

UC Irvine

Papers

Title

Risk and Return in Organizational Decision-making

Permalink

<https://escholarship.org/uc/item/3x57q8fd>

Journal

Academy of Management Journal, 42(3)

Authors

McNamara, G
Bromiley, P

Publication Date

1999

Peer reviewed

RISK AND RETURN IN ORGANIZATIONAL DECISION MAKING

GERRY McNAMARA
Michigan State University

PHILIP BROMILEY
University of Minnesota

Examining the association between managerial assessments of risk and expected return using nonexperimental data from specific commercial lending decisions, we found that risk-return associations depended on the measures used. However, with a return measure that accounted for the expected costs of riskier decisions, risk and return were negatively related. We also found evidence of conservatism in managers' adjusting to new information regarding the riskiness of decisions. The study points toward the need for more careful understanding of managerial definitions of risk and return, careful handling of leads and lags, and understanding risky decisions in their organizational and market contexts.

The relation between risk and return is a central concern of strategic management and has been extensively studied (Baucus, Golec, & Cooper, 1993; Bowman, 1980, 1982, 1984; Bromiley, 1991; Fiegenbaum & Thomas, 1985, 1986, 1988; Fiegenbaum, 1990; Miller & Bromiley, 1990; Miller & Leiblein, 1996; Ruefli, 1990; Wiseman & Bromiley, 1991). Drawing from finance theory, scholars originally assumed a positive association between risk and return but, starting with Bowman (1980), strategic management researchers have found more complex relations. Some have found negative relations between corporate risk and return for all or subsets of firms (Bowman, 1980, 1982, 1984; Bromiley, 1991; Fiegenbaum & Thomas, 1985, 1986, 1988; Wiseman & Bromiley, 1991). In contrast, others have argued that corporate risk and return correlate positively and that findings of negative associations come from research design problems, including the use of biased return measures (Baucus et al., 1993), risk measures that do not capture the conceptualization of risk used by managers (Miller & Leiblein, 1996), and artifactual measures of risk (Ruefli, 1990, 1991; Ruefli & Wiggins, 1994). Finally, Miller and Bromiley (1990) and Wiseman and Catanach (1997) argued that risk has multiple dimensions and that

risk-return relations vary across those dimensions. Overall, basic questions about risk-return relations remain unanswered since empirical results vary substantially across studies.

These mixed results bring into question the general design of studies of risk and return. Virtually all of these studies have relied on corporate financial outcome data to measure firm returns. Most researchers have also measured risk using corporate outcome data, most commonly looking at variation in profitability (exceptions are Bromiley [1991] and Miller and Bromiley [1990]). However, corporate data viewed in retrospect remain distant from actual risk-return decisions. This level of analysis and retrospective viewpoint do not permit researchers to examine the potential risk-return choices faced by actual business decision makers.

We contribute to the managerial risk-return literature by examining specific business decisions using measures of expected risk and return. The level of analysis in our study corresponds to the decision-level phenomena and theories (Kahneman & Lovallo, 1993; Kahneman & Tversky, 1979; Tversky & Kahneman, 1974) underlying the risk-return relations examined in prior studies (e.g., Bromiley, 1991; Fiegenbaum & Thomas, 1986, 1988; Miller & Leiblein, 1996). Further, using expected values of risk and return allowed us to directly investigate whether managers anticipate receiving adequate return for riskier decisions. Unlike previous researchers, we did not infer this relationship from outcome data. Finally, focusing on the risk and return measures used by decision makers, as opposed to researcher-derived measures that might or might not align with the dimensions of risk and return man-

We would like to thank Bill Stansifer and the many others at Norwest Banks who assisted us with data collection and provided comments on our findings. We would also like to thank Shawn Curley and Daniel Kahneman for their help with theoretical development and David Deephouse, Erhard Bruderer, and the reviewers for their comments on earlier drafts.

agers use, allowed us to directly assess the risk-return relation from a decision maker's perspective. The use of manager-relevant measures is critical in light of findings that the risk-return relation varies for different measures of risk (Miller & Bromiley, 1990; Wiseman & Catanach, 1997).

CONTEXT AND HYPOTHESES

This study focuses on the examination of expected risk and return at the decision level. We would therefore like to more fully explain the context of the decisions that we examined. We then discuss the hypothesized relations between assessed risk and our two return measures.

The Study Context: Commercial Lending

This study focuses on the risk-return relations found in a large set of borrower-bank interactions within a single commercial bank. We examined the relations between assessed risk and expected return as seen in the bank's annual review of each borrower. By risk, the bank meant the likelihood of default by the borrower. The bank measured this risk on a seven-point scale based on a comprehensive, subjective evaluation of the borrower. We, and the bank, used two measures of expected returns: (1) the interest rate charged a borrower relative to the prime interest rate and (2) the return on assets expected for that borrower, after adjustment for the administrative and default risk costs that the bank associated with different levels of borrower risk, termed risk-adjusted expected returns.

Commercial lending provides an appropriate site for risk studies for several reasons. First, commercial lending decisions provide data on explicit risk and expected return estimates covering many comparable judgmental decisions. Although many corporate decisions involve risk and expected return assessments, these assessments are often not written down; the decisions are infrequent and unique; and data on the decisions are often not retained. Commercial lending does not have these problems, allowing examination of assessed risk and expected return relations across a range of very similar judgments in a single organizational setting.

Second, commercial banks' decisions are important and involve substantial judgment. The bank studied had over two billion dollars in outstanding commercial loans at the end of the study period. The bank's success critically depended on accurate assessments of borrower risk, yet the process of borrower evaluation should be seen as more art than science. The bank provided guidelines about the criteria that lending officers should use, but

these guidelines did not include the use of a formula or highly standardized policy. In fact, managers reported that loan officers' judgment strongly influenced the decisions and was an important corporate resource.¹

Third, we cannot directly assess the generalizability of the findings from this examination, but commercial lending parallels general risky business decisions in several ways. Commercial lending decisions involve allocation of firm resources for expected gain where there is a degree of uncertainty about the decisions' returns and risks and where the success of the decisions is only partly under the control of the decision maker. The quality of the borrower over time will depend on a plethora of factors, including everything from managerial competence, through the success of product launches, to economic shifts. In essence, commercial lending decisions relate very directly to the issues that are typically central to capital allocation and expenditure decisions in business organizations.

Fourth, the structure of the commercial lending decision process also fairly well resembles a range of other business decision processes. In the typical lending decision, one employee, the lending officer, leads on the decision, but supervisors review and approve it. A group may work on particularly difficult or important decisions. Not surprisingly, the degree of managerial oversight directly relates to the monetary value of the decision. This structured decision process with its significant human judgment component is very similar to the processes found in case studies of organizational decisions (e.g., Bromiley, 1987). The characteristics of individual lead, managerial oversight, and group deployment when the financial outlay is large can be found in many corporate contexts, including

¹ Although quantitative credit scoring has become increasingly common in consumer lending, it was not utilized in the target bank's commercial lending group. The commercial lender utilized both quantitative and qualitative evaluation of potential borrowers. The quantitative evaluation focused on financial ratios, but the bank's loan review procedures only discussed general rules of thumb regarding financial ratios. They did not specify fixed rules or cutoffs for identifying loan risk. At the same time, the loan review process also included a significant qualitative borrower assessment that included business site visits and interpersonal discussions with the business principals to assess management quality and ownership structure. In sum, the borrower evaluation process relied heavily on the subjective evaluation of both quantitative and qualitative factors by the responsible lending officer.

product development, capital investment, and hiring. In short, although no single type of decision can generalize perfectly to all business decisions, commercial lending is an important kind of business decision with a process, context, and content that are similar to those found in a range of business decisions.

Fifth, the setting provides a strong test for behavioral models of risky decision making. Managers should assess and value risk-return relations more accurately when making commercial lending decisions than when making more abstract strategic choices. Commercial lenders face similar, well-structured decisions repeatedly and receive relevant feedback. They should learn to accurately and rationally assess the value of their decision choices more easily than strategic decision makers, who face unstructured decisions with long and noisy feedback cycles. Thus, if commercial lenders make suboptimal risk-return choices, strategic decision makers facing more ambiguous and complex strategic decisions probably make them also.

Hypothesized Relationships

Assessed risk and interest rates. Both theoretical and practical evidence from economics and finance indicate that default risk should positively influence interest rates charged (Armour & Teece, 1978; Brealey & Myers, 1981; Caves, 1977; Conrad & Plotkin, 1968). To have the same expected value as a borrower for whom the risk of default is low, a borrower with higher risk of default must offer higher expected returns. Consequently, commercial lenders that are either risk averse or risk neutral should charge higher interest rates for riskier borrowers.

Psychology researchers have also provided arguments for a positive association between risk and return. Kahneman and Lovallo (1993) argued that the relation between risk and return varies depending on whether decision makers manage decisions singly or as a portfolio. If they see a decision as one small part of a large portfolio, they should exhibit risk neutrality. However, Kahneman and Lovallo argued that, in practice, individuals ignore portfolio effects even where they exist. They further argued that because decision makers view every decision in isolation and anticipate organizational sanctions for bad choices, they will exhibit the typical risk-averse behavior found in experimental settings (MacCrimmon & Wehrung, 1986). Kahneman and Lovallo's isolation perspective implies that risk and return will be positively related. In this context, a risk-averse decision maker will demand higher returns from riskier projects, not just

sufficient income to compensate for the expected costs. This argument agrees with those made in a number of studies in the strategy literature (e.g., Baucus et al., 1993; Miller & Leiblein, 1996) that have shown positive risk-return relations in corporate outcome returns and in which those findings have been viewed as evidence of risk aversion.

Hypothesis 1a. Assessed risk relates positively to expected returns measured as both interest rates and risk-adjusted expected returns.

In contrast, in a large portion of the risk-return research in strategic management (Bowman, 1980, 1982; Bromiley, 1991; Fiegenbaum & Thomas, 1985, 1986, 1988; Miller & Bromiley, 1990; Wiseman & Bromiley, 1991; Wiseman & Catanach, 1997), negative risk-return relations have been found. This literature indicates that although economic theory (Armour & Teece, 1978; Caves, 1977) and decision theory (Kahneman & Lovallo, 1993) imply that organizations demand higher returns for riskier actions, researchers often find the opposite in corporate outcome data.

At least two plausible arguments could explain the negative risk-return relations seen in corporate outcome data. First, decision makers may systematically misestimate the risk and return of the decisions they face. For example, they may discount low-probability negative outcomes and thus overestimate the anticipated returns from decisions (Fischhoff, Lichtenstein, Slovic, Derby, & Keeney, 1981; Slovic, 1967). Consequently, they may anticipate receiving higher returns for riskier choices, but they are surprised by the outcomes. Alternatively, decision makers may accurately assess expected risk and return but still accept riskier choices without risk premiums that are sufficiently high to compensate for the higher costs associated with the risky choices. Such an effect could be the result of an allocation of attention problem (March & Simon, 1958): Decision makers may focus their attention on interest rates since this measure of return is traditional, easily understood, and directly manipulable and largely ignore the newer, more complex risk-adjusted expected returns measure. This failure to incorporate adequate risk premiums would result in a negative relation between risk and risk-adjusted expected returns. We tested this alternative explanation with our expected measures of risk and return. Doing so provided a strong test of the negative risk-return relation, since we measured risk and expected returns using *ex ante* measures.

Although we included two outcome measures in our study, the arguments above suggest that only the risk-adjusted return measure will be negatively

related to the riskiness of a decision. We did not anticipate finding that interest rates were lower for riskier borrowers.

Hypothesis 1b. Assessed risk relates negatively to risk-adjusted expected returns.

Anchoring and adjustment effects. We also examined the effect of changes in assessed risk on the expected returns of borrowers. Tversky and Kahneman (1974) argued that decision makers are conservative in adjusting to new information; individuals anchor their expectations on prior experience and insufficiently adjust this anchor point when provided new information. In lending, when the relative riskiness of a borrower changes, decision makers should be slow to adjust their pricing of a loan to match the change in the risk the borrower presents. Returns for customers whose assessed riskiness has just increased will be less than those for customers who have had the higher level of risk for several years. Likewise, for customers whose risk has declined, the returns will not decline fully to the level of returns for customers who have had lower risk levels for several years.

Hypothesis 2. Borrowers who have had downgrades (upgrades) in the assessed risk they present within the past year will tend to have lower (higher) expected returns (interest rates and risk-adjusted expected returns) than other borrowers presenting the same risk.

DATA AND METHODS

Our sample included risk and return data from 386 annual borrower evaluations made in the community banking division of Norwest Banks, a superregional bank holding company. Although Norwest had over 30 branches in the area of the study, most of them had very limited commercial portfolios. These branches focused their business on consumer relationships and regularly referred business borrowers with significant loan needs (greater than \$100,000) to one of the branches that emphasized business borrowers. Therefore, we collected data on all of the commercial borrowers that received annual credit reviews in the 5 branches that emphasized business borrowers. These 5 branches included 3 downtown and 2 suburban locations.

We limited data collection to borrowers whose loan balances exceeded \$100,000, a balance resulting in their having fully documented annual reviews. At the beginning of the study period (1987), the 5 branches had 223 corporate borrowers who met this criterion. All of these businesses were small corporations (with sales of less than

\$20,000,000), and most had approved total loan values under \$1 million, although a few were as high as \$5 million. However, only 175 borrowers had variable-rate loans only. Since the bank could not adjust interest rates on fixed-rate loans in response to risk-level changes, we eliminated all borrowers with fixed-rate loans from our sample. The unit of analysis was the borrower-year, and we focused on the risk and return assessments from the annual borrower evaluation. We collected data from 1987 through 1991. Since many borrowers had multiple years of data, the total sample included 386 observations.²

Dependent Variables

This study used two return measures: the average interest rate charged and the risk-adjusted expected return. In the annual borrower review, the lending officer set the interest rate for each line of credit (loan) in the lending relationship, with larger loans being subject to approval by the branch manager. Since borrowers often had more than one credit line at any given time, and the interest rate varied across these lines, we calculated an average interest rate weighted by the size of each line of credit in the lending relationship. This weighted average was calculated each year for each borrower. Most borrowers had between one and three credit lines. As stated earlier, we used only borrowers that had loans with variable interest rates (175 of the 223 borrowers) for two reasons. First, it ensured consistency across the entire time period included in the study. For variable-rate loans, the interest rate was specified as the number of percentage points above the prime interest rate, which factored out differences over time resulting from prime rate fluctuations through the study period. Second, lending officers could not adjust the interest rates on fixed-rate loans, making the annual review data unusable for our analysis. In contrast, officers could adjust the rates on variable-rate loans annually in response to risk-level changes. Consequently, the interest rate studied was the average interest rate charged above the prime interest rate.

The second return measure, the risk-adjusted expected return, was the after-tax return on assets that the bank expected from this customer. This ROA figure, which was calculated by the lending officer as part of the borrower analysis, included an ad-

² To check whether the multiple observations per firm influenced the results, we conducted the analysis with only 1 observation per borrower. The results did not differ significantly from those with all 386 observations.

ministrative charge and a loan loss provision charge that varied according to the assigned risk level. The administrative charge accounted for the level of monitoring and reporting costs associated with borrowers of a given risk level. Both of these charges derived from studies of historical costs associated with borrowers at each risk level and were adjusted annually on the basis of the prior year's cost analysis. A senior vice president at Norwest indicated that the bank believed that these two categories accounted for all of the relevant costs associated with different risk levels. Additionally, our discussions with lending managers and officers indicated that they understood the ROA calculation, believed it included appropriate adjustments to account for the costs of increased risks, and consistently used it as part of the borrower review process.

Although we had 386 borrower-year observations in the data set, when examining the risk-adjusted dependent variable, we had fewer observations. The bank first began using the ROA calculation in 1990. Consequently, only 104 observations were available with which to test the risk-adjusted returns hypotheses.³

Independent Variables

Assessed risk. The annual loan review included a reevaluation of the current creditworthiness of a borrower in terms of a seven-point risk-rating scale on which 1 represented extremely low risk and 7 represented a high probability of the borrower's not repaying the full principal of the loan. In essence, the risk rating reflected the lender's perceptions of the degree to which there was a risk that the borrower would not repay the loan. The bank's loan review manual indicated that the major factors that lending officers should base their risk evaluations on included a borrower firm's management capabilities, market position, financial health (cash flow, financeable assets, net income, liquidity, leverage and size, for instance), collateral, and sources of loan repayment.

This risk rating differs dramatically from the risk measures used in most prior studies of the risk-return relation. Most prior studies have used variance in returns. However, managerial surveys (Baird & Thomas, 1990; March & Shapira, 1987) have found that managers typically evaluate risk as

the chances for downside loss. Since the assessed risk measure used in this study relates solely to downside loss potential, it more closely relates to how managers conceptualize risk than do the variance measures of risk used in most prior studies (Baucus et al., 1993; Bowman, 1980, 1982, 1984; Fiegenbaum, 1990; Fiegenbaum & Thomas, 1985, 1986, 1988; Wiseman & Bromiley, 1991).

Although the risk ratings ranged from 1 to 7, we only included observations in which the rating was 3, 4, or 5.⁴ We dropped observations from the extreme ratings for two reasons: First, there was an extremely small number of such observations (ten in all). If they had been included in the analysis, they might have overly influenced the results. Also, borrowers rated either 6 or 7 (problem borrowers) were sent to a "workout organization" within the bank; this unit specialized in minimizing loss to the bank when loans were closed out. The bank seldom changed the interest rates charged these borrowers to reflect the increased risk they presented because the probability of default had increased to the point where the bank's major concern was recovery of loan principal.

Upgraded and downgraded borrower variables. We created indicator variables to measure whether the risk rating for a borrower had changed since the last annual review. If the borrower's risk had been upgraded, we coded the indicator variable 1. We generated a similar code for borrowers that had been downgraded since the last annual review.

Control variables. We included three borrower characteristics to control for factors that might affect the interest rates and risk-adjusted returns the bank could expect. These control variables were the duration of the bank-borrower relationship, the total value of a borrower's currently outstanding loans in millions of dollars, and the number of those loans. We also included a control variable indicating whether a borrower had a term loan with the bank. All borrowers in the sample had at least one revolving credit line, but only about half also had term loans. Including an indicator variable for term loans allowed us to control for differences in returns that might be due to the types of loans held by a borrower.

We would have liked to control for differences in the risk-related behaviors of individual bankers but

³ We also examined the hypothesized relationships related to average interest rate returns using this smaller data set. The results were not significantly different from those found with the larger data set.

⁴ We also analyzed the data with the extreme values included, and they did not significantly change the results. Given our concerns about routine nonadjustment in interest rates for extremely risky borrowers, we chose to report the results with the constrained risk range.

TABLE 1
Descriptive Statistics and Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7	8
1. Risk-adjusted expected return	1.33	0.90								
2. Weighted average interest rate	1.39	0.72	.05							
3. Risk level	3.81	0.59	-.40**	.49**						
4. Upgraded risk	0.08	0.27	.19 [†]	.06	-.13**					
5. Downgraded risk	0.15	0.35	-.23*	-.02	.38**	-.12*				
6. Duration of relationship	14.92	15.64	.05	-.36**	-.21**	.01	.06			
7. Current value of all loans	0.66	0.99	-.24*	-.15**	.15**	-.02	.14**	.01		
8. Number of loans	1.39	.49	-.19 [†]	-.07	.01	.02	.11*	.11*	.08 [†]	
9. Indicator for term loans	0.55	0.50	-.25*	.16**	.15**	-.08	.04	.05	.10 [†]	.43**

^a $N = 104$ for the first correlations column; $N = 386$ for all other columns.

[†] $p < .10$

* $p < .05$

** $p < .01$

could not do so. Although an individual banker had responsibility for each borrower at a given point, over time the banker assigned to each borrower changed. According to bank managers, the data concerning which banker had handled which borrower in the past were unreliable. Furthermore, although some of the decisions, particularly those concerning borrowers with low credit limits, reflected only the judgments of bankers at the lowest level of authority, some of the larger accounts also reflected the judgments of their superiors. Since the level of personal authority varied across bankers, we could not control for the individual who had primary responsibility for a borrower or for whether a decision was an individual or a team one.

Analyses

We tested the hypotheses using regression analysis, running one analysis for the interest rate hypotheses and one for the risk-adjusted returns hypotheses. We closely examined the data to check for influential and outlier observations, heteroskedasticity, nonlinear relationships, and multicollinearity. No significant problems were evident.⁵

⁵ Residual plots indicated no heteroskedasticity or nonlinearity problems. We also examined the externally "studentized" residuals and Cook's D values to check for outliers and influential observations. One data point appeared to be a possible outlier. We estimated the model without the data point and found that the results did not significantly change. Finally, we checked for multicollinearity by calculating the variance inflation factors for all independent variables and found no evidence that multicollinearity was a problem.

RESULTS

Table 1 reports the means, standard deviations, and correlations. The values in the correlation table do not suggest that multicollinearity was a problem and do not contain any surprising relationships between variables. Table 2 presents the two main analyses of the hypothesized relationships. In this section, we first consider the results for interest rates and then turn to risk-adjusted returns.

The risk-return results differ for the two measures of return. Consistent with Hypothesis 1a, risk has a highly significant, positive relation with interest rate returns ($p < .01$). The value of the parameter, .64, indicates a .64 percent average increase in interest rate (that is, nearly two-thirds of 1 percent) for a one-level difference in risk. However, consistent with Hypothesis 1b, the risk rating is significantly negatively related to risk-adjusted expected returns. Expected risk-adjusted returns for higher-risk borrowers are lower than those for lower-risk borrowers ($p < .01$). Thus, the interest rate analysis showed higher interest rates for higher-risk borrowers, but the higher rates did not translate into higher risk-adjusted returns. From another perspective, although the interest rate results show lending officers demanded a risk premium for riskier borrowers, the premium did not fully compensate for the additional costliness of the borrower. If the risk premium charged sufficiently compensated the bank for the increased costs associated with riskier borrowers, the relation between assessed risk and risk-adjusted expected returns would have been neutral. Consequently, the negative risk-adjusted results suggest that the premium demanded did not fully compensate for the increased risk-related costs that the bank expected to incur.

Hypothesis 2 proposed lenders would be conser-

TABLE 2
Results of Regression Analysis of the Risk-Return Relation in Organizational Decisions^a

Independent Variable	Weighted Average Interest Rate Return	Risk-Adjusted Expected Return
Intercept	-0.71** (.23)	4.40** (.66)
Risk	0.64** (.05)	-0.55** (.14)
Downgraded risk	-0.32** (.09)	-0.20 (.18)
Upgraded risk	0.32** (.10)	0.05 (.24)
Duration of relationship	-0.01** (.00)	-0.00 (.01)
Current value of loans	-0.15** (.03)	-0.12 [†] (.067)
Number of loans outstanding	-0.13* (.07)	-0.40* (.19)
Borrowers with term loan(s)	0.25** (.06)	-0.10 (.20)
Adjusted R ²	.41	.24
F	39.69**	5.73**
N	386	104

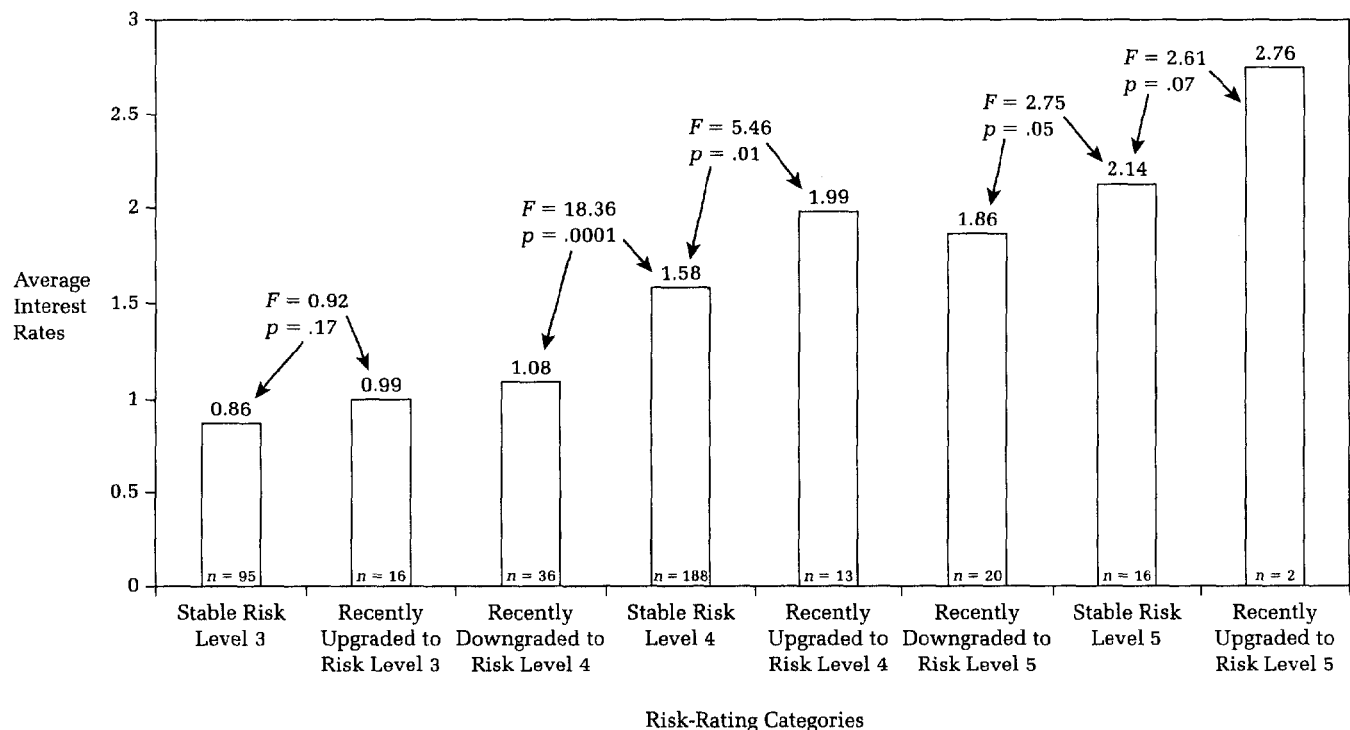
^a Values are unstandardized regression coefficients; standard errors are in parentheses.

vative in changing interest rates for borrowers that had changed to a new risk category within the year prior to observation. Supporting Hypothesis 2, both downgrades and upgrades in risk ratings had strongly significant influences on interest rates ($p < .01$). In contrast, neither upgrades nor downgrades had statistically significant coefficients in the risk-adjusted returns equation, although they had the same signs as in the interest rate equation

estimate. The lack of statistical significance in the risk-adjusted returns analysis may be due to the small number of observations it contained and the even smaller number with changes in risk rating.

Given the interest rate results, we examined the data related to borrowers with changed risk more closely. A consistent pattern across risk levels reinforced the conservatism finding. The parameter estimates in Table 2 and the values in Figure 1 both

FIGURE 1
Conservatism in Interest Rate Adjustments^a



^a The value shown above a bar is the mean interest rate for that category of borrower. The F s and p 's are the results of significance tests between paired borrower categories.

show that borrowers that had just had their assessed risk downgraded were charged lower interest rates on the average than those that had been at a given risk level for more than one year. For example, borrowers that had recently been downgraded to risk level 4 had a mean interest rate of 1.08, and those that were stable risk level 4 borrowers had a rate of 1.58 ($p = .0001$). The opposite pattern is evident for borrowers that had just been upgraded. Borrowers that had just been upgraded had on the average higher interest rates than those that had been at a given risk level for a year. For example, borrowers that had just been upgraded to level 4 had a mean interest rate of 1.99, as compared to 1.58 for incumbent risk level 4 borrowers ($p = .01$).

Because our sample of risk level 5 borrowers was much smaller than the level 4 sample, we were not surprised to find that the differences across the upgrade-stable-downgrade categories did not achieve a less-than-.05 level of statistical significance. The pattern is, however, quite consistent across all risk levels: recently upgraded borrowers had higher average rates, and recently downgraded ones had lower average rates. For risk level 5 borrowers, the probability that the recently upgraded ones had interest rates as low as those of their stable counterparts was .07. Also at risk level 5, the probability that recently downgraded borrowers' interest rates were as high as stable borrowers' was .05. Interestingly, the smallest difference between stable and changing borrower interest rates was the difference between borrowers with a stable risk 3 rating and those recently upgraded to risk 3 (.13, $p = .17$). This smaller difference for borrowers with newly superior risk may reflect those customers having become more desirable and so increasing their bargaining leverage. They could demand lower interest rates with the implied threat that they would take their business to another bank if their demands were not met. Alternatively, the bank may simply have catered more carefully to these customers out of awareness of their greater desirability.

DISCUSSION

This study extended the examination of the risk-return relation from the corporate level down to the decision-making level in a single organization. It also differed from earlier studies by using *ex ante* measures of risk and expected return. Let us summarize some of the findings and discuss their implications.

First, our results demonstrate that the nature of the risk-return relation is contingent on the mea-

asures used, but the relation appears to be negative when a comprehensive return measure that takes into account the costs associated with decisions of varying risk is used. Risk has a positive association with expected returns measured by interest rate but a negative association with risk-adjusted expected returns. This pattern agrees with Miller and Bromiley's (1990) and Wiseman and Catanach's (1997) findings that different risk measures in corporate data have different associations with performance.

These findings have relevance to the possible explanations for risk-return relations offered in earlier studies. For example, one possible explanation for the negative association between risk and return found in outcome data in prior studies (Bowman, 1980, 1982, 1984; Bromiley, 1991; Fiegenbaum & Thomas, 1985, 1986, 1988; Wiseman & Bromiley, 1991) is that decision makers may have expected sufficient compensation for taking riskier actions but systematically erred in their evaluations of the risk and return of those decisions (Slovic, 1967). Under this explanation, the relation between *expected* risk and *expected* return should be positive. Instead, we found a negative relation; risk-adjusted expected returns were lower for borrowers with higher assessed risk.

Furthermore, our findings bring into question the prospect theory explanation proposed by Bowman (1980, 1982, 1984) and others, in which they suggest that the negative risk-return relation may be the result of firms with low performance taking on additional risk. Although our results have the same negative risk-return association, it does not come from the Bowman process. We know that during the borrower review process, bankers assess risk before determining interest rate and expected returns. Consequently, the negative risk-return association cannot come from low returns driving risk taking. Thus, in this data set, the negative association results from decision makers failing to require adequate additional return for riskier decisions.

We believe that the results demonstrate the need to measure risk and return as decision makers see them. Previous researchers have discussed problems with the measurement of risk and the need for research to use risk measures that correspond to decision maker perceptions (Miller & Bromiley, 1990; Miller & Leiblein, 1996). In view of March and Shapira's (1987) managerial interview and survey findings, Miller and Leiblein argued convincingly for the use of downside risk measures. But perceptions of both risk and return may reflect even more complex factors. How actual decision makers perceive risk and expected return will depend on numerous factors, including tradition and organizational context. The bankers had used interest

rates for many years and directly controlled them. The risk-adjusted returns measure had been newly introduced by management and required greater effort to understand and manage. The results suggest that the bankers focused on the traditional return measure (interest rates) and demanded higher returns for riskier decisions. However, this focus of attention resulted in unintentional consequences related to risk-adjusted returns. In other words, the bankers acted sensibly (locally rational) regarding interest rates (demanding higher rates for riskier customers), but this did not translate into sensible outcomes on risk-adjusted returns.

Thus, understanding the allocation of attention (March & Simon, 1958) seems critical to understanding risk-return decisions. Corporate researchers have arbitrarily imposed a set of stock market or accounting measures, and experimental researchers provide certain risk-related information directly to subjects. Neither practice reveals what real managers actually use. Without knowing what managers attend to, researchers may construct and test models that have drastic errors in design and interpretation.

The second major implication for risk-return studies comes from our finding of managers' conservatism in adjusting interest rates in response to changes in risk assessment. Borrowers that had just been downgraded had, on the average, lower interest rates than borrowers that had been at that same risk rating for more than one year. The opposite held for borrowers that had just been upgraded. Thus, commercial lenders appeared to use the prior interest rate as an anchor and to only partly adjust a borrower's interest rate to reflect a changed risk rating.

If risk and return relations adjust with lags, simple cross-sectional studies will generally be misspecified. Assume that a decision maker has obtained a desired risk-return relation for a borrower, but one of the factors changes exogenously and the decision maker adjusts the other with a lag. In our study, risk changed exogenously (as a function of the business prospects of the borrowers), and the bank adjusted interest rates. A cross-sectional study would let the relations at a point in time be estimated, but the data would depend on how variable the exogenous factor (risk or return) has been in that particular time period and how rapidly the decision maker adjusted. Given high variability in the exogenous variable and slow adjustment, the observed pattern could have little relation to the decision maker's desired relation. Alternatively, with quick adjustment and little exogenous change, the observed pattern could match the desired pattern very closely.

Finally, previous theories of risk and return have been based on the assumption that risky decisions

appear independently rather than as parts of ongoing relationships. Current risk and returns, particularly for riskier borrowers, reflect the outcome of a set of decisions tied to ongoing customers and involving adjustments of risk ratings and interest rates as well as a market or negotiation facet. In other words, the risk-return relations observed here do not reflect a clean set of risk choices of the sort seen in experimental settings; rather, they are the outcome of a complex set of interactions played out over time between lenders and borrowers. This understanding of organizational decision making is more reflective of business decisions in general than of simple, single-period choices. Corporate decisions, such as expansion decisions, capital expenditures, and strategic alliances, involve complex relations, are long-lasting, and often require reassessment as potential risks and gains change. Consequently, research on risk-related decision making needs to more actively incorporate a longitudinal perspective.

This study also has significant limitations. The findings from studying commercial lending decisions at the participating bank may not be generalizable to other business decisions or even to other commercial banks. Also, we cannot fully explore the reasons for some of our findings. Some of the underlying motivations for these behaviors cannot be determined in our study. Finally, as we mentioned earlier, we were unable to assess the effects that the characteristics of individual decision makers had on the risk-return relation. Consequently, we believe that future research should explore the generalizability of the findings, the processes underlying risk-return decisions, and the role of the individual decision maker in the portfolio of organizational risk-return decisions.

In conclusion, this study advances the study of risky decision making in several ways. First, in studying the risk-return relation at the organizational decision level, we bridge the gap between experimental studies of risky decision making and studies that rely on archival corporate data. Second, we show that the negative risk-return relations identified by Bowman (1980) can be found not only using *ex post* measures of risk and return, but also using managerial assessments of risk and expected return. Third, we find support for the conservatism (Tversky & Kahneman, 1974) phenomenon in organizational decision making. The results point to the need for more careful work on managerial definitions of risk and return and for researchers to take care in understanding the lag structures involved in risk-return activities and the organizational and market structure within which risky choices are made.

REFERENCES

- Armour, H., & Teece, D. 1978. Organization structure and economic performance: A test of the multidivisional hypothesis. *Bell Journal of Economics*, 9: 106–122.
- Baird, I., & Thomas, H. 1990. What is risk anyway? Using and measuring risk in strategic management. In R. Bettis & H. Thomas (Eds.), *Risk, strategy, and management*: 21–52. Greenwich, CT: JAI Press.
- Baucus, D., Golec, J., & Cooper, J. 1993. Estimating risk-return relationships: An analysis of measures. *Strategic Management Journal*, 14: 387–396.
- Brealey, R., & Myers, S. 1981. *Principles of corporate finance*. New York: McGraw-Hill.
- Bowman, E. H. 1980. A risk/return paradox for strategic management. *Sloan Management Review*, 21(3): 27–31.
- Bowman, E. H. 1982. Risk seeking by troubled firms. *Sloan Management Review*, 23(4): 33–42.
- Bowman, E. H. 1984. Content analysis of annual reports for corporate strategy and risk. *Interfaces*, 14(1): 61–72.
- Bromiley, P. 1987. Do forecasts produced by organizations reflect anchoring and adjustment? *Journal of Forecasting*, 6(3): 201–210.
- Bromiley, P. 1991. Testing a causal model of corporate risk taking and performance. *Academy of Management Journal*, 34: 37–59.
- Caves, R. 1977. *American industry: Structure, conduct, performance*. Englewood Cliffs, NJ: Prentice-Hall.
- Conrad, G., & Plotkin, I. 1968. Risk/return: U.S. industry pattern. *Harvard Business Review*, 46(2): 84–93.
- Fiegenbaum, A. 1990. Prospect theory and the risk-return association: An empirical examination in 85 industries. *Journal of Economic Behavior & Organization*, 14: 187–204.
- Fiegenbaum, A., & Thomas, H. 1985. An examination of the structural stability of Bowman's risk-return paradox. *Academy of Management Proceedings*: 7–11.
- Fiegenbaum, A., & Thomas, H. 1986. Dynamic and risk measurement perspectives on Bowman's risk-return paradox for strategic management: An empirical study. *Strategic Management Journal*, 7: 395–407.
- Fiegenbaum, A., & Thomas, H. 1988. Attitudes toward risk and the risk-return paradox: Prospect theory explanations. *Academy of Management Journal*, 31: 85–106.
- Fischhoff, B., Lichtenstein, S., Slovic, P., Derby, S., & Keeney, R. L. 1981. *Acceptable risk*. New York: Cambridge University Press.
- Kahneman, D., & Lovallo, D. 1993. Timid decisions and bold forecasts: A cognitive perspective on risk taking. *Management Science*, 39: 17–31.
- Kahneman, D., & Tversky, A. 1979. Prospect theory: An analysis of decision under risk. *Econometrica*, 47: 263–290.
- MacCrimmon, K. R., & Wehrung, D. A. 1986. *Taking risks: The management of uncertainty*. New York: Free Press.
- March, J. G., & Shapira, Z. 1987. Managerial perspectives on risk and risk taking. *Management Science*, 33: 1404–1418.
- March, J. G., & Simon, H. A. 1958. *Organizations*. New York: Wiley.
- Miller, K., & Bromiley, P. 1990. Strategic risk and corporate performance: An analysis of alternate risk measures. *Academy of Management Journal*, 33: 756–779.
- Miller, K., & Leiblein, M. 1996. Corporate risk-return relations: Returns variability versus downside risk. *Academy of Management Journal*, 39: 91–122.
- Ruefli, T. 1990. Mean-variance approaches to risk-return relationships in strategy: Paradox lost. *Management Science*, 36: 368–380.
- Ruefli, T. 1991. Reply to Bromiley's comment and further results: Paradox lost becomes dilemma found. *Management Science*, 37: 1210–1215.
- Ruefli, T. W., & Wiggins, R. 1994. When mean square error becomes variance: A comment on "Business risk and return: A test of simultaneous relationships." *Management Science*, 40: 750–759.
- Slovic, P. 1967. The relative influence of probabilities and payoffs upon perceived risk of a gamble. *Psychonomic Science*, 9: 223–224.
- Tversky, A., & Kahneman, D. 1974. The framing of decisions and the psychology of choice. *Science*, 185: 1124–1131.
- Wiseman, R., & Bromiley, P. 1991. Risk-return associations: Paradox or artifact? An empirically tested explanation. *Strategic Management Journal*, 12: 231–242.
- Wiseman, R., & Catanach, A. 1997. A longitudinal disaggregation of operational risk under changing regulations: Evidence from the savings and loan industry. *Academy of Management Journal*, 40: 799–830.

Gerry McNamara is an assistant professor of management at Michigan State University. He received his Ph.D. from the University of Minnesota. His research interests include strategic decision making, top management team processes, risk taking in organizations, and strategic cognition.

Philip Bromiley holds the Curtis L. Carlson Chair in Strategic Management at the University of Minnesota. He received his Ph.D. from Carnegie-Mellon University. His current research interests include risk taking in organizations and techniques to improve strategic thinking.