Managerial risk taking: a conceptual model for business use

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Abstract

Purpose – The purpose of this paper is to establish a conceptual model for managerial risk taking that considers objective measures related to an organization's characteristics and subjective factors related to a decision maker's profile.

Design/methodology/approach – A multilevel process-centered managerial decision-making framework was developed based on previously published risk taking models. The framework accounts for the conflict between agents and principals, as well as the macro- and micro-level environments in which risky decisions are made.

Findings – The integrative model presented in this paper provides a theoretically robust tool that can be used to further explore the interrelationships among known risk concepts that influence decision making in corporate settings.

Research limitations/implications – The present research is a conceptual model for managerial risk-taking. Further research is needed to test the linkages and propositions within the model, developing measures of the constructs and empirically testing the relationships among the dimensions of risk.

Practical implications – The proposed model can help firms define what manager profile is most suitable in terms of a match to the company's investment strategy.

Originality/value – This paper is theoretically valuable in describing the relationships among several elements of risk: risk need, risk capacity, risk profile, risk perception, and risk tolerance. Future directions for empirical research are also presented.

Keywords Risk tolerance, Risk perception, Managerial risk taking, Risk profile

Paper type Conceptual paper

1. Introduction

Risk refers to the degree of uncertainty associated with the possible outcomes of a decision (Walker *et al.*, 2003). Risk is inherent in nearly all business activities. Organizations are subject to distinct types of risk that result from financial decisions, investment choices and operational pursuits. Research on the financial risk resulting from financing decisions is most often measured objectively using evaluations of cost and capital structure (e.g. Oztekin, 2015). Investment risk analysis refers to the viability of projects, and within this context, risk analysts have developed assessment techniques that have evolved from classical deterministic models to probabilistic techniques. These forecasting methods, while quite useful when used for the allocation of organizational resources, often fail to account for an individual manager's perspective. Instead, forecasting techniques tend to assume that organization decision makers who have similar demand projections and investment project cost estimates will behave the same way when making a decision. This assumption turns out to be problematic. It is entirely

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plausible that the ultimate outcome associated with an organizational decision can be shaped, in large part, by the willingness of individual managers to engage in risk taking behavior.

Over the past half century, there have been numerous studies devoted to describing, explaining and predicting various forms of business and organizational risk (Hoskisson *et al.*, 2017). Even so, the risk literature has not yet consolidated. One reason for this lack of consolidation is that decisions involving operational risks are seldom addressed in the corporate finance literature. Those interested in corporate risk taking often use models that are devoid of individual decision maker characteristics, which can change based on specific industries, variability in revenues and operations costs, profitability and liquidity constraints.

This has created a gap in the literature. Little is known about how subjective manager characteristics and risk objectives are related or how these factors influence the decision-making process at the unit level (Cain and McKeon, 2016; Hoskisson *et al.*, 2017). To date, no standardized model of decision maker level risk taking has emerged in the literature. The purpose of this paper is to help address this conceptual need by providing a theoretically grounded conceptual model of risk taking at the organizational level.

Drawing on behavioral decision theory and on Knight's (1921) definitions of risk and uncertainty, this study addresses two questions in relation to the development of a managerial level decision-making framework. First, how should the variables and concepts associated with risk taking be defined within the context of manager risk taking, and second, what are the interrelationships among concepts known to influence decision making at the manager level in corporate settings? The contribution of the present study is the presentation of a multilevel model that can be used to provide context for the way managers consider business objectives and measure aspects related to the objectives of organizations, considering a firm's ability to absorb possible losses. The model is unique in that it is focused on subjective features related to a manager's profile and each manager's awareness of risks associated with specific decisions and outcomes.

It is worth noting that there was a flurry of research on this topic in the late 1980s and early 1990s in response to shifts in management theory, but this line of study was quickly replaced by research focused on corporate valuation rather than manager characteristics. An important study on executive risk taking characteristics was presented by MacCrimmon *et al.* (1986). Through a series of interviews and surveys with 500 corporate executives working in Canada and USA, they identified personal, financial and business characteristics of business risk averters and risk takers. They concluded that nearly all business managers and policy makers hold "stereotyped views about who does and who does not take risks" (MacCrimmon and Wehrung, 1990, p. 422). At around the same time, Sitkin and Pablo (1992) proposed a model of the determinants of risk taking behavior, pointing out that research on the subject presented up until that time presented a fragmented view on the subject. For Sitkin and Pablo, this view stemmed from the use of industry wide simplified models, which assumed direct relationships between the individual, organizational and contextual characteristics of the behavior at risk. One reason model development stalled was the lack of definitional clarity surrounding risk terms. Carr (2014) suggested that in order to combat the lack of generally accepted definitions inherent in the risk assessment process, strategies were needed that included clear descriptions of the elements that comprise a manager's assessment of risk. It was concluded by Carr (2014), MacCrimmon and Wehrung (1990) and Sitkin and Pablo (1992) that without a common definitional framework it becomes difficult to facilitate an understanding of the determinants of risk taking.

The remainder of this paper is organized as follows. The paper commences with a discussion of the theoretical background and review of literature with regard to managerial risk taking. This is then followed by the presentation of a managerial risk taking model, a description of the model's propositions, and a summary of key variable and concept definitions. Implications for research and practice are presented next. This is followed by a review of limitations and future research directions.

2. Theoretical background/literature review

The modern origin of the conceptualization of risk dates to Knight's (1921) definitions of risk and uncertainty. While categorizing probabilities, Knight distinguished risk from uncertainty, designating the former as a "measurable uncertainty," and the latter as "unmeasurable uncertainty." Hence, the debate on the presence of subjectivity on the assessment of probabilities derives from Knight's contention that uncertainty arises when decision makers estimate the risks of failure or success based on a unique calculus. According to Holton (2004), the uniqueness of business decisions relates to the role opinions take in the absence of symmetry or homogeneous data. This follows from Knight's observation that objectively measured probabilities rarely exist in the context of day-to-day business questions. This implies that if the probability of success or failure is not directly measurable before a decision is made, risk cannot be eliminated. Instead, decision makers must attempt to mitigate negative decision outcomes.

While some researchers place the distinction between risk and uncertainty in terms of the existence (or not) of subjective probabilities, for LeRoy and Singell (1987) this distinction rests on the existence of objective probabilities. Their reasoning follows from Knight's (1921) insight that if "[a]n uncertainty can […] be reduced to an objective […] probability, [it] can be reduced to complete certainty by grouping cases" (p. 231). For LeRoy and Singell, Knight's risk situations refer to insurable hazards, while uncertainty is associated with uninsurable hazards. From this point of view, the difference between uncertainty and risk becomes focused on an attribute of reality (Andrade, 2011).

Langlois and Cosgel (1993), on the other hand, argued that the distinction has more to do with the initial act of grouping random outcomes than with assigning probabilities to outcomes. Under uncertainty, a decision maker is required to estimate possible results and predict their occurrence. This means that the Knightian expression of "estimate of an estimate" encompasses all intuitive judgments, a qualitative and subjective classification of reality that turns uncertainty into a category that is interpersonal, shareable and agreeable among decision makers and their peers. That understanding of Knight's (1921) ideas is shared by Rowe (1977), who defined risk estimation as the ability to reduce uncertainty into a risk situation, and by Miller (2007) who stated that "Knight's theory of rational entrepreneurship depends on how individuals having different abilities to convert situations of uncertainty toward situations of risk" (p. 59).

Keynes's (1937) idea about uncertainty is less controversial than Knight's (1921) view. Leroy and Singell (1987) noted that Keynes's notion of uncertainty is based on the level of knowledge about future events that, by its nature, cannot be expressed in terms of a quantifiable probability distribution. When conceptualized this way, uncertainty becomes an attribute of knowledge, not an attribute of reality, so decisions made in an uncertain context are then based on a limited, fallible and contingent knowledge about the present with an estimate of results in an indeterminate future (Andrade, 2011; Lawson, 1988). Keynes emphasized the time gap between a decision and the decision outcome as a key factor affecting the cognitively unreachable nature of future events, and hence, uncertainty. By pointing out that decision makers are often forced to make decisions using incomplete and fallible knowledge, Keynes ended up criticizing classical economists for whom "judgements based on probability distributions could reduce the uncertainty to the same calculable status as that of certainty itself" (p. 213; see also Andrade, 2011).

Agreeing on the inverse relationship between knowledge and uncertainty, Davidson (1982–1983) advanced the notion of conceptualizing uncertainty as a non-ergodic environment, in which past observations and the current distribution of probabilities do not produce knowledge regarding future events, as these factors are unable to provide reliable estimates. In a non-ergodic environment, reality is created by what Shackle (1958) called crucial decisions, which shape the economic circumstances in an unpredictable way.

The idea of managing uncertainty through crucial decisions echoes on what McGrath (1999) said about real options reasoning as a way to manage uncertainty: by making transactions in the present, an entrepreneur may reposition a business in order to pursue future investment opportunities.

Walker *et al.* (2003), writing with the objective of proposing an interdisciplinary theoretical framework for uncertainty analysis, split uncertainty into three dimensions: its location, which refers to where uncertainty manifests itself; its level, ranging from determinism to total ignorance; and its nature, which at its extreme is epistemic uncertainty (due to the imperfection of an individual's knowledge) and variability uncertainty (due to the nature of the phenomena). The conceptual model presented in this paper incorporates some constructs that serve as the foundation of other social science models. For instance, the level of uncertainty as a continuum for levels of knowledge goes back to Keynes (1937). Additionally, the existence of "*a priori* irreducible uncertainties" (Knight, 1921; Venkataraman, 1997; McGrath, 1999) relates to uncertainties that, because of its nature, cannot be mitigated.

Classical decision theory has also weighed in on the topic. Within classical decision theory, the concept of risk is most commonly used to refer to a variation of possible outcomes, as well as their likelihood and subjective values (March and Shapira, 1987). But, here too, there is a stream of literature that associates risk to negative expected values rather than the full range between positive and negative expected values. In a strategic management context, the idea that business managers tend to associate risk with possible negative outcomes is a generally accepted axiom (Baird and Thomas, 1985, 1990; Libby and Fishburn, 1977; Miller, 2007; Sitkin and Pablo, 1992; Roy, 1952). Roy (1952) suggested that decision makers attempt to objectively and subjectively weigh the probability that actual returns associated with an investment will be more or less than the expected return. When a risk of earning less than a minimum acceptable return is present, decision makers become risk averse. This understanding was shared by Sitkin and Pablo (1992). They showed that it is not the expected return itself that is the risk, but the gap between the desired return and the return obtained, even if this return is positive. Libby and Fishburn (1977) stated that associating risk with below-target returns provides a better understanding of executives' decisions. It is worth noting that each of these conceptualizations of risk have in common a subjective factor caused by cognitive aspects of individuals and, therefore, each supports the idea that risk assessment can differ among individuals. The way managers conceptualize risk, ignoring or downplaying the probabilities of losses to the amount invested, is closer to the classical definition of loss aversion (Baird and Thomas, 1985).

Behavioral decision theorists have also weighed in on the subject. Slovic *et al.* (2004) argued that risk itself can be viewed from one of three perspectives: risk analysis, risk policy and risk sentiment. Risk analysis refers to the logic and instrumental rationality that is most closely aligned with risk management in the classical perspective of finance. Risk policy describes risk as it relates to social norms. When viewed this way, individuals are 'called' to follow a social behavior that avoids transgressions of what is commonly accepted as appropriate. Breaking a norm is considered a taboo (Tansey, 2004). Risk sentiment involves subjective evaluations and the emotions associated with risk taking. Risk as a feeling, for example, is an element of experiential ways of thinking. Risk heuristics are examples of risk sentiment. Heuristics provide a quick and automated system based on the experiences and cognition of individuals to quicken decision making (Moore and Chater, 2003). Evidence from behavioral finance, and by extension literature on Simon's (1955, 1979) bounded rationality and heuristic modeling, suggests that every person develops their own unique approach to evaluating risks. Rather than assume a systematic process of risk assessment, the literature leads one to hypothesize that every unit level business manager, who has any degree of leeway in their decision-making ability, assesses risky decisions uniquely and with different outcome expectations.

Based on the concept that the risk of a situation reflects the possibility of loss, and that each individual evaluates and interacts differently with this possibility within socially accepted standards, it is possible to identify some constructs that help to clarify the way business managers conceptualize risk taking decisions. Consider the work of Carr (2014). Carr argued that seven factors work together to shape someone's risk profile. He argued that risk profiles are what differentiate the way people make decisions that entail risk. As conceptualized by Carr, everyone has a unique risk profile, and as such, everyone exhibits a unique decision approach when faced with a risky choice. The factors in Carr's model include: risk tolerance, risk capacity, risk composure (i.e. previous behavior), risk knowledge, need to take risk, risk perception and preference for risk. Carr's original work was designed to clarify the elements that go into a financial risk profile. As such, his model turned out to be very simple and lacking linkages between and among the factors, resulting in a framework in which the factors are interdependent.

3. Research model and propositions

3.1 Development of research propositions

Nobre and Grable (2015) used the foundational elements of Carr's (2014) risk profile model to propose a theoretical framework of risk taking behavior. Their framework is shown in Figure 1.

Nobre and Grable (2015) developed the framework show in Figure 1 to help describe household investment behavior; however, the way in which the model was conceptualized means that it can be extended beyond the domain of personal investing. Three propositions were presented by Nobre and Grable:

- A key proposition underlying the framework is that an individual's risk profile is a relatively stable characteristic that is comprised of a person's risk capacity, risk composure and preference for risk. While risk capacity does change over time, capacity factors tend to be stable over short periods that correspond to real world risky choices. Risk composure and risk preference also tend to remain stable for most decision makers. For example, while someone may choose to invest aggressively, nearly all people have a preference to avoid risk, if at all possible (Guthrie, 2003).
- A second proposition within the model is that a person's willingness to engage in a behavior in which a negative unknown outcome is possible must precede calculated risk taking behavior. In some ways, this proposition is similar to the notion of intention preceding behavior in the theory of planned behavior (Ajzen, 2011; Madden *et al.*, 1992). As noted by Ajzen and Fishbein (2000), "people's attitudes follow spontaneously and consistently from beliefs accessible in memory and then guide corresponding behavior" (p. 1). Additionally, "intention is thus assumed to be the immediate antecedent of behavior" (p. 17). In other words, while it is true that

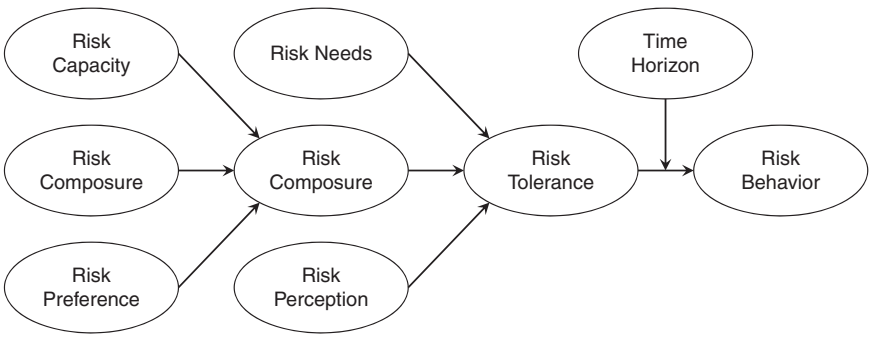

Figure 1.
The Nobre and Grable model of risk-taking behavior

individuals are sometimes coerced to participate in risky situations that are beyond their control, investors and business managers generally engage in risk estimations freely by making a calculated decision to engage in a risky behavior. Before engaging in a behavior, they must exhibit a willingness to do so. Risk tolerance, as shown in Figure 1, is essentially a latent construct that is defined by a person's risk need, risk profile and risk perception. Although someone's risk profile tends to be stable, risk need and risk perception can change quickly based on environmental information and subjective evaluations. This helps explain how someone's willingness to take a risk can appear to vary from one period to another.

- The third proposition in the model relates to time horizon. Every risky decision is subject to a time constraint. Time horizon acts as a moderating agent that either enhances or dampens the appropriateness of a risky decision. In the end, if a decision maker has the willingness to take a risk, and the time horizon is sufficiently long enough for the decision maker to obtain a desired return (even if there are short-term setbacks), the decision maker should exhibit greater confidence in the decision. In contrast, if the time horizon is not sufficiently long, even with a high willingness to risk, the decision maker may not (and probably should not) engage in the proposed action.

As noted above, the model shown in Figure 1 was designed to explain and predict personal investment behavior. Within a household finance context there generally is no conflict of interest between the decision maker and the person who receives the gains (or losses) resulting from the risky decision; most often, the decision maker is the beneficiary. In organizations, on the other hand, this is seldom the case. Business risks are borne by the company's stakeholders, but decisions are made by executives and managers. There is little overlap of roles. The person who makes the decision is not necessarily the primary beneficiary of the outcome. This separation of ownership and management may lead to a conflict of interest, which is generally referred to as an agency conflict within agency theory (Jensen and Meckling, 1976). Restating the conflict between agents and principals, Wiseman and Gomez-Mejia (1998) pointed out that if agents forecast good performance for a company, they may act more conservatively in order to maintain their current position and financial results. This tendency has been documented by others. MacCrimmon *et al.* (1986) reported that managers generally report being willing to take fewer risks when "things are going well." This may occur even if it means underinvestment in the capital of shareholders. This choice was explained by Kahneman and Tversky (1979) and Tversky and Kahneman (1986, 1991). They noted individuals are more sensitive to avoiding losses than to gaining wealth. In addition to that, Wiseman and Gomez-Mejia (1998) defined risk bearing as perceived risk that might threaten a manager's wealth. Specifically, if managers choose a riskier investment choice, they may put their own wealth at risk. In the absence of necessary and complete information, the principal must assess whether the agent's actions and decisions are currently, and in the future, utility maximizing. Given the agency problem associated with business management and the complex set of variables making up a decision maker's risk profile, a new model of risk taking is needed to help explain management level risky taking.

Taking into account the need to examine common factors used by strategists when faced with risky situations, and the need to develop a multilevel process-centered decision-making framework, the model shown in Figure 2 was developed by adapting the work of Nobre and Grable (2015). The framework expands on the earlier work by accounting for the conflict between agents (e.g. managers) and principals (e.g. stakeholders) that is inherent in most decision-making processes with organizations. The model comprises the multiple levels in which nearly all business decisions are made. Organizations compete at the macro-level, whereas decision makers operate at the organizational micro-level. It is important to add that the macro-level is an abstraction (Coleman, 1990), with the interdependent behavior of

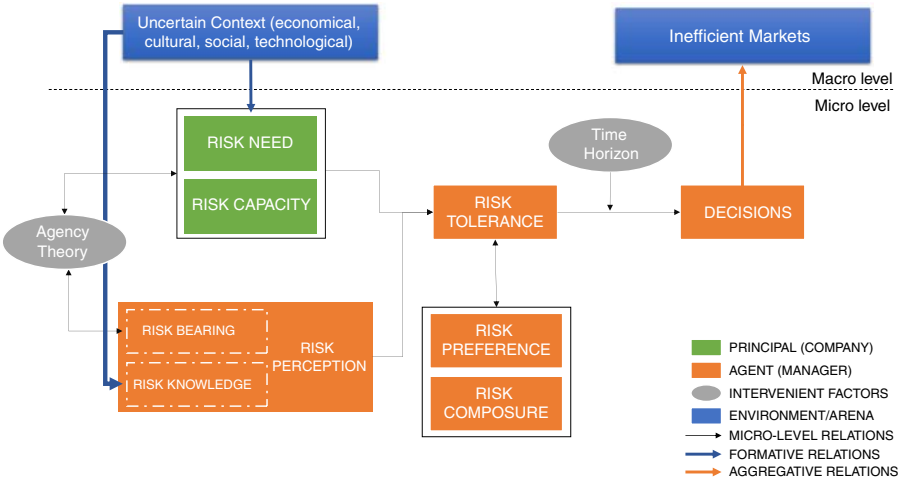

Figure 2. Proposed model of manager decision making under risk

individual decision makers influencing the macro-level to a certain extent. This means that the macro-level elements (uncertain context and inefficient markets) do not influence managers' decisions directly. Instead, managers' awareness about these elements is determinant factor of such decisions. Rather than focus strictly on individual decision makers, this model differentiates among elements as being either organization or manager based. For example, risk need and risk capacity are organizational attributes. As such, the needs of the organization are directed by stakeholders. Risk capacity refers to an organization's ability to withstand financial stress rather than a unit manager's ability to handle a potential loss. Risk preference, risk composure, risk perception and risk tolerance represent manager level elements that result in manager actions.

An important proposition within the model is that the decision-making process begins by identifying the need to take a risk; that is, in order to achieve market and financial goals of the organization it is necessary to define what types of investments or actions should be made, and to what extent the organization needs to engage in risky behavior in order to make the objectives a reality. As an objective evaluation, risk need should be based on the desired minimum profitability of a project, the amount of wealth that each investment can generate, and the return to shareholders and other stakeholders. As March and Shapira (1987) pointed out, value attached to risky alternatives considers both the current firm position and which target is evoked. March and Shapira noted that below-target firm performance should lead to greater willingness to take risks to achieve a company's objectives. Considering this, greater risk need should lead to more risk tolerant managers and as a result, risk need and risk tolerance should exhibit a positive relationship with each other.

Once the goals and the consequent risk need have been defined, the organization's ability to make necessary investments and incur possible losses must be estimated. Factors to consider include the amount of cash flow that is currently available, projected cash flows committed to the payment of interest, the amount of resources allocated to the payment of dividends, and the amount of cash flow allocated to other investments. Also of importance when evaluating risk capacity is an organization's level of indebtedness and the organization's ability to hedge investments in the capital markets. As such, risk capacity and risk tolerance should be positively associated.

Similar to what Nobre and Grable (2015) proposed, risk preference and risk composure are assumed to be relatively stable elements within the model and related to each manager's

risk profile. Risk composure, for example, carries the values and history of how a manager has historically made decisions. It is reasonable to assume that a manager who has been aggressive in the past, with no serious negative repercussions, will continue to engage in aggressive behavior in the future. Organizational stakeholders cannot easily change a manager's risk profile, but stakeholders can prompt the hiring (and firing) of managers with risk profiles that match (or do not match) the organization's objectives and strategy. As such, risk composure and risk preference compound a manager's risk profile, and these factors tend to be positively related to risk tolerance.

A manager's risk perception comprises the problem definition, with the assumption that even if each business decision is unique (Knight, 1921), it is somehow similar to another decision, and therefore, it is possible for the business manager to evaluate the associated risk. Perception can be shaped according to the context of the problem in which the decision takes place, considering the macro-level and micro-level environment (Walker *et al.*, 2003). Furthermore, the context of a decision shapes a manager's assignment of possible outcome probabilities. When viewed this way, risk perception matches the notion that risk cannot be treated as a purely scientific fact independent of human experience (Ben-Ari and Or-Chen, 2009). In the decision-making model, risk perception represents the channel in which uncertainties related to the environment and to internal processes are decodified and categorized in order to be an input into the decision-making process. Internal processes, as they relate to risk perception, are agency theory conflicts, which are not directly associated with risk capacity or risk need. Additionally, as a cognitive aspect of risk, risk perception is directly associated with risk tolerance and separate from risk preference and risk composure. In practice, risk knowledge acts as a filter of reality, as knowledge reduces epistemic uncertainty. Risk bearing, a perceived vulnerability of the agent in light of stakeholders' power is a dimension of risk perception. This suggests that risk knowledge and risk bearing play a role in shaping the way a decision maker perceives the riskiness of a situation.

The process of perceiving risk works at four different levels: cultural background, social-political institutions; affective-cognitive factors; and heuristics of information processing (Renn and Benighaus, 2013). Perceptions of risk is an important element within the model because this factor helps align macro-level events and situations to decisions made at the micro-level. Risk perception includes two dimensions: risk bearing, which is related to an agent's biases and reflects the threats to the agent's career and reputation, and risk knowledge, which encompasses an evaluation of reality. This dimension of risk is premised on the assumption that uncertainty is an ongoing reality faced by business managers. As Miller (2007) stated, "[t]he freedom of others to act creatively is a source of irreducible uncertainty" (p. 66).

In practice, each manager uses his or her own personal methodology to evaluate the probabilities of success and failure associated with a risky decision. This is particularly true when objective probabilities are unknown. Aspects of the evaluation include possible outcomes, and the potential rewards and penalties, associated with a given action. Perception is also affected by the threat a choice can have on a decision maker's own wealth. As such, risk perception and risk tolerance should be directly, yet negatively, related.

Taken together, risk preference, risk composure, risk bearing and risk perception shape a manager's risk tolerance. The organization's risk need and risk capacity also provide context to help direct a manager's willingness to take risk. Organizations that are fundamentally risk averse in need and capacity will send clear signals to their managers that aggressive behavior can be problematic.

As with the Nobre and Grable (2015) model, time horizon can be considered a moderating element in the model. Similar to decisions made at the household level, firm decisions in which there is a longer period of time to recoup gains and reduce the effects of short-term volatility should place a manager in a position where she or he is likely to increase risk

taking behavior. On the other hand, organizations that are constrained by time in terms of return on investment may be forced to scale back the level of risk taken when making a decision. As such, time horizon should act as a moderator between risk tolerance and decision making.

3.2 Conceptualization of model variables

An important element associated with the conceptualization of the model shown in Figure 2 is the adoption of standardized risk evaluation definitions. Historically, business managers and researchers have tended to use terms such as "risk tolerance," "risk perception," and "risk preference" interchangeably. As noted by Carr (2014), this definitional approach can lead to confusion and problematic outcomes. Within Figures 1 and 2, each variable and concept has its own definition and conceptual application to the risk evaluation process. The following discussion provides a review of each concept and its definition as used in Figure 2. The first two concepts refer to companies' attributes: risk capacity and risk need, while other constructs refer to managers.

Risk capacity. The inclusion of risk capacity as a distinct definitional term to be incorporated into the risk assessment process was proposed by Cordell (2001), who noted that risk capacity is a person's or organization's ability to withstand a potential loss resulting from a risky behavior. To Kitces (2006), risk capacity allows someone to create a framework that determines how long or how severely a decision maker can afford to lose resources and still be able to finance future goals. Nobre and Grable (2015) considered risk capacity to be a key factor in shaping someone's risk profile. They noted that this concept, among those originally listed by Carr (2014), is the most objective and easy to measure. Characteristics, such as income stability and presence of insurance help shape risk capacity. Within the domain of business management, risk capacity is an attribute of the company and matches Shackle's (1966) concept of affordable loss as dependent on the nature and scale of the enterprise.

Risk need. Risk need refers to the degree of risk that should take in order to reach a previously established target (Grable and Lytton, 1999). Jeffrey *et al.* (2009) reported findings showing that when individuals have defined goals, they engage in riskier behavior to make the goal a reality. It can be inferred, therefore, that the need for risk is one of the driving forces underlying risky behavior in financial and business domains. In the present model, risk need reflects organizations' objectives and respective time horizons. A bold objective to be reached in a short period of time, for instance, will require a risky action to be taken.

Risk composure. Risk composure is a personality attribute that reflects the tendency of an individual to take or avoid a risk (Carr, 2014). This same construct appears in the literature as risk propensity. Sitkin and Weingart (1995) conceptualized risk propensity as a tendency to take or avoid risks. They stressed that this propensity is a persistent and enduring attribute, but not a stable attribute. Although the discussion on the stability of the attitude toward risk is relevant, it is worth noting that there is, as of yet, little agreement regarding the degree of stability. Some have argued that the propensity to take risk is not a stable attribute, but rather a decision-making bias as outlined in prospect theory. Prospect theory's premise is that individual behavior is relatively inconsistent in different situations; that is, a person can accept a risk when, say, making an investment but avoid risk in the leisure domain where physical security is valued. This difference may reflect the notion that individuals have different expectations and requirements based on the domain of risk. On the other hand, others have argued that risk propensity is relatively stable. Nicholson *et al.* (2005), for example, showed that risk propensity, in general, is similar across domains when the decision maker's interests, skills and orientation regarding risky decisions are approximately equal.

Risk preference. The term risk preference refers to the choice of an individual to engage in a risky behavior (Kitces, 2006; Sharpe, 1964). Someone's preference may be affected by cognition or learned experience, but risk preference mainly refers to initial intuitions and "gut feelings" (Roeser, 2010) or the feeling that one choice is better than another (Nobre and Grable, 2015). Risk preference represents the affective dimension of risk, and it approaches what Slovic *et al.* (2004) called risk as feelings. When viewed holistically, risk preference takes into account the notion that rationality is plural, situational, and dynamic (Miller, 2007). The use of this construct in a risk decision framework is important because preferences allow for a measure of rank choices based on the order of attractiveness of alternative choices.

Risk perception. The notion of risk perception is related to an individual's cognitive assessment of a situation or behavior. Risk perception is based on an individual's capabilities associated with the processing of information received from the environment. This definition is premised on the following conceptions of risk perception: perceptions are based on an individual's assessment of the risk inherent in a given situation (Cooper and Faseruk, 2011; Hunter, 2002; Pablo *et al.*, 1996); perceptions are developed essentially using cognitive activities that involve rigorous assessment of the external situation and the personal capabilities of the decision maker (Ji *et al.*, 2011; You, 2008); and developing a perception involves the "processing of physical signals and/or information […] and the formation of a judgement about seriousness, likelihood, and acceptability" of a situation (Renn and Benighaus, 2013, p. 3). In the present model, risk knowledge and risk bearing are categories of risk perception.

Risk knowledge. The concept of risk knowledge is another factor related to the decision to take a risk. Risk knowledge involves understanding the tradeoffs associated with a risky choice and being savvy enough to make an informed decision (Cordell, 2001). This dimension has its origins on Knight's (1921) early decision framework research, as it refers to the intuitive judgment that allows the categorization of observations in order to understand the impact and the estimates of possible outcomes. The literature shows that those who understand the nature of risk—they have more knowledge, and therefore, they are able to reduce epistemic uncertainty (Walker *et al.*, 2003)—are more willing to accept risk (Ahmad *et al.*, 2011; Carducci and Wong, 1998; Grable, 2000; Haliassos and Bertaut, 1995; Sung and Hanna, 1996); however, it turns out that it is difficult to measure this construct. If risk knowledge is measured subjectively, there is the possibility of data being skewed by heuristics and biases, such as overconfidence (Carr, 2014), framing, ambiguity aversion and illusion of control, among other biases (Gilovich *et al.*, 2002). In addition, objective measures, while optimal, can be plagued by questions that are not process-oriented (Fitzpatrick, 1983) and may be either irrelevant to a given risky choice decision or of limited validity in the context of risky decision making.

Risk bearing. Risk bearing refers to the perceived threat to a manager's wealth (Wiseman and Gomez-Mejia, 1998). In an organization where there is little overlap between property and control, principals generally engage in decisions that maximize their utility, while managers' try to maximize their wealth. If those objectives do not match, there will be a gap in risk bearing, as it is a perceived threat that shapes a manager's behavior to avoid risky decisions that put their position at jeopardy.

Risk tolerance. Risk tolerance is the degree of uncertainty surrounding decision outcomes that a person is willing to accept when making a particular decision (Grable, 2000). Risk tolerance is most closely aligned with an individual's willingness to accept a risk (Carr, 2014; Grable and Joo, 2004; Grable and Lytton, 1999). Given this definition, it is possible for decision makers to be classified on a scale that incudes risk aversion on one end and risk tolerance on the other end. On occasion, authors use risk attitude as a synonym for risk tolerance (Fehr and Hari, 2014). Some researchers consider risk tolerance to be a personality

trait (Weber *et al.*, 2002), or at a minimum, a stable individual attribute (Van De Venter *et al.*, 2012). However, there is evidence that risk tolerance may vary according to each decision maker's objective. Hunter (2002), for example, pointed out that the personal value each individual attributes to a particular purpose has a mediating effect on the degree of their risk tolerance. For Hunter, risk tolerance may vary depending on the type of decision in which an individual is involved. Corroborating this idea, Hanna *et al.* (2013) pointed out that when a decision involves a small monetary amount, even if some people are generally risk averse, they may appear neutral or even willing to accept the risk.

4. Implications for research and practice

This paper presents a model of managerial risk taking that describes how different aspects of risk evaluation are associated with decision making. The model's propositions are consistent with the evidence on managerial behavior.

The model shown in Figure 2 adds to the existing body of literature by extending the work of Nobre and Grable (2015) to organizational risk taking. Nobre and Grable's original work focused exclusively on household level financial risk taking. The model presented in this paper incorporates elements from agency theory, as well as illustrating how the different factors associated with risk tolerance differ based on the viewpoint of the principal and decision maker. The model is grounded in theory that can be applied in practice and tested empirically. The model offers value in an organizational context where there is little overlap between property and control, which can lead to agency problems. The model also advances the manner in which a multilevel analysis can be contemplated, leading to a better understanding of the subjective aspects related to risk assessment in inefficient markets.

Although not directly tested in this paper, the model can be used to inform personnel and business policies. For example, the model can be used to guide the hiring and promotion of managers. Ideally, an effective manager will make decisions that enhance institutional outcomes. The model provides a framework for understanding what factors an organization can adjust to bring a manager's decisions into alignment with organizational goals. As noted above, some risk dimensions are embedded in a manager (e.g. risk composure and risk preference). These elements cannot be easily manipulated or quickly realigned. On the other hand, some elements are malleable. For example, risk perception is something that can be shaped by adjusting the manner in which a manager learns about the rewards and punishments associated with decisions. Risk bearing is another element that can be influenced to help bring a manager's risk profile into alignment with an organization's needs. Risk bearing can be mitigated by corporate governance practices through consistent monitoring. This can then positively influence risk taking behavior (Hoskisson *et al.*, 2017). Decision making can also be shaped through the effective use of risk taking cues and clear explanations of time constraints in which a manager must work (Walker *et al.*, 2003).

5. Limitations and future research directions

A limitation associated with this paper is the lack of an empirical test of the model. Further research is needed to test the linkages and propositions within the model. Specifically, follow-up studies should focus on the following objectives: to develop measures of the various constructs and empirically test the relationships among the different dimensions of risk and risk tolerance, clarifying whether (and which) factors have more influence on the process of decision making under risk; and to clarify the way agency constraints may affect decision making under risk. Another research extension involves using qualitative methods to determine how the risk dimensions differ based on organizational size and industry affiliation. It would also be helpful to employ longitudinal studies to track decision makers across time to confirm the paths in the model.

6. Conclusion

Considering the relevance managerial risk taking plays in the context of strategic management research, it is surprising that few conceptual models exist to explain management risk taking behavior. This paper helps address this gap in the literature by establishing a conceptual model for managerial risk taking that considers risk measures related to an organization's characteristics and subjective factors related to a decision maker's risk profile. In additional to providing a new framework that can be used to conceptualize the factors that work together to shape decision making at the managerial level in organizational settings, this paper provides insights into approaches that can be incorporated into better understanding the mechanisms shaping risk taking behavior. The conceptual model provides clear linkages between and among the following risk factors: risk need, risk capacity, risk perception and risk tolerance. The model is theoretically valuable in exploring the relationships among these factors, as well as describing managerial risk taking behavior. The proposed model can also help firms define which manager profile is more suitable given a company's investment strategy.

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Further reading

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