Does managerial myopia explain Bowman's Paradox?

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Abstract

Purpose – The purpose of this paper is to investigate if Bowman's Paradox (negative association between risk and return) is caused by managerial myopia. It also attempts to disentangle whether results are more consistent with one or more potential explanations.

Design/methodology/approach – The paper uses univariate statistics and OLS regressions. Empirically examines the relationship between four risk and return proxies, across a wide ranging time period and utilizing a number of model specifications. Results hold after using three-way clustered errors and using a more robust rolling five year, fixed regression methodology measure.

Findings – Confirms the existence of the Paradox. Also documents that the association between risk and return is positive in "winner" firms and negative in "loser" firms. Upon further analysis, the earlier negative risk-return relationship is found to entirely be due to the volatility of the (short term) income statement component of the performance terms. Results imply that executives of winner (loser) firms are less (more) likely to manage earnings or engage in other value destroying activities.

Research limitations/implications – The study is confined by the typical archival study limitations; including potential endogeneity, selection biases and generalizability of the results.

Practical implications – Anecdotal evidence indicates that the business community makes extensive use of these performance measures. These performance measures are also pervasive in academic research. Given the importance of controlling for both managerial and firm performance, a good performance proxy is quintessential.

Originality/value – Although over 30 years have passed since Bowman (1980) first observed the negative correlation, to date, no consensus explanation exists. Findings suggest that Bowman's Paradox, is potentially a manifestation of managerial myopia. Thus, this result contributes to several existing research streams.

Keywords ROE, Prospect theory, Risk, Returns, Bowman's Paradox, Managerial myopia, ROA

Paper type Research paper

1. Introduction

The relation between risk and returns is a central concept in the accounting, finance, and strategic management areas. For example, the extant strategic management literature has long studied a controversial and confounding negative association between accounting measures for risk and return (Bowman, 1980, 1982; Ruefli, 1990; Fiegenbaum and Thomas, 1988)[1]. Since investors expect higher returns for taking higher risk, the negative association between the mean and variance of performance measures is considered a contradiction, which is now widely known in the literature as Bowman's Paradox. The current study investigates the relationship between accounting performance measures, ROA and ROE, and risk measured as their respective standard deviations over the preceding five-year period. It extends the prior literature by investigating if Bowman's Paradox stems from the trade-off between managerial myopia and firm performance. This trade-off can be explained with the following arguments.

First, under managerial myopia, management either directly or indirectly makes decisions, which sacrifice long-term firm value for short-term firm performance[2].

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Myopic firm managers' discretionary behavior in one period reverses in subsequent periods[3]. Thus, for myopic firms, one would observe a negative association between performance and the volatility of earnings. Alternatively, because of growth, good investment, and/or good discretionary expense decisions, one would expect to observe a positive association between performance and the volatility of earnings for high-performance (hereafter referred to as "winner") firms[4]. Accordingly, the current study investigates if Bowman's Paradox is more associated with the variance of the numerator component of ROA and ROE, earnings, which would potentially be indicative of managerial myopia or is more associated with the variance of the denominator component of ROA and ROE, equity/assets, which would be consistent with the aforementioned performance story[5].

While Bowman's Paradox has generated a lot of research in the strategic management arena, it has received much less attention in other disciplines. The dearth of research on this paradox in the accounting and finance disciplines is particularly surprising, given that this anomaly focuses on the relationship between accounting risk and return measures[6]. In addition, anecdotal evidence from the business press indicates that the business community makes extensive use of these performance measures in evaluations of firms both at the firm-level and at the individual-management level[7]. With respect to their use in accounting research, these performance measures are pervasive in both the stewardship and valuation roles of financial reporting information[8]. Given the importance of controlling for both managerial and firm performance, a good performance proxy is quintessential.

The existing literature argues that the risk-return paradox can be partly explained by the choice of accounting risk and return measures. Baucus *et al.* (1993) is a leading paper in this area. These authors show that the risk-return paradox is somewhat explained by the choice of accounting risk and return measures. They argue that the end-of-period accounting measures used in prior studies produce negative risk-return associations, while those utilizing beginning-of-period accounting measures in general lead to positive risk-return associations[9].

Several features of Baucus *et al.* (1993) make it an important starting point. First and foremost, the study represents one of the more serious methodological challenges to Bowman's Paradox. Second, although it presents a compelling piece of evidence against this paradox, this study used a relatively short time period (20 years). Fiegenbaum and Thomas (1986) argue that the risk-return paradox is not stable across time, suggesting that an analysis of a more extensive time period is desirable. Third, the study imposed a relatively strict filter on the data, with a requirement of 20 consecutive years of data to be included in the sample. This restriction greatly limits the sample size and consequently the generalizability of the study's results. Fourth, advancements in research methodologies allow for using tests that are more rigorous, without sacrificing the original research design.

The current study contributes to this literature stream. It uses one of the most unique and comprehensive samples (204,540) and longest time horizons (1969-2013) in the extant literature[10]. Consistent with Baucus *et al.* (1993), the current study first investigates the relationship between accounting return measures ROA and ROE, measured at both the beginning of the period (hereafter referred to as ROE_BOP and ROA_BOP) and at the end of the period (hereafter referred to as ROE_EOP and ROA_EOP) and risk measured as their respective standard deviations (hereafter referred to as SROE_EOP, SROE_BOP, SROA_EOP and SROA_BOP) over the preceding five-year period (e.g. Baucus *et al.*, 1993).

Overall, with respect to the existing literature, results are mixed. Similar to Baucus *et al.* (1993), the end-of-period return measures (ROE_EOP, ROA_EOP) are negatively associated with their corresponding risk measures for the five-year periods ending in 2013 and for the full-sample regressions (where the return variables are regressed on their risk counterparts for the entire sample period). However, beginning-of-period return measures (ROE_BOP, ROA_BOP) are also negatively associated with the corresponding risk measures. Consistent with existing literature (e.g. Baucus *et al.*, 1993), we find that the underperforming (below the median earnings) firms drive the observed negative relationships. Specifically, there is a positive association between risk and return for the above the median firms and a negative association between risk and return for the below the median firms.

The first hypothesis predicts that the performance measures (ROE/ROA) will be negatively associated with the standard deviation of earnings and positively associated with the standard deviation of assets/equity. To address this hypothesis, we regress the respective performance variable on the variances of the earnings and the base. For example, ROE is regressed on the standard deviation of earnings and the standard deviation of equity. Here, consistent with the first hypothesis, the earlier results are found to primarily be due to the numerator term – i.e. ROE (ROA) is negatively associated with earnings variance and positively associated with equity (assets) variance.

Given that winner (myopic) firms are likely to be those firms with sustainable (unsustainable) earnings, the second hypothesis predicts that performance returns (ROE/ROA) will be positively (negatively) associated with the standard deviation of earnings (assets/equity) for the winner (myopic) firms. We test this hypothesis by conditioning on above and below the median firms. For winner firms, the standard deviation of earnings is positively associated with the performance term. This result seems to suggest that for these firms as performance improves, the volatility in earnings increases. The opposite relationship emerges for the myopic (below the median) firms. For these firms, the standard deviation of earnings is negatively associated with the performance term.

Overall, results suggest that the negative risk-return relationships previously documented in the literature are mainly due to the numerator component (the volatility of the reported earnings) of the performance terms. This outcome is consistent with managerial myopia likely being one of the primary causes of Bowman's Paradox.

Furthermore, our results are unlikely to be plagued by research design issues, which have affected other studies. In addition to considering a comprehensive sample of firms that spans an extensive time period, our econometric methodology allows for clustering on multiple dimensions at the same time. Specifically, we clustered errors across firms, years, and industries. In sensitivity tests, the same analysis is conducted using a more robust rolling five-year, fixed regression methodology where for every year (t) the return measure is regressed on the corresponding preceding five-year risk measure, allowing for portfolio rebalancing at each year t. Results here are qualitatively similar to the earlier results.

The paper proceeds as follows: Section 2 presents the literature review and hypotheses development; Section 3 provides the sample description and main results; in Section 4, the study concludes.

2. Literature review and hypotheses development

2.1 Two competing explanations for the risk-return paradox

This section synthesizes the discussion around two opposing viewpoints, which seem to have evolved as the leading explanations for the Paradox. The first relates to those papers which argue that the Paradox has behavioral or theoretical underpinnings (here the focus is on Prospect Theory, which seems to be the consensus choice) and the second relates to those studies which blame the Paradox on research design issues.

2.2 Prospect theory

A number of studies offer behavioral explanations for the Paradox. In this regard, the consensus explanation seems to be Prospect Theory (Anderson *et al.*, 2007), which generally argues that people are more risk-averse when prospects are positive (expected gains) and more risk-seeking when prospects are negative (expected losses) (Kahneman and Tversky, 1979, 1984; Tversky and Kahneman, 1986).

Building on this argument, various researchers argue that managers are also risk takers when facing losses, but they are risk-averse when facing gains (Singh, 1986). In other words, when performance is below a given target level, managers are likely to be more risk-seeking, and when performance is above the target level, they are likely to be more risk-averse. It follows that if this behavior is the primary explanation for the Paradox, the negative risk-return relationship arises because managers in underperforming firms would decide to take riskier actions to increase returns[11]. This logic suggests that managers in good performing firms (above-target returns) would have a positive risk and return relationships[12]. Conversely, managers in poorly performing (below-target returns) would have negative risk-return relationships. The logic here is somewhat analogous to the poker player in the casino who tries to recoup his or her losses in an increasingly more desperate fashion.

A number of studies provide evidence consistent with this prediction. For example, Bowman (1982, 1984) argues that the Paradox may be due to "troubled firms." In this scenario, unprofitable firms have to take large risks to improve their position. In support of this argument, Fiegenbaum and Thomas (1988) hypothesized a target level of return for firms in a given industry. They found a negative mean-variance relationship for firms below the target (below the median firms) and a positive relationship for firms above the target (above the median firms) for a wide range of industries. They suggest that a hypothesis of a U-shaped risk-return function and an overall negative risk-return association (The Bowman Paradox) is consistent with their results.

Fiegenbaum and Thomas (1986, 1988) attempt to explain the negative risk-return relationships with the oil crisis of the 1970s. These authors argue that the oil crisis led to economic uncertainty, which increased competition and subsequently altered the manager's risk-taking behavior[13]. This argument is seemingly refuted by other papers, which show that the negative risk-return relationship existed during more stable time periods, such as the 1960s (Bettis and Mahajan, 1985). Bromiley (1991) finds that higher risk seems to be an antecedent to poor performance. This is a behavior which, in their sample, seems to be continuously repeated. Alternatively, low risk would be an antecedent to good performance.

2.3 Research design issues

Our second line of inquiry focuses on those papers, which assert that the Paradox is due to research design issues. In this regard, several studies find that the Paradox is due to misspecified regression models, selective time periods and biased samples, as well as other fortuitous statistical or spurious results. Many researchers in this area argue that this methodology suffers from a "dual hypothesis" problem, where it is impossible to differentiate between time specific risk-return relationships and shifts in these relationships over time (e.g. Ruefli, 1990; Ruefli and Wiggins, 1994; Ruefli *et al.*, 1999).

Studies in this genre argue that the dual hypothesis problem manifests when one uses the variance of returns as a measure of risk, along with the mean of those returns. This leads to a situation in which the resulting relationship is not identified (if one does not assume a stable return distribution) or one in which results are potentially caused by spurious correlations (if one assumes a stable return distribution) (Ruefli, 1990). This approach also ignores serial performance correlation, which could potentially lead to biased estimates of performance (Bettis and Mahajan, 1990).

In a similar vein, Cool and Schendel (1988) suggest that it is the combination of environmental conditions and troubled firms distributed across strategic groups that cause the risk-return Paradox. The authors suggest that since the negative risk-return relationships seem to persist over long periods, the respective industries may go through persistent phases of disequilibrium. This latter argument suggests that the risk-return "Paradox" may actually be due to the relationship being misidentified.

Along these lines, several studies in this area argue that the risk and return relationship is actually positive (e.g. Baucus *et al.*, 1993; Kahneman and Lovallo, 1993; Miller and Leiblein, 1996), and that those who find negative risk-return associations have research design problems, including using biased return instruments (Baucus *et al.*, 1993), false measures of risk (Ruefli, 1990; Ruefli and Wiggins, 1994) and risk measures "that do not capture the conceptualization of risk used by managers" (Miller and Leiblein, 1996) and are not accounting for the several dimensions of risk and the corresponding fact that risk-return relations probably differ across those dimensions (Wiseman and Catanach, 1997).

Henkel (2003) argues that samples where the accounting measures for risk and return tended toward negative returns were more likely to indicate spurious negative risk-return correlations. However, utilizing a more rigorous methodology, which the authors asserted led to more reliable results, still indicated an inverse risk-return relationship across industries during the 1970-1979 time period. Notably, this was the same period, which was analyzed (and refuted) by Ruefli and Wiggins (1994). Others argue that heterogeneity in risk propensity, along with serial correlation in performance, could potentially produce spurious U-shaped risk and return relationships (Denrell, 2004). Finally, a number of studies argue that the use of variance as a measure of risk is debatable (e.g. March and Shapira, 1987).

Overall, the research design proponents assert that arguing for a negative risk and return relationship is inherently unverifiable, both theoretically and empirically. Therefore, one cannot conclude that these relationships have been proven or refuted using a mean-variance approach (Ruefli, 1990).

2.4 Hypotheses development

This section develops the testable hypotheses. Extant literature suggests that risk and return may actually be tapping separate dimensions of performance and that prior studies, which considered performance in terms of returns (e.g. ROA), might actually be overlooking other important relationships among the variables (Jemison, 1987). This argument suggests the need for considering other components in the risk-return relationship. Along these lines, Dichev and Tang (2009) argue that the volatility of reported earnings is expected to reflect important aspects of the accounting determination of income, which they assert will provide a link to earnings predictability. The authors note that one such aspect is the quality of how well expenses are matched to revenues.

This is primarily because a poor matching may act as noise in the economic relation between revenues and expenses, which causes the volatility of reported earnings to increase in these scenarios. Similarly, this study suggests that this poor matching will be associated with poor earnings predictability because the matching noise in the reported earnings potentially obfuscates the true underlying economic relation, which directs the evolution of earnings over multiple periods. In the context of the current study, this suggests a negative relationship between performance returns (ROA/ROE) and the earnings component of risk. However, income statement items are assumed to be more transitory than balance sheet items, which suggest a more or less stable relationship between performance returns (ROA/ROE) and the balance sheet components of risk[14]. Therefore, in general, we expect a positive association between the performance measures and the balance sheet items (assets and/or equity). These predictions are formalized in the following hypothesis:

H1. Overall, the performance measures (i.e. ROE/ROA) are expected to be negatively (positively) associated with the standard deviation of earnings (standard deviation of assets/equity).

As noted above, myopic managers either directly or indirectly make decisions, which may have negative intertemporal performance ramifications. For example, reducing contemporaneous fixed asset investments will result in lower depreciation expense and related interest expenses from foregone debt financing will improve earnings in the short run (Kraft *et al.*, 2016). However, for myopic firms, this behavior is unsustainable and hence, will reverse in future periods. Thus, for myopic firms, one would observe a negative association between performance and the volatility of earnings. Alternatively, because of growth, good investment and/or good discretionary expense decisions one would expect to observe a positive association between performance and the volatility of earnings. However, as noted above, growth on the income statement is likely to contain more transitory elements than growth on the balance sheet. This is likely to be especially pronounced for winner firms which have more growth in general. Therefore, the standard deviation of the balance sheet items (assets and/or equity) is expected to be negatively related to performance for winner firms. At the same time, myopic firms are more likely to artificially manipulate assets and/or equity, therefore, the standard deviation of the balance sheet items is expected to be positively related to performance for myopic firms. These predictions are formalized in the following hypotheses:

H2a. For winner firms, performance returns (i.e. ROE/ROA) are expected to be positively (negatively) associated with the standard deviation of earnings (assets/equity).

H2b. For myopic firms, performance returns (i.e. ROE/ROA) are expected to be negatively (positively) associated with the standard deviation of earnings (assets/equity).

3. Sample description and main results

Table I summarizes the sample selection procedure. The sample begins with all firm-year observations between fiscal years 1968 and 2013. Next, firms without complete performance data available in Compustat are eliminated. This initial data set contains 445,821 firm-year observations (34,782 unique firms). Next, the following types of firms are eliminated: observations with missing data; firms with negative assets or negative equity; industries with less than 20 firms. Finally, for any given five-year period, the sample is restricted to firms with five consecutive years of data[15]. This final step

Table I.
Sample breakdown

Panel A: Total observations

	Obs	Unique firms
Firms covered in Compustat during the sample period of 1969 to 2013	445,821	34,782
Firms with negative assets, or missing assets, earnings or book value of equity	(103,465)	(4,570)
Industries with less than 20 observations in a given year	(9,410)	(354)
Require 5 consecutive years of data for each year in our sample period	(128,406)	(13,394)
Total Firm year observations used in analysis	204,540	16,464

Panel B: Year by year sample

Year	No. of Firms	Year	No. of Firms
1969	2,613	1992	5,562
1970	3,083	1993	5,557
1971	3,079	1994	5,466
1972	3,079	1995	6,447
1973	3,080	1996	6,460
1974	2,969	1997	6,450
1975	3,855	1998	6,461
1976	3,865	1999	5,956
1977	3,867	2000	6,855
1978	3,872	2001	6,866
1979	3,797	2002	6,856
1980	4,584	2003	6,832
1981	4,593	2004	5,568
1982	4,578	2005	6,270
1983	4,582	2006	6,275
1984	3,867	2007	6,270
1985	4,686	2008	6,260
1986	4,691	2009	845
1987	4,695	2010	845
1988	4,694	2011	845
1989	4,621	2012	845
1990	5,568	2013	845
1991	5,564		

leaves a total of 204,540 firm-year observations (16,464 unique firms). All variables are winsorized at the 1st and 99th percentiles; this allows the extreme observation problem to be mitigated without decreasing the number of observations.

Table I, Panel B provides the sample breakdown by year. Existing research argues that Bowman's Paradox may be due to the researcher's choice of time periods and/or exogenous macroeconomic factors. For example, our sample period covers a number of periods which are notorious for various significant macroeconomic events. For example, the sample period straddles the 2000-2001 well-known accounting scandal period and the subsequent promulgation of the Sarbanes-Oxley Act (SOX). SOX was passed in July 2002, partly as a response to the numerous corporate scandals of that time period. For the most part, the sample is fairly evenly distributed across the sample period. However, the requirement of five consecutive years reduces the sample quite a bit in the last five years of the sample period (2009-2013). Observations range from a high of 6,855 in 2000, to a low of 845 in 2009-2013.

3.1 Summary statistics

Table II presents the summary statistics for the sample firms. Panel A presents these statistics for the entire period. All variables are defined in the data Table AI. The means for each of the performance measures ranges from negative 0.01 to positive 0.04. These numbers are noticeably less than Baucus *et al.* (1993), whose sample size was substantially smaller. The medians for each of these variables are also much larger, suggesting that the distribution is somewhat negatively skewed, even after winsorizing at the 1st and 99th percentiles.

Similarly, an inspection of the standard deviations of the ROE measures suggests that these measures have higher volatility than the ROA measures (0.50 and 0.53, vs 0.11 for both ROA measures). Taken together, these results suggest that the ROE measures are considerably more volatile and skewed than the ROA measures. Table II, Panel B provides a more robust selection of summary statistics for the sample firms. This panel presents the average annual cross-sectional summary statistics for the 45 years in the sample period[16]. For the most part, the results in this panel are similar to the above results.

Table III presents the correlation matrices. Panel A provides the correlations over the entire sample period from 1969 to 2013. The primary result in this table is a significant negative correlation between the performance variables (ROA/ROE) and the volatility variables (SROA, SROE) for all four of the primary measures (beginning and end of period ROA and ROE). This is consistent with the Bowman Paradox (the overall negative association between accounting measures of risk and return).

Table III, Panel B presents the average annual cross-sectional correlations for the 45 years in the sample period. Results here are similar to the results above, if not somewhat stronger. The cross-sectional correlation results suggest a clear negative

Variables	Q1	Mean	SD	Median	Q3	Number
Panel A: Entire period						
ROE (EOP)	0.01	0.03	0.48	0.10	0.16	204,536
ROE (BOP)	(0.00)	0.04	0.45	0.11	0.18	204,540
ROA (EOP)	0.01	(0.01)	0.23	0.06	0.09	204,518
ROA (BOP)	0.01	0.01	0.21	0.06	0.10	204,540
SROE (EOP)	0.03	0.53	1.41	0.07	0.24	204,540
SROE (BOP)	0.04	0.50	1.31	0.09	0.25	204,540
SROA (EOP)	0.01	0.11	0.23	0.03	0.08	204,540
SROA (BOP)	0.01	0.11	0.23	0.04	0.10	204,540
Panel B: Average annual cross-sectional statistics						
ROE (EOP)	(0.00)	0.03	0.43	0.10	0.16	45
ROE (BOP)	(0.01)	0.05	0.40	0.10	0.18	45
ROA (EOP)	0.00	0.00	0.19	0.05	0.09	45
ROA (BOP)	0.01	0.02	0.18	0.06	0.10	45
SROE (EOP)	0.03	0.48	1.23	0.07	0.26	45
SROE (BOP)	0.04	0.44	1.12	0.09	0.25	45
SROA (EOP)	0.01	0.10	0.19	0.03	0.09	45
SROA (BOP)	0.01	0.10	0.18	0.04	0.10	45

Notes: The table provides information about the distribution of the variables that are used in the regressions. Panel A presents the statistics for the entire sample period of 1969-2013. Panel B presents the average annual cross-sectional summary statistics for the 45 years in the sample period. All variables are defined in the Data Appendix

Table II.
Summary statistics

	ROE (EOP)	ROE (BOP)	ROA (EOP)	ROA (BOP)	SROE (EOP)	SROE (BOP)	SROA (EOP)	SROA (BOP)
Panel A: Correlations over the sample period (1969 to 2013)								
ROE (EOP)								
ROE (BOP)	*0.38*							
ROA (EOP)	*0.34*	*0.42*						
ROA (BOP)	*0.35*	*0.44*	*0.92*					
SROE (EOP)	*(0.16)*	*(0.27)*	*(0.45)*	*(0.43)*				
SROE (BOP)	*(0.10)*	*(0.21)*	*(0.44)*	*(0.44)*	*0.72*			
SROA (EOP)	*(0.14)*	*(0.21)*	*(0.66)*	*(0.62)*	*0.56*	*0.52*		
SROA (BOP)	*(0.14)*	*(0.18)*	*(0.61)*	*(0.60)*	*0.48*	*0.59*	*0.82*	
Panel B: Average cross-sectional correlations (1969 to 2013)								
ROE (EOP)								
ROE (BOP)	*0.98*							
ROA (EOP)	*0.92*	*0.93*						
ROA (BOP)	*0.91*	*0.91*	*0.99*					
SROE (EOP)	*(0.84)*	*(0.86)*	*(0.90)*	*(0.91)*				
SROE (BOP)	*(0.82)*	*(0.84)*	*(0.91)*	*(0.92)*	*0.99*			
SROA (EOP)	*(0.85)*	*(0.87)*	*(0.96)*	*(0.97)*	*0.97*	*0.98*		
SROA (BOP)	*(0.81)*	*(0.82)*	*(0.94)*	*(0.95)*	*0.95*	*0.98*	*0.99*	

Notes: This table provides the correlation coefficients for the variables used in the study. Panel A presents the correlations for the entire sample period of 1969 to 2013. Panel B presents the average annual cross-sectional correlations for the 45 years in the sample period. Italic values indicate significance at the 1 percent level. All variables are defined in the data Appendix

Table III.
Correlation matrices

relationship, regardless of the method used to calculate realized returns. The strength of the overall negative association between these variables seems to be a testament to the robustness of Bowman's Paradox in this sample.

3.2 Results

Similar to Baucus *et al.* (1993), the study begins by estimating the following regressions (firm and year subscripts removed for convenience):

$$\text{Return} = \alpha + \beta_1 \text{ Risk} + \beta_n \text{ Industry\_Controls} + \text{error} \quad (1)$$

The left-hand-side variable, "Return," is equal to one of the aforementioned four performance return variables (EOP_ ROE, BOP_ROE, EOP_ ROA and BOP_ROA). The right-hand side theory variable, "Risk," is equal to the standard deviation of these variables. "Industry Controls" refers to two-digit SIC industry control indicator variables.

Table IV presents the risk-return relationships. To be consistent with prior literature, select five-year average results are presented for the firms in the sample period (see Baucus *et al.*, 1993)[17]. Each regression presents the results of regressing the respective performance measure on its volatility counterpart. For example, Model 1 regresses end of period ROE (ROE_EOP) on the standard deviation of the end of period ROE (SROE_EOP). The number of observations in the regressions ranges from 14,934 in the early years of the sample period, to highs in excess of 33,000 observations in the later years of our sample period.

Cool and Schendel (1988) argue that differences among strategic group members may lead to differences in performance within the same strategic group. The authors suggest cluster analysis as one method to control for this issue. To mitigate this concern, the current study uses three-way clustered errors where the models cluster across firms, years and industries in each regression (similar to Petersen, 2009). This methodology controls for variation across firms, years and industries, which enhances the robustness and generalizability of the results.

Each of the five-year periods reported illustrates a reliable negative and significant relationship. This consistency suggests that previous results are not due to time specific macroeconomic conditions, methods of computing returns, and are not specific to the time period studied. The overall conditional relationship is strongly consistent with the Bowman Paradox; it is negative and it appears to be fairly robust.

Given the substantial evidence and robustness of the results, the linear analysis is overwhelmingly in favor of a negative realized risk – realized return relationship. However, this does not preclude the possibility that the overall relationship is better characterized, as suggested by Fiegenbaum and Thomas (1988), as U-shaped.

Next, the regressions are estimated after conditioning on the type of firm. Table V presents the risk-return relationships from estimating Equation (1) using EOP and BOP accounting measures. Here, the analysis is focused on the high performing (above the median) firms[18]. Similar to before, select five-year average results are presented for the firms in the sample period.

Regression results in Table V show that EOP risk-return relations for the above-median firms are positive for every five-year period and the total sample period. This is consistent with the findings of previous studies such as Fiegenbaum and Thomas (1988) and Baucus *et al.* (1993) that there is a positive risk-return relationship for these "winner" firms. Interestingly, the relationship in terms of R^2 (explained model variance) is much stronger for the ROE and ROE standard deviations than it is for the ROA and ROA standard deviation. The pattern is consistent for all periods. Similar to before, each regression model includes three-way clustering.

Analogous to Tables V and VI presents the risk-return relationships from estimating Equation (1) using EOP and BOP accounting measures, focusing the analysis on the poor performing (below the median) firms. Similar to before, select five-year average results are presented for the firms in the sample period and the entire time period.

Regression results in Table VI show that the risk-return relations for the below-median firms are consistently negative for every five-year period and the total sample period. This is consistent with the findings of previous studies, such as Fiegenbaum and Thomas (1988) and Baucus *et al.* (1993), that there is a negative risk-return

Table IV.
Risk-return relationships using EOP and BOP accounting measures (all firms)

	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)
	1969-1973				1979-1983				1989-1993			
SROE (EOP)	−0.07** (0.03)				−0.05* (0.01)				−0.05* (0.01)			
SROE (BOP)		−0.07* (0.02)				−0.07* (0.01)				−0.07* (0.01)		
SROA (EOP)			−0.46* (0.09)				−0.53* (0.04)				−0.59* (0.02)	
SROA (BOP)				−0.10 (0.06)				−0.39* (0.05)				−0.53 (0.02)
Adj R^2	0.02	0.01	0.11	0.00	0.02	0.04	0.26	0.11	0.02	0.04	0.35	0.28
n	14,934	14,934	14,934	14,934	22,135	22,135	22,134	22,135	26,874	26,875	26,872	26,875
F Stat	347	190	1796	47	382	836	7,654	2,846	489	1,029	14,462	10,444
	1999-2003				2009-2013				1969-2013			
SROE (EOP)	−0.05* (0.00)				−0.08* (0.02)				−0.05* (0.00)			
SROE (BOP)		−0.07* (0.00)				−0.07* (0.02)				−0.07* (0.00)		
SROA (EOP)			−0.63* (0.01)				−0.67* (0.04)				−0.65* (0.01)	
SROA (BOP)				−0.53* (0.01)				−0.58* (0.04)				−0.56* (0.01)
Adj R^2	0.02	0.04	0.43	0.38	0.04	0.04	0.48	0.37	0.02	0.04	0.44	0.36
n	33,376	33,376	33,365	33,376	4,225	4,225	4,225	4,225	204,536	204,540	204,518	204,540
F Stat	618	1,439	24,936	20,333	192	168	3,902	2,495	5,183	9,239	160,913	117,177

Notes: The table presents OLS regressions, which regress the performance variable (ROE/ROA) on the risk variable (Standard deviation of ROE/ROA). Selected five-year regression periods are presented. The 1969-2013 models include the entire sample period. Standard errors are shown in parentheses. Each regression model clusters across firms, years and industries. The sample is described in Table I and all variables are defined in the Data Appendix. *,**,***Significant at the 0.001, 0.05 and 0.10 levels, respectively

Table V. Risk-return relationships using EOP and BOP accounting measures (above the median firms)

	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)
	1969-1973				1979-1983				1989-1993			
SROE (EOP)	0.11* (0.02)				0.14* (0.01)				0.14* (0.00)			
SROE (BOP)		0.27* (0.05)				0.15* (0.01)				0.13* (0.00)		
SROA (EOP)			0.35* (0.08)				0.19* (0.02)				0.09* (0.01)	
SROA (BOP)				0.72* (0.05)				0.30* (0.03)				0.20* (0.01)
Adj R^2	0.17	0.22	0.09	0.24	0.33	0.29	0.10	0.19	0.36	0.32	0.07	0.16
n	7,467	7,467	7,467	7,467	11,068	11,068	11,067	11,068	13,437	13,438	13,436	13,438
F Stat	1,508	2,065	776	2,359	5,117	4,302	1,284	2,638	7,073	5,947	1,015	2,379
	1999-2003				2009-2013				1969-2013			
SROE (EOP)	0.14* (0.00)				0.14* (0.01)				0.14* (0.00)			
SROE (BOP)		0.13* (0.00)				0.14* (0.01)				0.14* (0.00)		
SROA (EOP)			0.07* (0.00)				0.07* (0.02)				0.07* (0.00)	
SROA (BOP)				0.14* (0.01)				0.14* (0.04)				0.15* (0.00)
Adj R^2	0.40	0.36	0.06	0.11	0.39	0.41	0.03	0.07	0.38	0.34	0.04	0.10
n	16,688	16,688	16,683	16,688	2,113	2,113	2,113	2,113	102,268	102,270	102,259	102,270
F Stat	10,486	8,710	953	1,920	1,367	1,509	63	164	60,966	51,862	4,332	11,553

Notes: The table presents OLS regressions, which regress the performance variable (ROE/ROA) on the risk variable (Standard deviation of ROE/ROA). The sample is restricted to "winner" (above the median) firms. Selected five-year regression periods are presented. The 1969-2013 models include the entire sample period. Standard errors are shown in parentheses. Each regression model clusters across firms, years and industries. The sample is described in Table I and all variables are defined in the Data Appendix. *,**,***Significant at the 0.001, 0.05 and 0.10 levels, respectively

Table VI.
Risk-return relationships using EOP and BOP accounting measures (below the median firms)

	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)
	1969-1973				1979-083				1989-1993			
SROE (EOP)	−0.24* (0.03)				−0.18* (0.01)				−0.17* (0.01)			
SROE (BOP)		−0.29* (0.07)				−0.19* (0.01)				−0.17* (0.01)		
SROA (EOP)			−0.69* (0.17)				−0.65* (0.05)				−0.68* (0.02)	
SROA (BOP)				−0.79* (0.07)				−0.76* (0.05)				−0.66* (0.02)
Adj R^2	0.23	0.25	0.34	0.30	0.24	0.27	0.41	0.44	0.26	0.29	0.47	0.47
n	7,467	7,467	7,467	7,467	11,068	11,068	11,067	11,068	13,437	13,438	13,436	13,438
F Stat	2,161	2,499	3,750	3,245	3,707	4,388	7,566	8,528	5,081	5,868	12,440	12,622
	1999-2003				2009-2013				1969-2013			
SROE (EOP)	−0.18* (0.00)				−0.23* (0.02)				−0.19* (0.00)			
SROE (BOP)		−0.17* (0.00)				−0.19* (0.01)				−0.19* (0.00)		
SROA (EOP)			−0.69* (0.01)				−0.75* (0.03)				−0.74* (0.01)	
SROA (BOP)				−0.58* (0.01)				−0.65* (0.04)				−0.67* (0.01)
Adj R^2	0.28	0.32	0.52	0.50	0.36	0.33	0.61	0.53	0.31	0.34	0.56	0.55
n	16,688	16,688	16,683	16,688	2,113	2,113	2,113	2,113	102,268	102,270	102,259	102,270
F Stat	6,955	8,427	19,549	18,234	1,195	1,038	3,130	2,284	45,289	52,956	13,2519	12,5536

Notes: The table presents OLS regressions, which regress the performance variable (ROE/ROA) on the risk variable (Standard deviation of ROE/ROA). The sample is restricted to "loser" (below the median) firms. Selected five-year regression periods are presented. The 1969-2013 models include the entire sample period. Standard errors are shown in parentheses. Each regression model clusters across firms, years and industries. The sample is described in Table I and all variables are defined in the Data Appendix. *,**,***Significant at the 0.001, 0.05 and 0.10 levels, respectively relationship for these "loser" firms. Interestingly, the pattern of explained variance has also shifted. The ROA – ROA standard deviation now has significantly more explanatory power than the ROE – ROE standard deviation models.

The first hypothesis predicts that overall, performance returns (ROE/ROA) will be negatively related to the standard deviation of earnings and positively related to the standard deviation of equity/assets. To investigate this hypothesis, Equation (1) is altered in the following manner:

$$\text{Return\_variable} = \alpha + \beta_1 \sigma_{\text{Earnings}} + \beta_2 \sigma_{\text{Equity}} + \delta\ \text{Industry\_CONTROLS} + \text{error} \quad (2)$$

$$\text{Return\_variable} = \alpha + \beta_1 \sigma_{\text{Earnings}} + \beta_2 \sigma_{\text{Assets}} + \delta \text{Industry\_CONTROLS} + \text{error} \quad (3)$$

The left-hand-side performance return variable is equal to one of the aforementioned four performance variables (EOP and BOP ROE and ROA). The right-hand side theory variables in Equation (2) are equal to the standard deviations of earnings (σ_{Earnings}) and equity (σ_{Equity}). The right-hand side theory variables in Equation (3) are equal to the standard deviations of earnings (σ_{Earnings}) and assets (σ_{Assets}). The σ_{Earnings} is defined as the firm-specific standard deviation of earnings over the preceding five-year time period. The σ_{Equity} (σ_{Assets}) is defined as the firm-specific standard deviation of equity (assets) over the preceding five-year time period. Table VII presents the results of estimating Equations (2) and (3) above over the 1969-2013 time period.

Several interesting observations can be made. Consistent with the predictions, the earlier negative risk-return relationships appear to be due solely due to the numerator (the volatility of earnings) of the performance terms for three of the four performance measures. In addition, the denominators (the volatility of equity and assets, respectively) are positively related to the respective performance variables (ROA and ROE) for all four performance measures. This relationship is invariant to using ROA or ROE and to measuring these variables at the end of the period or the beginning of the period.

The second hypothesis predicts that performance returns (ROE/ROA) are expected to be positively (negatively) associated with the earnings (assets/equity) component of risk

		1969-2013		
	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)
S_INCOME (EOP)	−0.0370 (0.0000)*		−0.00004 (0.0000)	
S_EQUITY (EOP)	0.0210 (0.0000)*			
S_INCOME (BOP)		−0.0233 (0.0000)*		0.00186 (0.0000)**
S_EQUITY (BOP)		0.0161 (0.0000)*		
S_ASSETS (EOP)			0.00044 (0.0000)*	
S_ASSETS (BOP)				0.00022 (0.0000)*
Adj R^2	0.015	0.012	0.001	0.001
n	180,005	180,007	180,006	180,007
F Stat	1,333	1,079	133	75

Notes: The table presents OLS regressions, which regress the performance variable (ROE/ROA) on the decomposed (numerator and denominator) components of the risk variable (Standard deviation of ROE/ROA) for the sample period 1969-2013. Standard errors are shown in parentheses. Each regression model clusters across firms, years and industries. The sample is described in Table I and all variables are defined in the Data Appendix. *,**,***Significant at the 0.001, 0.05 and 0.10 levels, respectively

Table VII. Risk-return relationships using decomposed performance measures (all firms) for the winner firms. In order to investigate this issue, the aforementioned relationships are reconsidered after conditioning on high and low performing firms. Table VIII presents the results of estimating Equations (2) and (3) for firms with above the median performance terms. After conditioning on the above the median firms, the relationship between risk and return is of the opposite sign – the volatility of earnings is positively related to the performance returns for the high performing (winner) firms. Conversely, the volatility of both equity and assets are negatively related to the performance returns for the high performing (winner) firms. These relationships hold for all four models presented.

Analogously, Table IX presents the results of estimating Equations (2) and (3) for firms with below the median performance terms. Table IX documents that, after conditioning on the below the median firms, the volatility of earnings is negatively related to the performance returns for the myopic (loser) firms. Conversely, the volatility of both equity and assets are positively related to the performance returns for the myopic (loser) firms. Taken together, these results support *H2a* and *H2b*.

3.3 Discussion

Overall, the earlier negative risk-return relationships appear to be almost exclusively due to the volatility of the reported earnings (the numerator effect of the performance terms). The volatility of equity and assets, respectively (the denominators effects) are positively related to the respective performance variable (ROA and ROE). This relationship is invariant to using ROA or ROE and to the timing of the variable measurement (end of period or beginning of period). However, after isolating winner (above the median) and loser (below the median) portfolios, the opposite relationship emerges for the winners. The volatility of earnings is positively (negatively) related to the performance returns for the high (low) performing firms. Conversely, the volatility of both equity and assets are negatively (positively) related to the performance returns for the high (low) performing firms.

In other words, returns are negatively related to the short-term income statement component of risk – for myopic (loser) firms. Similarly, returns are positively related to

	1969-2013 1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)
S_INCOME (EOP)	0.0109 (0.0000)*		0.0094 (0.0000)*	
S_EQUITY (EOP)	−0.0019 (0.0000)*			
S_INCOME (BOP)		0.0178 (0.0000)*		0.0124 (0.0000)*
S_EQUITY (BOP)		−0.0044 (0.0000)*		
S_ASSETS (EOP)			−0.00144 (0.0000)*	
S_ASSETS (BOP)				−0.00187 (0.0000)*
Adj R^2	0.009	0.005	0.050	0.041
n	89,029	88,858	88,938	88,708
F Stat	420	231	2,352	1,879

Notes: The table presents OLS regressions, which regress the performance variable (ROE/ROA) on the decomposed (numerator and denominator) components of the risk variable (Standard deviation of ROE/ROA) for the sample period 1969-2013. The sample is restricted to “winner” (above the median) firms. Standard errors are shown in parentheses. Each regression model clusters across firms, years and industries. The sample is described in Table I and all variables are defined in the Data Appendix. *,**,***Significant at the 0.001, 0.05 and 0.10 levels, respectively

Table VIII.
Risk-return relationships using decomposed performance measures (above the median firms)

Table IX. Risk-return relationships using decomposed performance measures (below the median firms)

	1969-2013			
	1 ROE (EOP)	2 ROE (BOP)	3 ROA (EOP)	4 ROA (BOP)
S_INCOME (EOP)	−0.0717 (0.0000)*		−0.01069 (0.0000)*	
S_EQUITY (EOP)	0.0305 (0.0000)*			
S_INCOME (BOP)		−0.0518 (0.0000)*		−0.0104 (0.0000)*
S_EQUITY (BOP)		0.0218 (0.0000)*		
S_ASSETS (EOP)			0.0020 (0.0000)*	
S_ASSETS (BOP)				0.00196 (0.0000)*
Adj R^2	0.016	0.013	0.014	0.012
n	90,695	90,874	90,823	91,030
F Stat	737	578	647	548

Notes: The table presents OLS regressions, which regress the performance variable (ROE/ROA) on the decomposed (numerator and denominator) components of the risk variable (Standard deviation of ROE/ROA) for the sample period 1969-2013. The sample is restricted to "loser" (below the median) firms. Standard errors are shown in parentheses. Each regression model clusters across firms, years and industries. The sample is described in Table I and all variables are defined in the Data Appendix. *,**,***Significant at the 0.001, 0.05 and 0.10 levels, respectively

the short-term income statement component of risk – for winner firms. Thus, the results add to this literature stream, by suggesting that managerial myopia is likely one of the causes of Bowman's Paradox.

4. Conclusion

Although over 30 years have passed since Bowman (1980) first observed the negative risk-return correlation, to date, no consensus exists in regards to an explanation of this Paradox (Andersen *et al.*, 2007). The current study contributes to this literature stream by conducting a rigorous empirical examination of the relationship between four risk and return proxies, across a wide ranging time periods and utilizing a number of model specifications. Given the ongoing (and sometimes controversial) debate in the literature, it attempts to provide a plausible explanation for the Paradox. Specifically, the study further extends this literature stream by investigating if Bowman's Paradox results from the trade-off between managerial myopia and firm performance.

Overall, the earlier robust negative risk-return relationships appear to be due to the volatility of the numerator component (reported earnings) of the performance terms. This relationship is invariant to using ROA or ROE and to the timing of the variable measurement (end of period or beginning of period). However, after isolating winner (above the median) and loser (below the median) portfolios, the relationship reverses for the winner portfolios. The volatility of earnings is positively (negatively) related to the performance returns for the high (low) performing firms. Conversely, the volatility of both equity and assets are negatively (positively) related to the performance returns for the high (low) performing firms.

We interpret these results as suggesting that managerial myopia is likely one of the primary causes of Bowman's Paradox. Given the ongoing (and sometimes controversial) debate in the literature and the widespread use of these performance measures, these results may be of interest to accounting, management and finance academics, regulators, capital market participants and other interested observers. For example, our study is likely to help investors guide their strategy by providing a better understanding for the relationship between a company's accounting performance and its risk.

Notes

1. For seminal reviews of the literature, see Ruefli *et al.* (1999), Bromiley *et al.* (2001), and Nickel and Rodriguez (2002).
2. Examples of myopia would include cutting discretionary expenses (such as R&D, advertising and SG & A expenses) in order to maximize current period earnings (e.g. Dechow and Sloan, 1991), or reducing fixed asset investments (minimizing depreciation/interest expenses) in order to maximize current period earnings (e.g. Kraft *et al.*, 2016).
3. For example, cutting advertising expenses this period will lead to an increase in earnings this period and a decrease in earnings next period (lower advertising expenses eventually lead to reductions in subsequent customer demand and/or because advertising expenses return to optimal levels).
4. A manager who makes good performance decisions is willing to sacrifice current profitability and/or performance for long-term firm value (Laverty, 1996). For example, good managers are willing to increase their discretionary (R&D, advertising) expenses in order to increase future earnings.
5. Although the volatility of the ratio (earnings/assets) is not equal to the ratio of the volatilities of its components (i.e. the volatility of earnings/volatility of assets), *per se*, one can argue that it is a function of the volatilities of its components (specifically, it varies positively with the volatility of earnings and negatively with the volatility of assets).
6. There are potentially many reasons for why accounting and finance researchers have failed to explore Bowman's Paradox. Obviously, one of the main reasons is the interdisciplinary silos that seem to have arisen over time. During this time period, accounting and finance researchers were largely concerned with providing external validity to fundamental accounting constructs. To do this, a number of studies investigated the relationship between accounting variables and stock returns or the association between accounting variables and capital market efficiency (see Kothari, 2001 for a seminal review of this literature). Accordingly, one of the main contributions of this paper is to bridge this interdisciplinary gap in the literature.
7. E.g. Warren Buffet lists ROE as an important measure for a winning trading strategy.
8. Armstrong *et al.* (2010) talks about the link between these two roles of accounting information with the following discussion: "Another area that has received recent attention in the empirical literature on accounting-based performance measures is the distinction between stewardship and valuation roles of accounting information. A key issue in this literature is whether financial reports that are best suited to aid investors in valuing the firm are also best suited to aid shareholders and directors in contracting with executives to mitigate agency conflicts […]. At first glance, it is easy to see the overlap between the valuation and contracting roles of accounting reports. Market price aggregates a variety of valuation relevant sources of accounting and other information to provide what is likely to be the best available estimate of shareholder value."
9. For their overall sample period (1969-1988) the study finds a positive association between beginning of period ROE/ROA and the standard deviation of ROE/ROA. In subsample analysis, the study also found instances of a positive association between beginning of period ROE/ROA and the standard deviation of ROE/ROA in various five-year sub-periods (see Baucus *et al.*, 1993, Table II).
10. Brick *et al.* (2015) utilized a similarly long time period. These authors investigated whether Bowman's Paradox remained after adjusting earnings for the issuances and repurchases of stocks, and controlling for other explanatory variables, such as size and leverage. The authors concluded that a positive relationship between mean ROE and its standard deviation was far more likely than a negative one. However, Brick *et al.* (2015): concentrated on ROE; focused on the relation between performance and the variance of the performance ratios; did not condition

on winner/loser firms; and used a relatively strict filtering criteria, which greatly reduced their sample size and the corresponding generalization of their results. For example, the study's requirement of 30 consecutive years of data probably results in the sample excluding unprofitable firms.

11. Note that this is the direct opposite of the "threat-rigidity effects" prediction, which predicts that, in the face of performance declines, management would make conservative, status-maintaining decisions rather than drastic, high-risk choices (Staw *et al.*, 1981, p. 501).

12. These latter two results are suggested by Singh (1986), who used the questionnaire data from Khandwalla (1976) to empirically show a positive relationship between poor performance and managements' high-risk behavior.

13. In a slightly different context, Cool *et al.* (1989) make a similar argument. These authors argue that "the relative impact of firm attributes and market share on firm profitability depends on the degree of rivalry among competitors. In tight oligopolistic markets, returns are likely to reflect the exercise of market power […]." "Any differences in returns must reflect differential efficiency rents."

14. See Kothari (2001, pp. 132-134) for an insightful discussion concerning the transitory nature of earnings – including a mathematical model illustrating the econometric consequences of transitory earnings.

15. Of course, the decision to require five-consecutive years (observations) of data is arbitrary. This number is chosen to be consistent with the Baucus *et al.* (1993) research design. Requiring more (less) observations is problematical. To accurately identify trends in the relationship a sufficiently long period is desirable. However, one would also like to minimize any potential survivorship bias arising because of the selection process. Chang and Thomas (1989, p. 280) note that more years is problematical if the risk measure spans multiple stages of business growth. These authors note that an "alternative approach would be to design a refined measure of risk based on fewer years data, or to use a forecast error approach as suggested by Silhan and Thomas (1986)."

16. In this panel, we first calculate the cross-sectional statistics for each of the 45 years in our sample period. We then calculate the averages for the entire sample period.

17. For expositional clarity we present select five-year periods (1969-1973, 1979-1983, 1989-1993, 1999-2003 and 2009-2013) and the full sample period (1969-2013). Results for the omitted five-year periods (1974-1978, 1984-1988, 1994-1998, 2004-2008) are essentially equal to the results shown.

18. Our methodology for these regressions can be summarized as follows: First, similar to Baucus *et al.* (1993), we calculate industry medians for each five-year period. Next, we rank firms from lowest to highest within each industry using each of the return measures (ROE and ROA calculated using beginning and end of period methods). Then, we designate firms as below or above the median for each time period and return measure. It should be noted that since each time period was separately analyzed, it was possible for firms to be designated as below-median in one period and above the median in another time period. At the same time, firms could also be in the above-median subsample for ROE and below-median subsample for ROA, or vice versa.

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Appendix

Table AI. Data Appendix for the variables used in the study

Variables	Definition (Compustat names are in quotation marks)
ROE (EOP)	Net income before extraordinary items ("ib"), deflated by total equity ("ceq") (end of the year)
ROE (BOP)	Net income before extraordinary items ("ib"), deflated by lagged total equity ("ceq") (beginning of the year)
ROA (EOP)	Net income before extraordinary items deflated by total assets ("at") (beginning of the year)
ROA (BOP)	Net income before extraordinary items deflated by lagged total assets ("at") (end of the year)
SROE (EOP)	Standard deviation of ROE(EOP) over the previous five years
SROE (BOP)	Standard deviation of ROE(BOP) over the previous five years
SROA (EOP)	Standard deviation of ROA(EOP) over the previous five years
SROA (BOP)	Standard deviation of ROA(BOP) over the previous five years
S_INCOME (EOP)	Standard deviation of net income over the previous five years
S_INCOME (BOP)	Standard deviation of lagged net income over the previous five years
S_EQUITY (EOP)	Standard deviation of shareholder's equity over the previous five years
S_EQUITY (BOP)	Standard deviation of lagged shareholder's equity over the previous five years
S_ASSETS (EOP)	Standard deviation of total assets over the previous five years
S_ASSETS (BOP)	Standard deviation of lagged total assets over the previous five years

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