



# Journal of Innovation & Knowledge

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## Empirical paper

# A replication of Bowman's paradox phenomenon across 28 countries

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## ARTICLE INFO

### Article history:

Received 14 October 2016

Accepted 29 December 2016

Available online xxx

### JEL classification:

G3

### Keywords:

Bowman paradox

International business

Risk

Return

Skewness

## ABSTRACT

We assess the generalizability of Bowman's paradox across 12,235 firms from 28 countries. Both cross-sectional and longitudinal relationship between risk and return provided broad support for the presence of Bowman's paradox in diverse country settings (Asia, Europe, and South Africa), except for India, Japan, and South Korea where the relationship was positive. The current replication confirms that Bowman's paradox generally holds across diverse institutional and cultural settings and supports prior studies on Bowman's risk paradox drawn from the US sample.

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## Una reproducción del fenómeno de la paradoja de Bowman

## RESUMEN

Hacemos una evaluación de la generalizabilidad de la paradoja de Bowman en 12.235 empresas de 28 países. Tanto la relación transversal como la longitudinal entre el riesgo y el rendimiento facilitan un amplio apoyo de la paradoja de Bowman en diversos países (Asia, Europa, y Sur África). Con la excepción de la India, Japón, y Corea del Sur donde la relación era positiva, la reproducción actual confirma que la paradoja de Bowman generalmente

### Códigos JEL:

G3

### Palabras clave:

Paradoja de Bowman

Negocios internacionales

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<http://dx.doi.org/10.1016/j.jik.2016.12.006>

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Riesgo  
Rendimiento  
Asimetría

se mantiene en diversos contextos institucionales y culturales y apoya estudios anteriores sobre la paradoja de riesgo de Bowman basados en la muestra de EE. UU.

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## Introduction

Risk is generally expected to be positively associated with returns. However, Bowman (1980) observed an interesting phenomenon in a sample of 387 firms from 11 industries (from 1955 to 1973) and in a sample of 1572 firms from 85 industries (from 1968 to 1976). He found a negative correlation between accounting risk and return at the industry level. This phenomenon has since been referred to as Bowman's risk paradox, or the negative correlation between accounting based performance and the variance of accounting-based performance.

Bowman's paradox is considered a phenomenon and not a theoretical framework because it is counterintuitive to the generally accepted logic in financial economics – higher risk must accompany higher returns. Since Bowman's initial findings in 1980, strategy literature has addressed Bowman's paradox in a series of studies (Andersen & Bettis, 2015; Andersen, Denrell, & Bettis, 2007; Núñez Nickel & Rodríguez, 2002). Broadly, explanations for Bowman's paradox have focused on prospect theory or behavioral theory of the firm, statistical artifacts, and good management conduct (Andersen & Bettis, 2014, page 63). Drawing on prospect theory (Kahneman & Tversky, 1979), researchers have argued that low performing firms had a negative risk–return relationship and high performing firms had a positive risk–return relationship (Fiegenbaum & Thomas, 1988). Others have found a curvilinear relation between risk and return (Chang & Thomas, 1989). Relatedly, drawing on behavioral theory of the firm (Bromiley, 1991a), researchers have found that, when performance is below (above) aspiration levels, managers take more (less) risks, resulting in a negative (positive) cross-sectional relationship between risk and return (Bromiley, 1991b; Miller & Leiblein, 1996; Palmer & Wiseman, 1999). Others have proposed that the negative relationship is more likely among firms with high levels of unrelated diversification (Bettis & Hall, 1982; Chang & Thomas, 1989; Kim, Hwang, & Burgers, 1993), among firms with high market power who have lower variation in sales (Cool, Dierickx, and Jemison, 1989; Woo, 1987), or among firms with high risk in the previous period (Miller & Leiblein, 1996). Furthermore, as firms get closer to bankruptcy, the relationship between risk and return becomes increasingly negative (Miller & Bromiley, 1990).

Interest in Bowman's paradox has continued in recent years. Although studies have traditionally used ROA as a measure of return, For instance, Brick, Palmon, and Venezia (2015) conclude that “positive relationship between mean ROE and its standard deviation is far more likely than a negative one” (page 99). In another study, Brick, Palmon, and Venezia (2012) conclude that the risk–return relationship is positive or non-significant after adjustments to beginning of year, instead of

end of year, for equity and reported net income of accruals. To resolve Bowman's paradox using computational simulations, Andersen and Bettis, 2014 find that “both imperfect learning and a mindless random walk can lead to the inverse longitudinal risk–return relationships observed empirically” (page 1135), and others support for a U-shaped relationship (Pan & Zhou, 2015). Recent theoretical focus include behavioral theory of the firm (Xiaodong, Fan, & Zhang, 2014), managerial myopia (Holder, Petkevich, & Moore, 2016), and adaptive systems (Song, An, Yang, & Huang, 2012). Bowman's paradox was recently used as a backdrop to understand variations in risk preferences among female executives (Perryman, Fernando, & Tripathy, 2016).

In addition to theoretical explanations, others have pointed to potential statistical issues such as the use of accounting-based performance data (Marsh & Swanson, 1984), lack of lags (Miller & Leiblein, 1996), outliers and spurious correlation, and non-normal distribution of performance at the industry level (Henkel, 2009). A review of studies on Bowman's risk paradox also reveals that virtually all studies have drawn on US based samples, using Compustat, Fortune 500 firms, Value line, Census of Manufacturing, Arbitron, and PIMS [except for Jegers (1991) who drew on a sample of 3250 Belgian firms] (Andersen & Bettis, 2015; Núñez Nickel & Rodríguez, 2002).

The above discussion suggests that despite focus on mostly US based samples and correcting for statistical artifacts, Bowman's paradox continues to be supported in studies over the years. However, to extend the validity of this phenomenon, whether the relationship can be replicated in a cross-country context is essential to further build this framework.

The strategic management literature increasingly seeks to improve generalizability of management phenomena and scholars have called for a greater need for replication in different contexts (Harzing & Harzing, 2016; Hubbard, Vetter, & Little, 1998). Testing Bowman's risk paradox in a cross-country context is theoretically important and practically relevant as risk preferences, the mainstay of prospect theory and behavioral theory of the firm, are known to be culture specific or influenced by institutional factors (Rieger, Wang, & Hens, 2014). As risk–return relationship is influenced by cross-country differences, Bowman's risk paradox could vary across countries. Indeed, if Bowman's paradox were inconsistent across different countries, future research could further explore boundary conditions based on variations in cultural and institutional factors. In contrast, if the relationship were less variable across countries, firm- or industry-specific effects would be stronger in driving the relationship, and culture and institutional factors would be less influential. The proposed framework could help practitioners further understand the drivers of risk–return relationship.

This study assesses the generalizability of Bowman's risk paradox through a replication across 28 countries. It attempts

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