
TOP MANAGEMENT TEAM RISK TAKING PROPENSITIES AND FIRM PERFORMANCE: DIRECT AND MODERATING EFFECTS

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Abstract

We investigate the influence of top management team (TMT) risk taking propensities on firm performance. Diverging from previous work on the risk taking-performance relationship, we rely on perceptual (rather than archival) measures of risk taking. In addition to financial performance, we examine other performance outcomes of risk taking, such as innovativeness and stakeholder satisfaction. Contrary to the findings of Bromiley (1991) and Bowman (1980), we find that risk taking has a strong positive influence on firm performance. In addition, the risk taking-performance relationship is moderated by the dynamism of the firm's industry. More specifically, we find that the benefits of TMT risk taking are reduced in more dynamic environments.

Introduction

An important component of the strategic management process is decision-making that involves risk. Practitioners are inundated with choices that involve varying levels of risk; yet, strategic management researchers have not devoted as much attention to risk as have practitioners (Ruefli, Collins, & Lacugna, 1999). Furthermore, the studies that do analyze risk are inconclusive in their findings regarding the relationship between risk and performance (see Aaker & Jacobson, 1987; Bowman, 1980). Moreover, the bulk of studies that address risk taking and its effect on performance measure risk taking at the firm level by using various financial indicators as proxies for the firm's level of risk. Perceptual measures of TMT risk taking propensities have been virtually ignored. Because decisions influencing a firm's overall level of risk are made by the

firm's top management team, an examination of TMT risk taking propensities may shed additional light on the effects that top executive characteristics have on firm outcomes.

We examine the effects of top management team risk propensities on a broad variety of firm performance criteria. In addition to investigating the direct effects of TMT risk taking on firm outcomes, we also examine the potential moderating effects of the firm's industry environment. Thus, both individual-level and industry-level characteristics are used to explain firm-level outcomes. Organizational performance has long been the primary dependent variable in strategic management research. Indeed, perhaps a key contribution of strategy research is that it attempts to link various organizational characteristics to performance and survival (Meyer, 1991). Researchers have linked variables such as business-level or corporate-level strategy (Miller, 1988; Porter, 1980), organizational structure (Burns & Stalker, 1961; Miller, 1988), choice of environmental domains (Bourgeois, 1985; Miller, 1992; Prescott, 1986), and strategy-making processes (e.g., Priem, Rasheed, & Kotulic, 1995) to various performance measures.

In addition, a variety of scholars have considered the influence of top managers themselves on firm performance. Population ecologists, for example, view the impact of managers on organizational outcomes as minimal (Hannan & Freeman, 1977). Researchers in the tradition of Ricardian economics accorded little role for managers as well, focusing instead on the "original, unaugmentable, and indestructible gifts of Nature" (Ricardo, 1817). Strategic choice advocates, on the other hand, have recognized the importance of the choices top managers make which set in motion processes that affect organizational outcomes (e.g., Child, 1972).

In the years since Hambrick and Mason's (1984) call for an "upper echelons" perspective on the study of organizational phenomena and Gupta's (1984) suggestion that TMT characteristics are related to firm strategies and performance, researchers have attempted to explain a variety of strategy formulation, implementation, and performance issues using TMT characteristics. The results of these studies suggest that the characteristics of a company's top executives have important consequences for firm performance. A major assumption of this paper is that managers do, indeed, matter to organizational outcomes. As Hambrick and Mason (1984) note, however, the majority of this research has focused on the characteristics of chief executive officers (CEOs). Although the characteristics of CEOs are potentially important to firm outcomes, "abundant evidence exists that studying TMTs, rather than CEOs alone, provides better predictions of organizational outcomes" (Finkelstein & Hambrick, 1996: 117). Thus, the current study is concerned with the risk taking proclivities of entire TMTs and their effects on firm performance.

Literature Review and Theory Development

Risk Taking and Firm Performance

Hambrick and Mason (1984) proposed that observable and psychological TMT characteristics have the ability to influence both strategic choice and organizational performance. In addition, Bantel and Jackson (1989) found that TMTs had at least four common characteristics: age, organizational tenure, education, and functional experience. Yet strategy researchers have given relatively little attention to the risk taking proclivities, or, in other words, the risk taking tendencies, of top executives. It is likely that TMT risk proclivities have important implications for organizational outcomes. Although there are various definitions of risk, an applicable definition is "the extent to which there is uncertainty about whether potentially significant and/or disappointing outcomes of decisions will be realized" (Sitkin & Pablo, 1992: 10). Therefore, from a TMT perspective, risk taking propensity means the extent to which the TMT is willing to engage in behaviors with uncertain and significant outcomes for the firm. By way of definition, Sitkin and Pablo (1992: 10) define the term "uncertain" in terms of "the variability of outcomes (Libby & Fishburn, 1977), lack of knowledge of the distribution of potential outcomes (March, 1978), and the uncontrollability of outcome attainment (Vlek & Stallen, 1980)." Moreover, the term "significant" denotes a full range of outcomes potentially affecting the firm, both positive and negative (Sitkin & Pablo, 1992).

Since the 1980s, a number of researchers have examined organization risk, and the vast majority of these have used financial measures of risk. In essence, prior research on the risk-performance relationship has examined the riskiness of an organization's lines of business or portfolio of business units. For example, Miller and Bromiley (1990) performed a factor analysis on nine financial performance items in an attempt to provide a simpler and more useful set of risk measurements. Their analysis produced three overall factors. One is the income stream, which appears to be the most common measure used in risk studies, and is the fluctuation of financial ratios such as ROE or ROI. Stock returns are also used to measure risk. Finally, other financial ratios (such as debt-to-equity ratios) are used to measure risk, but appear to receive less attention in risk research. This lack of attention may be due to the promotion, by many scholars, of ROI as an important measure of financial performance (Chakravarthy, 1986). Miller and Bromiley (1990) proposed that these factors determine a firm's level of strategic risk, and they tied this to firm performance. They found a significant negative relationship between income stream risk and firm performance. Other types of risk were not significant. Again using the income stream approach, Bowman (1980) also found a negative relationship between risk and organizational performance.

Using stock return risk, Aaker and Jacobson (1987) found results that were contrary to Bowman's work. They discovered that, once risk was separated into the two categories of systematic or unsystematic risk, both types of risk had

considerable positive effects on ROI. Conversely, Bromiley (1991) found, in his analysis of the securities of 288 corporations, that risk had a strong negative effect on performance.

These studies highlight several interesting issues in the study of the relationship between risk and firm performance. First, while the research mentioned above examines risk, it does so only from a financial or portfolio perspective. Second, the findings of risk-performance relationships are inconsistent; some studies show a negative relationship, while others show a positive one. Some have suggested that these inconsistencies may arise because the traditional measures of risk lack face validity (Ruefli, Collins, & LaCugna, 1999). Or in other words, these measures may not capture risk that is conceptualized by managers (McNamara & Bromiley, 1999). Other explanations of these inconsistent findings could be attributed to a failure to examine contextual factors, such as the environment, in the risk/return studies. Finally, the underlying phenomenon that drives a firm's level of risk, namely top management team risk propensities, has been ignored by this stream of research. While researchers have examined organizational risk, they have failed to examine the TMT's *willingness to take risks* and its effect on a broad variety of firm outcomes. In fact, Palmer and Wiseman (1999) found that managerial risk is a distinct and separate construct from organizational risk.

If these constructs are two distinct concepts then it is imperative to study risk from a perceptual basis to determine if there are different findings from the traditional measures of organization risk. For example, from a management perspective, psychology would dictate that risk would be positively related to performance. The reason given for this argument is that employees will anticipate negative consequences for risky decisions that did not provide the appropriate results. This risk-averse nature will then drive employees to demand higher returns for riskier decisions (McNamara & Bromiley, 1999).

Some researchers who have incorporated perceptual measures have obtained results supporting a positive relationship between risk and performance. One study in particular addressed the relationship between TMT risk taking and firm outcomes. Gupta and Govindarajan (1984) studied 58 strategic business units of eight parent companies to examine the influence of TMT characteristics and business unit strategy on the effectiveness of strategy implementation. Specifically, they studied the TMT's length of experience in sales/marketing, its willingness to take risks, and its tolerance for ambiguity. Their findings indicate that risk taking has a significant positive influence on effectiveness of strategy implementation for "build" subsidiaries and a negative influence on "harvest" subsidiaries. Also, Knight, Durham, and Locke (2001) conducted a laboratory experiment to test the effects of many constructs, including risk assessment, on performance. One interesting finding was that they found a positive relationship with managerial risk assessment and task performance. Thus, researchers have shown that managerial risk proclivities can have a positive influence on certain types of organizational outcomes.

We propose that, in general, a positive relationship exists between TMT risk taking and a broad variety of organizational outcomes. Risk-averse top management teams are not likely to become involved in groundbreaking new ventures in an attempt to enhance organizational success. Furthermore, highly risk-averse TMTs will choose strategies that maintain the status quo, thereby decreasing the firm's level of innovation and reducing the firm's commitment to cutting-edge products and technologies. By contrast, risk-seeking TMTs will be more likely to engage in behaviors that lead to process enhancements, highly competitive new products or services, innovative marketing techniques, and so on. Thus, the behaviors of risk-seeking TMTs should serve to enhance organizational performance.

Hypothesis 1: Top management team risk taking has a positive effect on firm performance.

Environmental Dynamism

Environmental dynamism is the rate of change and the unpredictability of change in a firm's competitive environment (Dess & Beard, 1984). Dynamism appears to be an important moderator in relationships between organizational structure and performance (e.g., Burns & Stalker, 1961), business-level strategy and performance (e.g., Miller, 1988), capital structure and performance (Simerly & Li, 2000), outsourcing and performance (Gilley & Rasheed, 2000), and the strategy making process and performance (e.g., Priem, Rasheed, & Kotulic, 1995). With regard to risk taking, the dynamism in a firm's environment may have an impact on the degree to which risk taking behaviors influence firm performance. If the rate of change is extremely high and the direction unpredictable, risk taking may lead to ill-advised investments of resources into products or markets that do not prove viable. This environment may be difficult to analyze and accurately assess for risky investments. Boyd and Fulk (1996) found that environmental scanning declined when the environment was perceived to be less analyzable or predictable. The implication is that with less accurate information about the environment, risky behaviors may not pay off. Thus, in more dynamic environments, the relationship between the risky behavior and the eventual outcome is more likely to be obscured. The probability of observing differences in performance attributable to risk taking is thus likely to be smaller than in stable environments.

In stable environments, on the other hand, firms often have more latitude in terms of strategic decisions (decisions that directly impact an organization, commit large resources, and are often irreversible), including risk taking. These environments can accommodate more defensive types of behaviors as well as more aggressive ones (Smircich & Stubbart, 1985; Weick, 1979). For instance, firms in stable environments are often focused more on internal efficiency than might be the case in dynamic environments. The perceived stability of the environment allows them to focus attention on process improvements. This

inward focus may take attention away from potentially important external environmental trends, however, giving firms who engage in some risk taking an advantage. Thus, firms in stable environments who continue to take some risks may benefit. Also, stable environments may be more analyzable, and TMTs may be better able to “enact” (Weick, 1979) the environment to their advantage. As Smircich and Stubbart (1985: 724) note: “...organizations are socially constructed systems of shared meaning (Burrell & Morgan, 1979; Pfeffer, 1981; Weick, 1979). Organization members actively form (enact) their environments through their social interaction. A pattern of enactment establishes the foundation of organizational reality, and in turn has effects in shaping future enactments.” A more stable and analyzable environment is likely more conducive to enacting behaviors (establishing patterns and future expectations), whereas a less predictable, turbulent environment presents less certainty about cause-effect relationships. Indeed, in a banking simulation using TMTs, Waddock and Isabella (1989) found that the more predictable or understandable the environment was perceived to be, the more proactive management was, and the higher the performance. It follows that if stable environments are easier to analyze, and TMTs increase their levels of risk taking, performance should be enhanced.

Hypothesis 2: Environmental dynamism moderates the relationship between top management team risk taking and firm performance such that, in more dynamic environments, the performance effects of risk taking are reduced.

Research Method

Sample and Sampling Procedures

A survey methodology was used to test these hypotheses. The sample included the top executive (either the CEO or president) from independent, non-diversified manufacturing firms employing more than 50 people. These individuals received a cover letter explaining the research project and were asked to complete the enclosed survey. In return for their participation, the subjects were promised an executive summary of the study's results. Follow-up letters were sent seven days after the initial mailing. These follow-up letters served as a “thank you” to participants and as a reminder to those who had not yet returned their completed surveys (Dillman, 1978). Twenty-one days after the initial mailing, non-responding firms were contacted by telephone. Of 558 firms contacted, 94 (17%) returned usable surveys in time to be included in this study. While this response rate would appear to be somewhat below expectations, the length and complexity of the survey instrument itself likely had a negative effect on our response. Due to the nature of our overall data collection effort, the survey instrument was necessarily demanding on the respondents. The data collected for the tests reported in this study are from a much larger study of business strategy. One measure in particular (not reported in the current study)

required a multi-stage response format, and the tables completed by respondents were quite lengthy and complex, despite our best efforts to simplify them. Given the relatively high *non*-response rate, we were careful to check for non-response bias. To test for this, differences in total number of employees and industry representation for responding and non-responding firms were examined. No significant differences were detected in either firm size ($c^2 = 6.13$, $df = 4$, $p > .05$) or industry type ($c^2 = 18.71$, $df = 15$, $p > .05$). While checks for non-response bias based on other factors (such as performance) would be optimal, the data for the firms in our sample were not available.

The firms in the sample represent a total of sixteen industrial sectors. Firms ranged in size from approximately 50 employees to 7,500. Median firm size was 100 employees, and the average firm had been in operation for 38 years. The average respondent was 49 years old and had been with the firm for 14 years.

Measures

Risk taking. Risk taking was measured with six items. The first two items were adopted from Miller and Friesen (1982) and asked respondents whether the firm's "top executives have a strong preference for high-risk projects," and the extent to which "bold acts are viewed as useful and common practice" by the firm's top executives. Four other items were adopted from Miller (1988) and asked whether their top executives (1) "prefer to carefully analyze a situation before moving", (2) "favor the tried and true", (3) have a "tendency to follow competitors instead of introducing new products ourselves first," and (4) "prefer to let other firms in our industry assume the risk of product or process innovations before adopting them in our firm." Responses were scored on a 7-point scale (1 = strongly disagree to 7 = strongly agree). The reliability a global, combined risk taking measure was .63. An exploratory factor analysis, using principal axis extraction techniques and a varimax rotation in SPSS (see Ford, MacCallum, & Tait, 1986), revealed that the risk taking measure was actually comprised of two factors: one for risk taking associated with introducing new products or processes ahead of competitors and another for more general risk taking. We labeled these two measures of risk taking "product/process" risk taking and "general" risk taking. The internal reliability coefficients for these two risk taking measures were .78 and .76, respectively. Each has two items. The remaining two items were not used in the analyses due to their negative effect on reliability and significant cross-loadings in the factor analysis. Those were the items dealing with favoring the tried and true and carefully analyzing a situation before moving. In each case, the items deleted were worded such that the focus was on risk *aversion*, while the remaining items were primarily focused on risk *taking*. This resulted in those two items not falling cleanly into the two factors found in the data.

Firm performance. Multiple measures of performance were used to reflect the multidimensionality of the performance construct (Cameron, 1978; Chakravarthy, 1986). Venkatraman and Ramanujam (1987) suggest using a

broad range of firm performance measures in strategy research. More specifically, Miller and Leiblein (1996) point to the need for research on risk-return relations to be extended beyond profitability measures to other organizational performance dimensions. Thus, in addition to financial measures, we examined several other performance criteria with regard to the effect of risk taking.

Regarding financial performance measures, we expected most of the small firms in the sample to be privately held. We therefore believed it unlikely, based on past experience, that the CEOs would be willing to provide detailed, accurate accounting data on firm performance. Subjective, self-reported measures of performance were thus used in this research. The CEOs were asked to report their best subjective estimates of performance compared to similar firms in their industry on a five-point scale for each of the following: after tax return on total assets, after tax return on total sales, sales growth, and overall financial performance, all for the previous twelve-month period. Measures such as these have been found to be highly correlated with objective measures of firm performance (e.g., Dess & Robinson, 1984; Venkatraman & Ramanujam, 1987). Moreover, the literature suggests that subjective measures should be used when interest centers on capturing the perspective of organizational members (Duncan, 1972) and when studying managerial behavior and decision-making (Boyd, Dess, & Rasheed, 1993). The explicit performance comparisons to similar firms provided a form of control for differences in performance due to industry (Dess, Ireland, & Hitt, 1990) and strategic group (Hatten, Schendel, & Cooper, 1978) effects. To determine each firm's non-financial performance, respondents were asked to rate their firm's R&D and advertising outlays, stability/growth of employment, process innovations, product innovations, employee compensation, employee morale/job satisfaction, customer relations, supplier relations, and overall non-financial performance relative to their competitors. For both financial and non-financial performance, responses were coded on a 5-point scale (1 = at the bottom of similar firms in the industry to 5 = at the top of similar firms in the industry).

Exploratory factor analyses (using the same techniques described above) revealed that performance had three distinct factors. The financial performance items comprise one factor. The non-financial performance items, however, created two separate factors. One non-financial performance factor deals with innovation performance, while the second factor concerns stakeholders. As a result of the exploratory factor analysis, the performance measure was split into financial performance (three items), innovation performance (three items), and stakeholder performance (four items). With the exception of stability/growth of employment and employee morale/job satisfaction, items loading significantly on multiple factors were removed. These two were retained to maintain the reliability of the stakeholder performance measure. A total of four performance items were removed, including sales growth (a "change" measure which did not fit well with the more static measures of financial performance collected), as well as overall non-financial performance and advertising outlays, which both

failed to fit with either type of non-financial performance factor. The only remaining item removed from the analyses included employee compensation. Surprisingly, it did not load cleanly on the stakeholder performance factor. This was likely caused by the financial connotations resulting from the term "compensation", which was not found in any of the remaining non-financial performance items. The internal reliability coefficients for the performance measures were .93 (financial), .80 (innovation), and .76 (stakeholders).

Confirmatory factor analysis (CFA) models were used to test the discriminant validity of the risk taking and performance constructs. CFA has been widely used as a rigorous test of construct validity (Spreitzer, 1995). The first model was designed such that each of the observed variables (the four risk taking items and ten performance items discussed above) was set to load on a single latent variable. A second model was developed such that there were two latent variables, one representing risk taking and the other representing firm performance. A third model was developed such that there were two latent variables representing risk and three representing performance. As suggested in previous research (Bollen, 1989; Medsker, Williams, & Holahan, 1994) multiple indices were used to assess the fit of each model. The criteria examined included χ^2/df , a standardized measure where a smaller value represents a better fit; the Bentler and Bonett (1980) normed fit index (NFI); Bollen's (1986, 1989) relative fit index (RFI) and incremental fit index (IFI); the Tucker-Lewis coefficient (TLI); and Bentler's (1990) comparative fit index (CFI). Fit indices closer to 1.0 indicate a better model fit, except for χ^2/df , as mentioned above. Each fit index (see Table 1) suggested that the model was a better fit to the data when risk and performance were treated as separate latent variables. In addition, there was even better model fit with two risk constructs and three performance constructs, providing additional support for the results of our exploratory factor analyses. Thus it would appear that the risk items are, indeed, distinct from the performance constructs, providing support for divergent validity. In other words, it appears that respondents differentiated substantially between the risk and performance items despite some similarities in their wordings.

Table 1
Comparison Between One, Two, and Five Factors
for Risk and Performance Items

Models	χ^2/df	NFI	RFI	IFI	TLI	CFI
Model with two risk constructs and three performance constructs	1.97	.96	.95	.98	.97	.98
Model with one risk construct and one performance construct	4.37	.91	.88	.93	.90	.93
Model with one construct comprising four risk and ten performance items	5.00	.90	.86	.92	.88	.92

Environmental dynamism. Environmental dynamism was measured using a scale developed by Miller and Friesen (1982). Responses were coded on a 7-point scale (1 = strongly disagree to 7 = strongly agree). Miller (1988) reported a reliability of this measure of .59. To increase reliability, two additional items concerning environmental dynamism were included, increasing the number of items in this scale to seven. The internal reliability coefficient of the dynamism measure was raised to .79.

Industry control variable. To control for potential industry effects, fifteen industry dummy variables (firms from sixteen industrial sectors were included in the sample) were developed using each firm's two-digit SIC code. These were then included in the regression analyses.

Analytical Techniques

Multiple regression analysis was used to test the hypothesis that top management team risk taking has a positive influence on performance. In addition, moderated hierarchical regression analysis was used to test the extent to which environmental dynamism moderates the relationship between risk taking and firm outcomes. To test the moderator hypothesis, linear-by-linear interaction terms were created by multiplying the proposed moderator (dynamism) by the two risk taking variables (Stone & Hollenbeck, 1988). After entering the main effects (product/process risk taking, general risk taking, and dynamism) and industry control variables into the equation, the multiplicative terms were added. The regression weights for the multiplicative terms were then examined for significance. Following the advice of McClelland and Judd (1993), the p-values for the moderator tests were relaxed to .10 because of the difficulty of moderator detection.

Results

Means, standard deviations, zero-order correlations, and internal reliability coefficients for the variables in our regression analyses can be found in Table 2.

Table 2
Descriptive Statistics and Correlations

	Mean	S.D.	1	2	3	4	5	6
1. Financial Performance	10.31	2.97	(.93)					
2. Innovation Performance	9.32	3.01	.30**	(.80)				
3. Stakeholder Performance	14.78	2.60	.44***	.38***	(.76)			
4. Product/Process Risk Taking	9.33	2.66	.04	.44***	.17	(.76)		
5. General Risk Taking	6.13	2.66	.31**	.64***	.42***	.37**	(.79)	
6. Dynamism	32.25	7.17	.17	.26*	-.12	.21*	.18	(.79)

* p < .05 ** p < .01 ***p < .001

Internal reliability coefficients are on the diagonal in parentheses.

Table 3 highlights the findings of our tests for the direct effects of risk taking on firm performance. As shown, a linear combination of the two risk taking measures and the industry controls, adjusted for the number of independent variables, explains 29% of the variance in financial performance, 43% of the variance in innovation performance, and 16% of the variance in stakeholder performance. General risk taking ($b = .24$, $p < .05$) was a significant predictor of innovation performance. Product/process risk taking was a significant predictor of financial ($b = .34$, $p < .001$), innovation ($b = .54$, $p < .001$), and stakeholder ($b = .46$, $p < .001$) performance. These findings suggest that organizational risk taking, especially with respect to the firm's processes and products, has a strong, positive influence on a broad variety of financial and non-financial performance measures. Thus, hypothesis 1 is supported.

Table 3
Results of Regression Analyses for Performance Implications
of Top Management Team Risk Taking

Predictors	Standardized Regression Coefficients		
	Financial	Innovation	Stakeholders
General Risk Taking	.03	.24*	.04
Product/Process Risk Taking	.34***	.54***	.46***
F (full model)	2.95***	4.63***	1.90*
R ²	.44	.55	.33
Adj. R ²	.29	.43	.16
df	17, 65	17, 65	17, 65

* $p < .05$ *** $p < .001$

Industry dummy variables were omitted from this table for clarity of presentation.

Table 4 shows the results of our analyses for the moderating effects of environmental dynamism. Our second hypothesis suggested that the effects of risk taking on firm performance would be contingent on the environment in which the firm was operating. Our results provide moderate support for this notion. First, the effects of general risk taking on organizational innovation were found to be contingent on dynamism within the industry environment ($b = -1.01$, $p < .10$). The effects of product/process risk taking on financial performance appear to be contingent on environmental dynamism ($b = -.86$, $p < .10$) as well. The effects of risk propensities on stakeholder performance appear *not* to be contingent on environmental conditions. Nevertheless, our results show moderate support for the idea that the effects of risk taking are not the same for all firms. On the contrary, it would appear that organizational context (dynamism in this case) has an effect on the organization-level results of managerial risk taking behaviors. In other words, it appears that, in more dynamic environments,

risky behaviors may have less of an impact on firm performance. Conversely, in more stable environments, organizations may have more to gain through riskier behavior. Thus, hypothesis 2 is moderately supported.

Table 4
Results of Regression Analyses for Moderating Effects of Environmental Dynamism

Predictors	Standardized Regression Coefficients		
	Financial	Innovation	Stakeholders
General Risk Taking	-.54	-.62	.22
Product/Process Risk Taking	-.44	1.05*	.24
Dynamism	.68	.59*	-.19
General Risk Taking x Dynamism	-.67	-1.01 [†]	.17
Product/Process Risk Taking x Dynamism	-.86 [†]	-.59	-.27
F (full model)	3.76***	4.34***	1.74
R ²	.55	.59	.36
Adj. R ²	.41	.45	.15
df	20, 61	20, 61	20, 61

[†]p < .10 *p < .05 ***p < .001

Industry dummy variables were omitted from this table for clarity of presentation.

Discussion

With regard to the performance implications of TMT risk taking, our results suggest that TMT risk taking propensities have a significant influence on firm performance. More specifically, we found that TMTs that take risk (especially with regard to process and product enhancements) achieve superior levels of financial and non-financial performance. In addition, we found that the effects of risk taking on firm performance are not the same for all firms. Rather, the benefits of risk taking appear to be reduced somewhat by increasing levels of dynamism within the firm's industry environment. These results are discussed more fully below, as are the study's limitations and some suggestions for future research.

Risk Taking, Dynamism, and Firm Performance

Our results suggest that TMT risk taking has both a direct and an indirect effect on organizational performance. Regarding direct effects, we found that risk taking by top management teams has a significant, positive influence on the

performance of the firms they serve. Thus, we have provided additional support for the notion that managers do indeed make a difference. This study challenges the population ecology perspective, and presents further evidence that TMTs do influence organizational outcomes. Other studies support this conclusion as well (e.g., Daboub, Rasheed, Priem, & Gray, 1995; Hitt, Nixon, Hoskisson, & Kochhar, 1999). Our results indicate that risk-averse executives should increase the extent to which they choose innovative new strategies in an attempt to enhance their firms' performance.

Regarding indirect effects, we found that environmental dynamism partially moderates the effects of risk taking on firm outcomes. In more dynamic environments, the performance effects of TMT risk-taking proclivities had somewhat less of an effect on performance. Conversely, TMT risk taking had a somewhat more positive effect on firm performance in less dynamic environments. These findings perhaps cast some doubt on Lieberman and O'Connor's (1972) findings about "inertial" organizations.

Our results also provide a different perspective on the risk and return paradox, by finding that risk is positively related to firm performance. To reach this conclusion, we used non-financial rather than financial measures to calculate risk. The traditional financial measures can provide some support that an organization, which is perceived to be risky (e.g. high variation in ROE), is likely to have negative performance (e.g. high variation in ROI). While these measures can provide some insight about organizational risk by illustrating the risk/return paradox, analysis of ROI and ROE does not capture the perceptual and cognitive aspects of the executive. Thus, the traditional approach to measuring risk is likely more suitable for analyzing risk in the context of financial or outcome variability. Behavior, however, is too complex to be measured by only a financial model or measurement (March & Shapira, 1987). The psychometric measurement, therefore, calculates risk in a different context, which has led to a different conclusion about the risk/return relationship. A recent study performed by McNamara and Bromiley (1999) incorporated such measures of perception that assess risk from the manager's perspective rather than from the traditional manner of measuring risk using income stream analysis. Also, Knight, Durham, and Locke (2001) used managerial risk assessment and found a positive relationship between risk and task performance.

Our findings have provided some insight as to the importance of TMTs' risk-taking tendencies and the effects of dynamism. These results can have practical applications for managers and their organizations. Managers might benefit from determining the degree to which their environment is dynamic, and assessing the appropriateness of risky decisions. For those firms in more stable, predictable environments, our results suggest that some risk taking may prove fruitful, and that the competition may miss important opportunities that more aggressive firms can use to their advantage.

Limitations and Future Research

This study has several limitations. First, the generalizability of this study's findings may be limited. Although the sample was representative of the population of interest based upon firm size and industry type, there is a striking lack of representation of firms in various stages of industry development. There were no firms in introduction-stage industries and only one in a decline-stage industry (self-reported). In addition, all of the firms in our sample were manufacturers. Future research should attempt to gather risk-taking data from executives in firms in introduction- and decline-stage industries, as well as from those in service industries. These factors may play an important role in the relationships among risk taking, environmental dynamism, and firm performance.

In addition, a better risk aversion measure is needed. While the reliabilities of the two risk-aversion measures used in this study are sufficiently high, they only contain two items each. A more comprehensive measure of risk aversion may shed additional light on the relationship between risk taking and performance. Also, objective measures of performance were not available for the majority of firms in the sample because they are privately held. Although prior research has indicated a strong relationship between archival and perceptual measures of performance (Dess & Robinson, 1984; Venkatraman & Ramanujam, 1987), there is no guarantee that this is the case in our sample. Examining archival performance measures and their relationship to risk taking may add to our knowledge of this topic and is a suggestion for future research.

Also, given that our study is cross-sectional and correlational in nature, our conclusions of causation must be viewed with caution. While there are strong theoretical reasons for our assertions that risk taking will have an effect on subsequent firm performance, there is also the possibility that more successful top management teams make riskier decisions as a result of prior successes.

Another concern is that our interaction terms were only significant at $p < .10$. While recent research suggests that it is more difficult to find moderating effects in field studies than in experiments (Aguinis, 1995; McClelland & Judd, 1993; Stone-Romero, Alliger, & Aguinis, 1994), our interaction results should be viewed with caution. A recurring theme for this difficulty in finding statistical significance is that field studies have more noise, and thus are less sensitive than experiments. Power appears to be much lower in field studies. Therefore, power is an important matter when dealing with moderated models. In fact, some researchers found that small, medium, and large moderating effects may go undetected with sample size of 120. Our sample is 94 firms; thus power is likely low in this study. Also, McClelland and Judd (1993) provide support that in field studies there is a greater likelihood to have an ordinal interaction than in experimental designs. The rationale is that in field studies, there are "theoretical constraints on the nature of the interaction", and thus ordinal interactions are more likely to occur than disordinal interactions. Ordinal interactions make it more difficult to find significant interaction term variance. Experimental studies are more sterile, and may not have these constraints and thus tend to have

disordinal interactions. Lastly, measurement errors in field studies are considerably greater than in experimental designs, and thus make it more difficult to find significant interaction effects (McClelland & Judd, 1993).

Finally, a general criticism of survey research is common method variance, because the independent and dependent constructs are often measured entirely with self-reported data (as was the case here). One cannot dismiss Podsakoff and Organ's (1986) admonition to avoid measuring the independent and dependent variables by the same source, since there is a potential for questionable results. This counsel is particularly important to consider, since the moderated relationship was only significant at a p -value of $< .10$. Yet, common method variance may not be as much of a limitation as once thought, because although common method variance inflates zero-order correlations, it also increases the shared variance among the independent variables (Shaffer, Harrison, & Gilley, 1999). This makes it more difficult to find unique, significant beta weights (Florey & Harrison, 2000) and reduces the chance that common method variance had a major effect on the conclusions of this study. Additionally, in order to "second-guess" the hypotheses, subjects would have been required to purposefully match their responses to the environmental dynamism scale with the various risk taking and performance measures, without any cues as to the predicted "appropriate" matches required for superior performance. Given the complexity of the hypotheses, it is unlikely that CEOs could have somehow "structured" their responses to performance questions to reflect previous responses to the multiple items that measured the predictor variables (e.g., Doty, Glick, & Huber, 1993). Nevertheless, one cannot absolutely rule out the possibility that respondents artificially answered in a consistent fashion.

Despite these limitations, one should be cautiously optimistic of our findings. Our results on the linkage of risk and performance are promising, and the results on the moderated relationship are encouraging for further strategic research. The use of perceptual measures of risk is relatively new; hence, this study was performed to determine if risk could be positively related to return based on psychometric measures. Therefore, while this study has provided some insight to the measurement of risk, it should be seen as a building block for more risk/return studies based on management risk.

Conclusion

Although researchers have devoted considerable attention to top management teams and their influence on firm outcomes, findings regarding the performance effects of TMT risk-taking proclivities are scanty. We have attempted to fill this gap in the literature by exploring the relationships among TMT risk taking, environmental dynamism, and firm performance. Our results suggest that TMT risk taking has an important effect on a broad variety of organizational performance measures. In addition, we found that the relationship between risk taking and firm performance is moderated by environmental dynamism such

that, in more stable environments, the performance benefits of risk taking can be more easily realized. Alternately, in more dynamic environments, risk taking has less of a positive impact on firm outcomes.

References

- Aaker, D., & Jacobson, R. (1987). The role of risk in explaining differences in profitability. Academy of Management Journal, 30, 277-296.
- Aguinis, H. (1995). Statistical power with moderated multiple regression in management research. Journal of Management, 21, 1141 – 1158.
- Bantel, K.A., & Jackson, S.E. (1989). Top management and innovations in banking: Does the composition of the top team make a difference? Strategic Management Journal, 10, 107-124.
- Bentler, P. (1990). Comparative fit indexes in structural models. Psychological Bulletin, 107, 238-246.
- Bentler, P.M., & Bonett, D.G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88, 588-606.
- Bollen, K.A. (1986). Sample size and Bentler and Bonett's nonnormed fit index. Psychometrika, 51, 375-377.
- Bollen, K.A. (1989). Structural Equations with Latent Variables. New York: Wiley.
- Bourgeois, L.J. (1985). Strategic goals, perceived uncertainty, and economic performance in volatile environments. Academy of Management Review, 28, 548-573.
- Bowman, E.H. (1980). A risk/return paradox for strategic management. Sloan Management Review, Spring, 17-31.
- Boyd, B.K., Dess, G.G., & Rasheed, A.M. (1993). Divergence between archival and perceptual measures of the environment: Causes and consequences. Academy of Management Review, 18, 204 – 226.
- Boyd, B.K., & Fulk, J. (1996). Executive scanning and perceived uncertainty: A multi-dimensional model. Journal of Management, 22, 1-21.
- Bromiley, P. (1991). Testing a causal model of corporate risk taking and performance. Academy of Management Journal, 34, 37-59.
- Burns, T., & Stalker, G.M. (1961). The management of innovation. London: Tavistock Publishing.
- Burrell, G., & Morgan, G. (1979). Sociological paradigms and organizational analysis. London: Heinemann.

- Cameron, K. (1978). Measuring organizational effectiveness in institutions of higher education. Administrative Science Quarterly, 23, 604-632.
- Chakravarthy, B. (1986). Measuring strategic performance. Strategic Management Journal, 6, 437-458.
- Child, J. (1972). Organizational structure, environment and performance: The role of strategic choice. Sociology, 6, 1-22.
- Daboub, A.J, Rasheed, A.M., Priem, R.L., & Gray, D.A. (1995). Top management team characteristics and corporate illegal activity. Academy of Management Review, 20, 138-170.
- Dess, G.G., & Beard, D. (1984). Dimensions of organizational task environments. Administrative Science Quarterly, 29, 52-73.
- Dess, G. G., Ireland, R.D. & Hitt, M.A. (1990). Industry effects and strategic management research. Journal of Management, 16, 5-25.
- Dess, G. G., & Robinson, R.B. (1984). Measuring organization performance in the absence of objective measures: The case of the privately-held firm and the conglomerate business unit. Strategic Management Journal, 5, 265-273.
- Doty, D. H., Glick, W. H., & Huber, G. P. (1993). Fit, equifinality, and organizational effectiveness: A test of two configurational theories. Academy of Management Journal, 36, 1196-1250.
- Dillman, D.A. (1978). Mail and telephone surveys: The total design method. New York: Wiley.
- Duncan, R.B. (1972). Characteristics of organizational environments and perceived environmental uncertainty. Administrative Science Quarterly, 17, 313 – 327.
- Finkelstein, S., & Hambrick, D. C. (1996). Strategic leadership: Top executives and their effects on organizations. St. Paul, MN: West Publishing.
- Florey, A., & Harrison, D. (2000). Responses to informal accommodation requests from employees with disabilities: Multistudy evidence on willingness to comply. Academy of Management Journal, 43, 224-233.
- Ford, J.K., MacCallum, R.C., & Tait, M. (1986). The application of exploratory factor analysis in applied psychology: A critical review and analysis. Personnel Psychology, 39, 291-314.
- Gilley, K.M. & Rasheed, A. (2000). Making More by Doing Less: An Analysis of Outsourcing and its Effects on Firm Performance. Journal of Management, 26, 763-790.

- Gupta, A.K. (1984). Contingency linkages between strategy and general manager characteristics: A conceptual examination. Academy of Management Review, 9, 399-412.
- Gupta, A.K., & Govindarajan, V. (1984). Business unit strategy, managerial characteristics, and business unit effectiveness at strategy implementation. Academy of Management Journal, 27, 25-41.
- Hambrick, D.C., & Mason, P. (1984). Upper echelons: The organization as a reflection of its top managers. Academy of Management Review, 9, 193-206.
- Hannan, M.T., & Freeman, J.H. (1977). The population ecology of organizations. American Journal of Sociology, 82, 929-964.
- Hatten, K. J., Schendel, D.E., & Cooper, A.C. (1978). A strategic model of the U. S. brewing industry. Academy of Management Journal, 21, 592-610.
- Hitt, M.A., Nixon, R.D, Hoskisson, R.E, & Kochhar, R. (1999). Corporate entrepreneurship and cross-functional fertilization: Activation, process and disintegration of a new product design team. Entrepreneurship Theory and Practice, Spring, 145-167.
- Knight, D., Durham, C.C., & Locke, E.A. (2001). The relationship of team goals, incentives, and efficacy to strategic risk, tactical implementation, and performance. Academy of Management Journal, 44, 326 – 338.
- Libby, R., & Fishburn, P. C. (1977). Behavioral models of risk taking in business decision: A survey and evaluation. Journal of Accounting Research, 15, 272-292.
- Lieberson, S., & O'Connor, J.F. (1972). Leadership and organizational performance: A study of large corporations. Academy of Management Review, 9, 193-206.
- March, J. G. (1978). Bounded rationality, ambiguity, and the engineering of choice. Bell Journal of Economics, 9, 587-608.
- March, J.G., & Shapira, Z. (1987). Managerial perspectives on risk and risk taking. Management Science, 33, 1404-1417.
- McClelland, G.H., & Judd, C.M. (1993). Statistical difficulties of detecting interactions and moderator effects. Psychological Bulletin, 2, 376-390.
- McNamara, G., & Bromiley, P. (1999). Risk and return in organizational decision making. Academy of Management Journal, 42, 330-339.
- Medsker, G.J., Williams, L.J., & Holahan, P.J. (1994). A review of current practices for evaluating causal models in organizational behavior and human resource management research. Journal of Management, 20, 439-464.
- Meyer, A.D. (1991). What is strategy's distinctive competence? Journal of Management, 17, 821-833.

- Miller, D. (1988). Relating Porter's business strategies to environment and structure: Analysis and performance implications, Academy of Management Journal, 31, 280-308.
- Miller, D. (1992). Generic strategies: Classification, combination and context. Advances in Strategic Management, 8, 391-408.
- Miller, D., & Friesen, P. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. Strategic Management Journal, 3, 1-25.
- Miller, K.D., & Leiblein, M.J. (1996). Corporate risk-return relations: Returns variability versus downside risk. Academy of Management Journal, 39, 91-122.
- Miller, K., & Bromiley, P. (1990). Strategic risk and corporate performance: An analysis of alternative risk measures. Academy of Management Journal, 33, 756-779.
- Palmer, T.B., & Wiseman, R.M. (1999). Decoupling risk taking from income stream uncertainty: A holistic model of risk. Strategic Management Journal, 20, 1037-1062.
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organization research: Problems and prospects. Journal of Management, 12, 531-544.
- Pfeffer, J. (1981). Management as symbolic action: The creation and maintenance of organizational paradigms. In L. L. Cummings & Barry M. Staw (Eds.), Research in Organizational Behavior (Vol. 3, pp. 1-52). Greenwich, CT: JAI Press.
- Porter, M.E. (1980). Competitive strategy: Techniques for analyzing industry and competitors. New York: Harper and Row.
- Prescott, J.E. (1986). Environments as moderators of the relationship between strategy and performance. Academy of Management Journal, 29, 329-346.
- Priem, R.L., Rasheed, A.M.A., & Kotulic, A.G. (1995). Rationality in strategic decision processes, environmental dynamism and firm performance. Journal of Management, 21, 913-929.
- Ricardo, D. (1817). Principles of political economy and taxation. London: J. Murray.
- Ruefli, T.W., Collins, J.M., & Lacugna, J.R. (1999). Risk measures in strategic management research: Auld Lang Syne? Strategic Management Journal, 20, 167-194.
- Shaffer, M.A., Harrison, D.A., & Gilley, K.M. (1999). Dimensions, determinants, and differences in expatriate adjustment. Journal of International Business Studies, 30, 557-581.
- Simerly, R.L. & Li, M. (2000). Environmental dynamism, capital structure and performance: A theoretical integration and an empirical test. Strategic Management Journal, 21, 31 - 49.
- Sitkin, S.B., & Pablo, A.L. (1992). Reconceptualizing the determinants of risk behavior. Academy of Management Review, 17, 9-38.

- Smircich, L., & Stubbart, C. (1985). Strategic management in an enacted world. *Academy of Management Review*, 10, 724-736.
- Spreitzer, G.M. (1995). Psychological empowerment in the workplace: Dimensions, measurement, and validation. *Academy of Management Journal*, 38, 1442-1465.
- Stone, E.F., & Hollenbeck, J.R. (1988). Clarifying some controversial issues surrounding statistical procedures for detecting moderator variables: Empirical evidence and related matters. *Journal of Applied Psychology*, 74, 3-10.
- Stone-Romero, E. F., Alliger, G. M., & Aguinis, H. (1994). Type II error problems in the use of moderated multiple regression for the detection of moderated effects of dichotomous variables. *Journal of Management*, 20, 167-178.
- Venkatraman, N., & Ramanujam, V. (1987). Measurement of Business Economic Performance: An Examination of Method Convergence. *Journal of Management*, 13, 109-122.
- Vlek, C., & Stallen, P.J. (1980). Rational and personal aspects of risk. *Acta Psychologica*, 45, 273-300.
- Waddock, S.A., & Isabella, L.A. (1989). Strategy, beliefs about the environment, and performance in a banking simulation. *Journal of Management*, 15, 617-632.
- Weick, K.E. (1979). *The social psychology of organizing*. Reading: Addison-Wesley.

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