**

The following questions relate to your firm's competitive position relative to its direct competitors in Orange Juice Products:

19. How would you rate your firm's position relative to its competitors in production capabilities (ie. Relative cost)?

1	2	3	4	5	6	7
(Much Worse)	(Worse)	(Little Worse)	(Average)	(Little Better)	(Better)	(Much Better)

20. How would you rate your firm's position relative to its competitors in marketing capabilities (ie. Brand loyalty, Advertising Efficacy)?

1	2	3	4	5	6	7
(Much Worse)	(Worse)	(Little Worse)	(Average)	(Little Better)	(Better)	(Much Better)

21. What percentage of your FCOJ related sales are attained by:

Branded Product	_____%
Private Label /Generic	_____%
Total	100 %

Thank you for your time and effort in filling out this survey!

Appendix 2b

The Survey Instrument-Cocoa Processors

THE UNIVERSITY OF TENNESSEE
COLLEGE OF BUSINESS ADMINISTRATION

Hedging Performance Survey

All responses to this survey will be anonymous and in no way traceable to you or your firm. Please enclose a card with your name and address if you would like to have a copy of the findings sent to you upon completion of the study (this card will be separated from your data entry to protect the anonymity of your responses).

The following questions are related to the general organizational structure of your firm:

1. Which of the following ownership structures best describes your firm?

Please Circle: **Public** **Private** **Cooperative**

2. Would your firm be considered a subsidiary?

Yes **No**

3. Have the answers given in questions 1 & 2 changed during the period from 1993-1997?

Yes **No** If yes, how: (ie. Public to Private; Parent/Sub.)

4. In what year was your firm founded? _____

5. What is the average number of full time employees involved in the production/sales/marketing of cocoa related products? _____

The following questions relate to your firm's financial performance in the Cocoa Market:

7. By what percentage have your cocoa related sales changed from 1993-1997:

Calculate as follows: **(1997sales/avg. 1993-1996sales)**= _____%

7. What was your percentage of hedged inventory (**hedged inventory/total inventory**) of Cocoa related product at the end of your April accounting period during the following years?

1993: _____%

1994: _____%

1995: _____%

1996: _____%

1997: _____%

Does this ratio for 1997 exceed any requirements by lending institutions? Yes No

8. How many months sales were in inventory at the end of the April 1997 accounting period?

1997: _____

9. What was your Return on Assets (ROA) (Cocoa products only) for the following years?

1993: _____%

1994: _____%

1995: _____%

1996: _____%

1997: _____%

10. What was the effect of hedging (in percentage) on your earnings of Cocoa for the following years (a hedging loss of <$100,000> on pre-hedge earnings of $1,000,000 would be -10% while a hedging gain of $100,000 on pre-hedge loss of $1,000,000 would be +10%)?

1993: _____%

1994: _____%

1995: _____%

1996: _____%

1997: _____%

11. What was your firm's debt/equity ratio in the following years?

1993: _____

1994: _____

1995: _____

1996: _____

1997: _____

12. What percentage of your raw material (cocoa) used in production were produced by the firm (including cooperative participants, or company owned groves) in the following years?

1993: _____%

1994: _____%

1995: _____%

1996: _____%

1997: _____%

The following questions relate to the make-up of the hedging decision-making team:

13. How many employees are involved in hedging decisions?_____

14. How many outside members of the board of directors are involved in the decision making process? _____

15. Is the compensation of any of the hedging decision making team member directly dependent upon hedging performance?

Yes **No**

16. What percentage of the overall stock of the company is owned by members of the top management team?

_____%

17. How involved is the CEO in the hedging decisions of the firm?

1	2	3	4	5	6	7
(Not Very)			(Moderately)			(Heavily)

18. Did the firm maintain multiple accounts at any of the brokerage firms?

Yes **No**

The following questions relate to your firm's competitive position relative to its direct competitors in Cocoa Products:

19. How would you rate your firm's position relative to its competitors in production capabilities (ie. Relative cost)?

1	2	3	4	5	6	7
(Much Worse)	(Worse)	(Little Worse)	(Average)	(Little Better)	(Better)	(Much Better)

20. How would you rate your firm's position relative to its competitors in marketing capabilities (ie. Brand loyalty, Advertising Efficacy)?

1	2	3	4	5	6	7
(Much Worse)	(Worse)	(Little Worse)	(Average)	(Little Better)	(Better)	(Much Better)

21. What percentage of your Cocoa related sales are attained by:

Branded Product	_____%
Private Label /Generic	_____%
Total	100 %

Thank you for your time and effort in filling out this survey!

VITA

Craig A. Turner was born in Winter Garden, Florida. He received his high school diploma from West Orange High School in Winter Garden, FL. Upon completion of high school, he attended Auburn University for one year, after which he completed his Bachelor of Science Degree in Management at the University of Central Florida. He later received his Masters degree in Management from the same institution. After working in the financial field for a major citrus processor for twelve years, he entered the doctoral program at the University of Tennessee, Knoxville. He was awarded the Doctor of Philosophy degree in Business Administration in December of 1999.