

Relationship between Accounting Based Risk and Return: Analysis for Turkish Companies

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Abstract

Accounting based risk and return relationship is a relatively incomplete issue, which has mostly been studied under a separate framework from financial markets based risk and return. Researchers find different results for different classifications of companies/industries/time frames. This paper reports the cross-section and panel correlations between accounting risk and return for various industrial company size categories in Turkey. The goal is to show the direction and magnitude of the relationship. When standard deviation is used as a risk measure, significant correlations are typically positive for small & medium sized companies and large companies. The positive relationship is very strong when the performance measure is ROE. All significant correlations become negative for very large sized companies. For each size category, no difference is observed between low-performers and high-performers in terms of significant coefficient signs. However, when we look at the magnitude of coefficients, there are some substantial differences between size categories, and between performance categories. When the risk measure is total debt to total assets ratio, our results show significant negative association between return and risk for all company size categories.

Keywords: accounting-based risk and return, bowman's paradox, industrial companies, Turkey

1. Introduction

Firm-level accounting based risk and firm-level accounting based return posed a paradox in strategic management, sparked by consecutive studies of Bowman (1980, 1982, 1984). His studies remark that these two variables might be negatively related to each other under some circumstances, as opposed to generally accepted rule of financial market based positive relationship found by many researchers (Note 1). Bowman used mean values of ROA as a proxy for return, and variance of ROA as a proxy for risk. In a statistical point of view, this approach had been criticized in the forthcoming years. Because, using the moments of same variable might lead a statistical bias since the moments of any same variable could be positively related to each other (Baucus et al., 1993; Ruefli & Wiggins, 1994). Some studies report that skewness of return distributions can lead to spurious negative relationships between risk and return (Denrell, 2004; Henkel, 2009). Afterwards, researchers have started to make adjustments to their measures, or use different measures for risk and return to test this kind of relationship.

Strategic management theories, organization theories, and economic theories are applied to explain the complicated findings of empirical studies conducted to find if Bowman's paradox exists. Contingent risk decision hypothesis' attitudes toward risk are widely associated with the empirical evidence in the literature. No final argument was made on whether company managers' behaviors are risk averse, or risk seeking. Risk-averse investors are those who purchase assets with high risk only if they expect a premium return, as suggested by contingent risk decision hypothesis, reviewed by Ruefli et al. (1999); Nickel and Rodriguez (2002). This means a positive relationship between risk and return. On the other hand, risk-seeking investors purchase riskier assets with the same rate of return because riskier assets will allow higher probability of extraordinary returns, which means a negative relationship. Bowman's paradox lucidly obtains negative slope between risk and return, which leads researchers to assume decision-makers behave risk seeking. (Note 2) With a broader scanning, Oviatt and Bauerschmidt (1991) state that the attitude towards risk is dependent on the contingencies that a decision maker can behave risk-aversing in a circumstance, and he/she can behave risk-seeking in another circumstance. In addition, they conclude that risk and return relationship is determined by the managerial decisions, and it is dependent on the cognitive capabilities of decision makers.

To our best knowledge, no prior study was set to find out if Bowman's paradox exists for Turkish companies. This paper's main contribution to the existing literature is indicating the direction and magnitude of the relationship between firm level accounting based risk and firm-level accounting based return for Turkish companies, which operate in emerging economy conditions in Middle East/Eastern Europe area. Further contribution of the paper is to make a connection with agency theory to explain the evidence and conclusion. Maurer (2008) refers the need for moderating effects of agency theory on managerial decisions affecting strategic risk and return. The last contribution of the paper to existing empirical risk-return studies is the basis of grouping in empirical analysis. We take company size into account instead of industry classification because we believe that size matters for incidences of both risk and return. The profiles of managers, as decision makers in corporate firms, are typically different for different company size categories. For example, owners are generally managers at the same time for small and medium-sized companies, whereas managers are mostly professionals in very large companies. Concurrently, as we use leverage as a measure of risk in our analysis, we consider that access to credit opportunities significantly vary with company size.

Our findings are partially consistent with the existing return-risk relationship literature explaining the paradox with strategic conduct, yet with a twist. Prospect theory and behavioral theory give some direction to our suggestions from findings. Agency theory also appears to contribute to explain our case. The remainder of the paper is organized as follows. Conceptual framework connects core concepts and risk-return relationship from different approaches. It also reviews the literature. Third section describes the sample and data, and explains the methodology we used. Empirical results section shows the findings, and conclusions section sums up the overall paper.

2. Conceptual Framework and Literature Review

Academic studies conducted over time reveal that two streams of thinking have identified risk and return for corporations: financial market based and accounting based, separately. Financial markets and accounting streams have somehow put together by some researchers. (Note 3) Differences in identification lead empirical researchers to use different measurements. From financial markets point of view, return is measured by the lagged price, while risk is measured by volatility, or beta from CAPM. From accounting point of view, return generally called as performance, is typically measured by ROA, ROE, and by cash flows to total assets. Risk, on the other side, measured by the variance, standard deviation, or mean quadratic difference of the performance measure, and by leverage. Measurement of variables has been an issue for empirical literature as the results are mainly based on the identification of variables used in the analysis (Note 4). Another issue has been using end of period (EOP) vs. beginning of period (BOP) measures. Lehner (2000), using both EOP and BOP measures for comparison to previous studies, finds that the factor is the relative position of a company to a reference target level of performance, what determines the risk-return relationship. If the position of a company stays stable, risk-return relationship also stays stable. He proposes the need for an integrative model rather than conflicting explanations for risk and return relationship, which simply considers different framing effects simultaneously. Respectively, Brick et al. (2012) and Brick et al. (2015), also analyze the effects on the paradox of using EOP and BOP equity as well as those of earnings management via accruals. After adjustment of these two effects, they find no support for the Bowman's paradox in 2012. After incorporating the effects of equity issuances and repurchases, leverage, and firm size in 2015, they again find no support for the Bowman's paradox.

Different measurements used in time are chronologically listed by Nickel and Rodriguez (2002). Currently, behavioral theory, and prospect theory of contingent risk decision hypothesis, strategic conduct, and risks with implicit costs hypothesis are employed for explaining the relationship with decision makers' attitude towards risk and return.

Behavioral theory assumes that managers make decisions based on their aspirations and expectations of performance. The gap between aspirations and expectations determines the level of risk they take, which is to say, if the expected performance is higher than the aspired performance, managers will not consider to take additional risks. On the other hand, if the expected performance is lower, managers will try to make significant changes to increase the performance (Bromiley, 1991; Fiegenbaum et al., 1996; Greve, 1998; Palmer & Wiseman, 1999). Therefore, behavioral theory links low performance with negative association between risk and return; and it links high performance with positive association between risk and return. The definition of reference point is the issue of empirical papers testing behavioral theory hypothesis as discussed by Fiegenbaum et al. (1996). Some researchers use median as a reference point for target performance while some others use previous performance (Miller & Bromiley, 1990; Wiseman & Bromiley, 1996). Li et al. (2014), adopting the standard deviation of the securities analysts' forecasts of earnings to measure enterprises' risk and build the risk model based on behavioral theory, provides empirical evidence on the corporate risk- return argument. According to their results,

a low- performance corporate will seek risk actively and a high-performance corporate will avoid risk. They suggest that the phenomenon of “Bowman’s paradox” exists in Chinese enterprises.

Prospect theory (Kahneman & Tversky, 1979) finds and explains both positive and negative associations between risk and return. The theory suggests that company managers that have reached the target level of return will show risk-aversing behavior and the relationship between risk and return will be positive (Jegers, 1991; Sinha, 1994; Wiseman & Catanach, 1997). Company managers on the other side, that have not reached their target level of return will show risk-seeking behavior as they are looking for high-return probability, and the risk-return relationship will be negative. Empirical papers separate companies into two groups: high-performers and low-performers. They set industry mean or median of return as a target, and those that are below the target level performance become low-performers. Prospect theory possesses that decisions are made according to good and poor prospects, and current performances of companies. Maurer (2008), using ordinal strategic risk measure, finds empirical results suggesting that strategic risk may have a positive effect on subsequent performance and that performance has a negative effect on subsequent risk. So-called “self-correcting cycle” is reported as contrasting evidence against prospect-theory.

Strategic conduct (Siggelkow, 2001) is based on the concept of strategic fit and heterogeneity of firm strategic capabilities. According to this view, responding environmental demands and changes by aligning strategy content and organization structure leads to a high performance. Strategic conduct shapes performance outcomes and determines the relationship between risk and return. Authors model a simulation, and provide consistent results using empirical data. Miller and Chen (2003) and Fiegenbaum and Thomas (2004) explain strategic conduct such that good management practices are associated with risk-seeking behavior of managers and proactive management of risks, which in turn lead to high returns and low variation in the performance. Fiegenbaum and Thomas (2004) propose that organizations that develop unique capabilities, that are building and exploiting their dynamic capabilities for competitive advantage, that develop unique strategic groups that are better positioned than others, and that apply those three simultaneously, will achieve sustainable high organizational returns but low-risk outcome profile. Andersen et al. (2007) also propose a model of strategic conduct, which formulizes and mathematically reaches a negative association of risk and return.

Using risks with implicit costs hypothesis, Deephouse and Wiseman (2000), conclude that high risk will reduce companies’ operating income and increase operating costs, and leads to a reduction in the performance. Deephouse and Wiseman (2000) separately model return and risk using the risk-return measurement approaches of behavioral theory and agency theory (Note 5). They propose that managers of highly leveraged firms to be more cautious during periods when the potential for negative cash flows is high. On the other side, they consider riskier investments with higher income potential and market returns during periods of boom. They also show that leverage, as a risk measure, is positively related to return. Multiple frameworks may better explain risk-return relations, as they suggest.

3. Empirical Analysis

Our panel consists of 196 industrial non-financial companies operating and registered in Turkey based on accounting data from ORBIS (Note 6) database over 9 years, 2004-2012. All firms accessible on ORBIS with complete company size records were included in the analysis. We set three criteria to include a company in our sample. Criteria are shown in Table 1. In the sample, 102 companies are listed in stock exchange “Borsa İstanbul”, 93 are unlisted, and 1 company is delisted. In terms of size category, 112 companies are very large, 40 are large, 37 are medium sized, and 7 are small sized. The criteria for a company to be included in a size category are explained in Appendix 1. Companies in the sample are operating at non-financial sectors. Sectors are grouped according to Nace Rev. 2 main section classification, and definitions are in Appendix 2. Table 2 shows number of firms in the sample operating at each sector.

Table 1. Search criteria used in sampling

Search Step	Search Criteria	No. of Firms in ORBIS
1.	World region/Country/Region in country: Turkey	1,098,668
2.	Type of entities: Industrial companies	1,097,731
3.	Operating revenue (Turnover): All companies with a known value, 2012, 2011, 2010, 2009, 2008, 2007, 2006, 2005, 2004, for all the selected periods	198

Notes. 1) Search steps are combined as: “1 AND 2 AND 3” for boelian search in ORBIS.

2) Operating revenue (Turnover) is used as a criteria because it is used to determine the firm size category in ORBIS. It is defined as Net Sales + Other operating revenues + Stock variations.

Table 2. Number of firms in each sector

Industry	No. of Firms
Manufacturing	131
Electricity, Gas, Steam And Air Conditioning Supply	2
Construction	9
Wholesale And Retail Trade; Repair Of Motor Vehicles And Motorcycles	38
Transportation And Storage	6
Accommodation And Food Service Activities	1
Information And Communication	5
Professional, Scientific And Technical Activities	3
Human Health And Social Work Activities	1
Total	196

The relationship between accounting risk and return is analyzed by a correlation analysis. In one dimension, companies are categorized as small, medium-sized, large, and very large companies, to begin with. Bowman and many other authors testing his hypothesis used the standard deviation of performance as a measure of risk. However, some scholars criticize the use of variance or standard deviation as a measure of risk (Miller & Bromiley, 1990; Ruefli, 1990; Miller & Leiblein, 1996). They suggest that relationship between the moment of a variable and the variable itself creates a statistical bias. On the other hand, there is a consensus to use ROA and/or ROE as a measure of performance. We used two measures for risk: standard deviations of ROA and ROE over years 2004-2012, and leverage. Leverage is used as a measure of risk by Deephouse & Wiseman (2000). ROA is defined as (net income / total assets) *100, ROE is defined as (net income / equity) *100, and leverage is defined as total debt to total assets ratio. Whole process is replicated by using ROE instead of ROA for the robustness of results and similar results are found. Panel data descriptive statistics are on Table 3.

Table 3. Panel data descriptive statistics (all company size categories together)

	ROA	ROE	Leverage
Mean	5.54	9.35	50.94
Median	4.26	9.95	52.11
Maximum	99.75	718.61	99.01
Minimum	-53.02	-513.35	0.22
Std. Dev.	11.13	41.97	22.60
Observations	1650	1650	1650

On the other dimension, companies are categorized as above median (of ROA and ROE) as high performers, and below median as low performers to see if there is a difference between high performers and low performers. Many empirical studies in the literature use split samples between above and below median performers (Note 7)

Empirical analysis made by Andersen et al. (2007) is based on firms operating in different industries. We make a very similar analysis, based on different firm sizes. Apart from the outcomes of Andersen et al. (2007), mean performance of companies in our analysis is higher than the median performance in terms of ROA (mean is 5.54%, median is 4.26%). However, consistent with Andersen et al. (2007) results, mean is 9.35%, and average median is 9.95% for ROE. That means that the distribution of performance is negatively skewed for ROA, and it is positively skewed for ROE.

Table 4 shows descriptive statistics for each size category. It is observed that the mean performance of companies in "very large" size category is the lowest among other size categories (mean ROA is 4.59%) while the average performance of companies in "small and medium" size category is the highest among other size categories (mean ROA is 7.12%). However, the most interesting difference is the gap between ROA and ROE among very large sized companies and small & medium and large sized companies. Mean ROA and Mean ROE are very similar for very large companies, but mean ROE is almost double the mean ROA for and small & medium and large sized companies. When we look at median values instead of mean values, the case for very large sized companies becomes similar to small & medium and large sized companies. It may imply that the ROE values are closer to each other than ROA values among very large companies, or ROA values are more dispersed, which also means that these companies differ from each other in terms of taking advantage of debt.

Table 4. Panel data descriptive statistics for different company size categories

	n	ROA mean	ROA median	ROA std.dev.	ROE mean	ROE median	ROE std.dev.	Leverag e mean	Leverage median	Leverage std.dev.
Small company + Medium sized company	44	7.12	4.50	13.29	14.68	13.06	37.07	54.03	54.03	25.03
Large company	40	6.60	4.15	11.79	16.63	10.86	52.58	56.59	59.46	19.51
Very large company	112	4.59	4.28	9.86	4.86	9.07	38.97	47.86	48.37	22.12

Table 5 shows the cross-sectional correlations between period average returns (ROA and ROE) and the standard deviation of returns. Following Andersen et al. (2007), the sample is grouped into three, above median performance group, below median group, and full sample to see if there is a difference between high performers and low performers. Following Lehner (2000), median ROA and median ROE was chosen as a reference point of grouping to minimize the influence of outliers in short time series.

We see from Table 5 that significant cross-sectional correlations are typically positive for small & medium sized companies and for large companies. The positive relationship is very strong when the performance measure is ROE. All significant correlations become negative for very large sized companies. For each size category, no difference is observed between low-performers and high-performers in terms of signs of significant coefficients. However, when we look at the magnitude of coefficients, there are some substantial differences between size categories, and between performance categories such that the positive relationship is stronger for small & medium sized companies than large sized companies when the performance measure is ROA. The opposite is the case when the performance measure is ROE. For small & medium sized companies, the positive relationship between risk and return is stronger for high-performers than low-performers, using ROA as a performance measure. On the other hand, for large sized companies, the positive relationship between risk and return is stronger for low-performers than high-performers. Lastly, for high performer-very large companies, the negative coefficient is stronger than the low-performers.

Most correlations between average return and standard deviation of return are negative in Andersen et al. (2007). They observe a positive correlation just for firms above the median, which are high performers. Regarding that, our results are partially consistent with their work. Here, the term “partially” refers only to very large companies in our sample. They suggest a validation of strategic conduct approach in explaining the paradox. The strategic fit theory expects lower performance and inverse risk-return relationship in settings, which are demanding to assess and adapt to essential environmental characteristics, and when there is more variation in the abilities of firms to do so, and when the average performance is lower and more variable. As one can recall, the average performance of companies in “very large” size category in our sample is the lowest among other size categories both in mean and median terms.

Table 5. Cross-sectional correlations for performance (ROA & ROE) and risk measure (standard deviations of ROA & ROE)

	n	below median ROA	above median ROA	full sample
Small company + Medium sized company	44	0.4042 (0.0000)	0.4941 (0.0000)	0.4563 (0.0000)
Large company	40	0.5256 (0.0000)	0.3330 (0.0000)	0.3661 (0.0000)
Very large company	112	-0.3001 (0.0000)	-0.2081 (0.0000)	-0.2892 (0.0000)
All	196	-0.0154 (0.6555)	0.1550 (0.0000)	0.0488 (0.0404)

	n	below median ROE	above median ROE	full sample
Small company + Medium sized company	44	0.8384 (0.0000)	0.8370 (0.0000)	0.8297 (0.0000)
Large company	40	0.9259 (0.0000)	0.9289 (0.0000)	0.9135 (0.0000)
Very large company	112	-0.3496 (0.0000)	0.0809 (0.0640)	-0.1581 (0.0000)
All	196	0.6028 (0.0000)	0.7247 (0.0000)	0.6519 (0.0000)

Notes.

1) Correlation coefficients state the correlation between period average return (ROA and ROE, respectively) and the standard deviation of returns 2004-2012. Standard deviation is calculated on the average return (ROA and ROE, respectively) across firms within each firm size category.

2) Probabilities associated with correlations are reported in parenthesis.

Table 6 shows the panel correlations between return (ROA and ROE) and risk (leverage ratio). When we use panel data system, it is not possible to calculate correlations for above and below median performance sub-samples anymore because, for a given company, some data for a year may belong to above-median sample, while some data of the same company for another year may belong to below-median sample which in turn would lead to a conflict in the cross-section basis.

When the risk measure is total debt to total assets ratio, our results show significant negative association between performance and leverage for all company size categories. The negative relationship is stronger for very large sized companies.

Table 6. Panel data correlations for performance (ROA & ROE) and risk measure (Leverage)

	n	full sample
Small company + Medium sized company	44	-0.3114 (0.0000)
Large company	40	-0.2002 (0.0003)
Very large company	112	-0.3743 (0.0000)
All	196	-0.2991 (0.0000)

	n	full sample
Small company + Medium sized company	44	-0.0403 (0.4470)
Large company	40	0.0609 (0.2710)
Very large company	112	-0.2397 (0.0000)
All	196	-0.1015 (0.0000)

Notes.

1) Correlation coefficients state the correlation between period average return (ROA and ROE, respectively) and the total debt ratios. Total debt ratio is calculated as total debt to total assets.

2). Probabilities associated with correlations are reported in parenthesis.

4. Conclusions and Discussion

Starting with Bowman (1980), a large body of literature analyzing the relationship between accounting risk and return has been developing, and papers being produced both supporting and criticizing his findings and methodology. Results vary and inconclusive, as reviewed in detail by McNamara and Bromiley (1999); Andersen (2007); Li (2014). Generally referred as Bowman's paradox, empirical literature generally finds that firms operating below target performance typically have negative risk – return relationship, while those above target show positive risk – return relationship. The phenomenon has been studied widely for western companies; however, a little attention was given to emerging economy companies, especially to Turkish companies. In the sense of methodology, literature has commonly explored the issue for different industries. We, alternatively capture it for different company size categories. We report cross-section and panel correlations between accounting return and risk measures for different company size categories in Turkey. In the beginning of our analysis, we assume that there is no longitudinal association between return and risk exists. This might be considered as a kind of limitation of our study. One limitation of our analysis is the small sample size, a common problem for emerging economy firm-level data. Furthermore, using only secondary data might have limited us making real business life implications from our findings. Primary field data would contribute, if it was accessible.

Our sample consists of 196 industrial non-financial companies operating in nine different sectors, and registered in Turkey based on accounting data from ORBIS (Note 8) database over 9 years, 2004-2012. Panel descriptive statistics results basically show that small and medium-sized companies had superior financial performance for 2004-2009, both for median ROA and median ROE. Contrarily, very large sized companies had significantly lower performance. Data also show that ROA values are more dispersed than ROE values among very large companies, which implies that these companies differ from each other in terms of taking advantage of debt. The capabilities of managers working for very large companies are differentiated more than medium-sized, or small-sized company managers. It may also imply that the credit market is more competitive among very large sized credit seekers. In connection with this, leverage data simply tells that small and medium-sized companies used the most amount of leverage, while very large companies used the least amount of leverage.

When standard deviation is used as a risk measure, significant cross section correlations are typically positive for small & medium sized companies, and for large companies. However, all significant correlations become negative for very large sized companies. For each size category, no difference is observed between low-performers and high-performers in terms of the coefficient signs. Though, when we look at the magnitude of coefficients, there are substantial differences among size categories, and among performance categories. Cross section correlation results can be considered to be consistent with the prospect theory in such a way that managers of very large companies may behave risk-seeking because they could not reach the target performance level in 2004-2009.

When the risk measure is total debt to total assets ratio, our panel correlation results show significant negative association between performance and leverage for all company size categories. These outcomes are notable when we use both of ROA and ROE as performance measure (Note 9). It seems to be consistent with the behavioral theory such that managers in all size categories in our sample may feel that their expected level of performance could not catch up to the aspired level of performance, which in turn may lead them to behave risk-seeking. Alternatively, panel correlation results may also imply that companies in all size categories could not benefit from the leverage, or in other words, they may not use the debt in operations, which are revenue generating. Another reason might be the high level of interest rates in Turkey. Companies may not cover their interest expenses with their operating profit. Here, as the risk increases with the debt usage, equity financing might be a good solution for Turkish companies in order to decrease their risk and strength their equity by capital increase when debt-financing capacity is saturated.

In strategic conduct context, Siggelkow (2001) identifies a performance landscape, which is a multidimensional space in which each dimension represents the values of a particular choice that a firm can make and the final dimension indicates the performance value. Andersen et al. (2007) think of strategic fit broadly to include external environmental conditions, such as competitive structure, customer demand, and stakeholder relationships, as well as internal organizational structure and resource mobilization. In a strategic conduct view, high performance is achieved by aligning the strategy content and organizational structure of the firm with prevailing environmental conditions. As environmental conditions change, the alignment to obtain strategic fit will also need to change appropriately. Furthermore, the 'farther' one deviates from achieving optimal fit, the more severe the performance penalties. Papers finding consistent results with strategic conduct view of inverse risk-return relationship generally bring out the case where firms reach high performance at a low risk level.

However, in our case, very large sized companies show low performance at high level of risk rather than high performance when compared to small & medium sized, and large companies. Very large sized companies in our sample may be the ones, which deviate from achieving optimal fit for the selected period of 2004-2012, so their performance penalties are more severe. For Chinese companies, Li et al. (2014) precisely specify: "... Compared to western listed companies, under Chinese special national conditions, the listing age of listed companies in China is short and their development is not mature. It means that our country's listed companies have a long way to go in raising management ability, training company core competitiveness in order to gain "high performance, low risk" sustainable development ...". We think that, in an emerging Middle East/Eastern Europe context, the same goes for Turkish listed very large sized companies.

Agency theory may offer some complementary explanation to our findings in terms of ownership structure. Very large sized companies in our sample are mostly outsider-managed firms, whereas medium & small-sized companies are typically owner-managed family businesses. Former companies show significantly lower performance both in terms of ROA and ROE, where latter show superior performance, which is obvious in Table 4. Ang et al. (2000) provide evidence on corporate ownership structure and agency costs measured in terms of asset utilization and operating expenses. Their analysis suggests that agency costs for outsider-managed firms are higher relative to firms that are owner-managed. They show that asset utilization efficiency and operating expenses for small businesses are, respectively, positively and negatively related to the managerial ownership stake in the firm. Singh and Davidson (2003) and Fleming et al. (2005) find similar results. In our analysis, some portion of relatively low returns of very large sized companies might also result from the high agency costs due to conflicts of interests between outsider-managers and the principals.

When all evidence are considered simultaneously, we reach a conclusion that decision maker's attitude towards risk is a complicated issue to explain with a single approach. Instead, as Lehner (2000) mentioned, integrative models and explanations would be more realistic. Furthermore, it would be complimentary to do the same type of analysis for the same company managers for another time period. Results may vary as contingencies vary as stated by Oviatt and Bauerschmidt (1991). Future research direction would be the extensions of analysis in a number of directions: varying emerging countries, industries, periods, etc. This would develop the literature, also offer a robustness check for emerging country enterprises context. In the sense of methodology, ordinal methods to measure strategic risk, the lagged type of analysis, and panel data analysis might contribute. In the sense of connections with the existing theories, agency theory would give some new insights along with new variables to analyze and explain accounting risk and return relationship.

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Notes

Note 1. Sharpe (1964); Fama & Macbeth (1973); Copeland & Weston (1983); Fletcher (2000); Brealey et al. (2008); Ross et al. (2011).

Note 2. Miller and Chen (2004) suggest excessive risk taking as type I error; and insufficient risk taking as type II error.

Note 3. Fiegenbaum and Thomas (1986); Veliyath and Ferris (1997); Ruefli et al. (1999); Chatterjee (1999).

Note 4. Another issue has been whether to use end-of-period (EOP) or beginning-of-period (BOP) risk and return measures for analyzing the relationship between risk and return (Baucus et al., 1993; Fiegenbaum & Thomas 1988; Jegers, 1991; McNamara & Bromiley; 1999).

Note 5. Behavioral theory bases risk on the gap between aspirations and expectations, and slack resources.

Agency cost theory bases risk on leverage and monitoring by board of directors. On the other side, behavioral theory bases return on slack resources, and agency cost theory bases return on leverage and monitoring by board of directors, same as for risk.

Note 6. ORBIS is a commercial database which belongs to German-originated BureauvanDijk Electronic Publishing. It covers over 150 million private and public company around the world with their comparable financial and non-financial data.

Note 7. Fiegenbaum and Thomas (1988); Jegers (1991); Sinha (1994); Gooding, Goel, and Wiseman, (1996); Lehner, (2000); Andersen et al. (2007).

Note 8. ORBIS is a commercial database which belongs to German-originated BureauvanDijk Electronic Publishing. It covers over 150 million private and public company around the world with their comparable financial and non-financial data.

Note 9. Here, it may be need to remind that the correlation relationship is not significant for small & medium sized and large sized companies when the performance measure is ROE.

Appendixes

Appendix 1: Company Size Categories

Very large companies

Companies on Orbis are considered to be very large when they match at least one of the following conditions:

- Operating Revenue \geq 100 million EUR (130 million USD)
- Total assets \geq 200 million EUR (260 million USD)
- Employees \geq 1,000
- Listed

Notes:

- Companies with ratios Operating Revenue per Employee or Total Assets per Employee below 100 EUR (130 USD) are excluded from this category.
- Companies for which Operating Revenue, Total Assets and Employees are unknown but have a level of Capital over 5 million EUR (6.5 million USD) are also included in the category.

Large companies

Companies on Orbis are considered to be large when they match at least one of the following conditions:

- Operating Revenue \geq 10 million EUR (13 million USD)
- Total assets \geq 20 million EUR (26 million USD)
- Employees \geq 150
- Not Very Large

Notes:

- Companies with ratios Operating Revenue per Employee or Total Assets per Employee below 100 EUR (130 USD) are excluded from this category.
- Companies for which Operating Revenue, Total Assets and Employees are unknown but have a level of Capital comprised between 500 thousand EUR (650 thousand USD) and 5 million EUR (6.5 million USD) are also included in the category.

Medium sized companies

Companies on Orbis are considered to be medium sized when they match at least one of the following conditions:

- Operating Revenue \geq 1 million EUR (1.3 million USD)
- Total assets \geq 2 million EUR (2.6 million USD)
- Employees \geq 15
- Not Very Large or Large

Notes:

- Companies with ratios Operating Revenue per Employee or Total Assets per Employee below 100 EUR (130 USD) are excluded from this category.
- Companies for which Operating Revenue, Total Assets and Employees are unknown but have a level of Capital comprised between 50 thousand EUR (65 thousand USD) and 500 thousand EUR (650 thousand USD) are also included in the category.

Small companies

Companies on Orbis are considered to be small when they are not included in another category.

Appendix 2: Nace Rev.2 Industry Main Section Classification

1. Agriculture, forestry and fishing
2. Mining and quarrying
3. Manufacturing
4. Electricity, gas, steam and air conditioning supply
5. Water supply; sewerage, waste management and remediation activities
6. Construction
7. Wholesale and retail trade; repair of motor vehicles and motorcycles
8. Transportation and storage
9. Accommodation and food service activities
10. Information and communication
11. Financial and insurance activities
12. Real estate activities
13. Professional, scientific and technical activities
14. Administrative and support service activities
15. Public administration and defense; compulsory social security
16. Education
17. Human health and social work activities
18. Arts, entertainment and recreation
19. Other service activities
20. Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
21. Activities of extraterritorial organizations and bodies

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