Pontifícia Universidade Católica
do Rio de Janeiro

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Conservative Boards and Intrepid Managers: The interplay of corporate governance, managerial discretion and financing behavior along two famous financial "puzzles"

Tese de Doutorado

Thesis presented to the Programa de Pós-graduação em Administração de Empresas of PUC-Rio, in partial fulfillment of the requirements for the degree of Doutor – Administração de Empresas.

Advisor: Prof. Henrique Castro Martins

Rio de Janeiro

April, 2020

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Bibliographic data

Araki, Michael Espindola

Conservative Boards and Intrepid Managers: The interplay of corporate governance, managerial discretion and financing behavior along two famous financial “puzzles” / Michael Espindola Araki; advisor: Henrique Castro Martins. – Rio de Janeiro: PUC-Rio, Departamento de Administração, 2020.

v., 172 f.: il. (color.); 29,7 cm

1. Tese (Doutorado) – Pontifícia Universidade Católica do Rio de Janeiro, Departamento de Administração, 2020.

Inclui referências bibliográficas.

1. Administração – Teses. 2. Anomalias financeiras. 3. Governança corporativa. 4. Risk-taking. 5 Rule-taking. 6. Quadro teórico. I. Martins, Henrique Castro. II. Pontifícia Universidade Católica do Rio de Janeiro. Departamento de Administração. III. Título.

CDD:

658

Acknowledgements

I would like to express my fullest gratitude and appreciation to my advisor, Henrique Castro Martins, for his unending support, advice, and mentorship.

I would also like to thank my committee members, Professors Leonardo Lima Gomes, Marcelo Cabús Klötzle, Cristiano Machado Costa and Jéfferson Augusto Colombo for their thoughtful comments and great advice throughout the dissertation process.

To all my colleagues from the Ph.D. program, thank you for the time we shared and for our discussions, from which I certainly learned a lot.

My deepest gratitude goes to my dear wife, Raquel Labriola, who besides filling those challenging days of hard, seemingly endless work with positive energy and great love, gave me the greatest gift of all, our spectacular daughter Sophia.

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001.

Abstract

Araki, Michael Espindola; Henrique, Castro Martins (Advisor). **Conservative Boards and Intrepid Managers: The interplay of corporate governance, managerial discretion and financing behavior along two famous financial "puzzles"**. Rio de Janeiro, 2020. 172p. Tese de Doutorado – Departamento de Administração – Pontifícia Universidade Católica do Rio de Janeiro.

In this dissertation, I utilize a theoretical perspective that integrates traditional finance theories with the entrepreneurship and creativity theories to investigate the behavior of firms along two conspicuous financial "puzzles": the zero-leverage puzzle and the sensitivity of investment to cash flows. Particularly, I explore and develop two constructs—rule-taking and risk-taking—that exist at the interface of corporate governance and managerial decision-making under uncertainty and which are hypothesized to have a significant bearing on capital structure and investment decisions. Rule-taking is a novel construct that reflects the degree to which a manager is liable to external control, intervention or have their discretionary power constrained. Risk-taking, although not a novel construct, is re-examined through a more comprehensive theoretical lens that encompasses the insights from creativity theory and the concepts of Knightian uncertainty and Kirznerian alertness. These constructs, then, serve as the nexus to investigate the financial "puzzles" going beyond both traditional finance strands (e.g., the trade-off theory; Modigliani & Miller, 1958) and traditional "managerial" strands (e.g., agency theory; Jensen & Meckling, 1976) to analyze overlooked relationships between corporate governance and managerial "intrepidness" in competitive, complex and uncertain environments. The dissertation is composed of three stand-alone papers, with a unified introduction and a general discussion. The first paper is a theoretical essay in which I problematize the dominant paradigm of corporate governance (agency theory) and develop the theoretical background for the constructs of risk-taking and rule-taking. The second and third papers are empirical studies that investigate whether these constructs can help explain the puzzles of zero-leverage firms and investment-cash flow sensitivity, respectively. The results mainly support the hypotheses. This work, then, expands the discussion on traditional themes related to corporate finance and corporate

governance by bringing together underrepresented perspectives in the finance literature, stemming from different areas of research, such as the entrepreneurship and creativity literature strands, and demonstrating that they can add novel and useful insights for research and policy. Finally, this dissertation also answers recent calls for the utilization of more integrative and multidisciplinary approaches to further analyze firm behavior.

Keywords

Financial puzzles; Corporate governance; Risk-taking; Rule-taking; Theoretical framework.

Resumo

Araki, Michael Espindola; Henrique, Castro Martins (Orientador). **Conselhos Conservadores e Gestores Intrépidos: A interação entre governança corporativa, latitude gerencial e comportamento financeiro ao longo de dois famosos "enigmas" financeiros**. Rio de Janeiro, 2020. 172p. Tese de Doutorado – Departamento de Administração – Pontifícia Universidade Católica do Rio de Janeiro.

Nesta tese, utilizo uma perspectiva teórica que integra as teorias tradicionais de finanças às teorias de empreendedorismo e criatividade para investigar o comportamento das empresas ao longo de dois famosos "enigmas" financeiros: a alavancagem zero e a sensibilidade do investimento ao fluxo de caixa. Particularmente, eu exploro e desenvolvo dois construtos — "rule-taking" e "risk-taking" — que existem na interface entre governança corporativa e tomada de decisão gerencial sob incerteza, e que têm uma influência significativa nas decisões de estrutura de capital e de investimento. O "rule-taking" é um novo construto que reflete o grau em que um gestor é passível de controle externo, intervenção ou tem seu poder decisório restrito. O "risk-taking", embora não seja um novo construto, é reexaminado através de uma lente teórica mais abrangente, que engloba as ideias da teoria da criatividade e os conceitos de incerteza knightiana e do "estar alerta" kirzneriano. Assim, tais construtos servem como o nexo para investigar os famosos "enigmas" financeiros, indo além das vertentes financeiras tradicionais (e.g., a teoria do "trade-off"; Modigliani & Miller, 1958) e das vertentes "gerenciais" tradicionais (e.g., a teoria da agência; Jensen & Meckling, 1976) para analisar as relações negligenciadas entre governança corporativa e a "intrepidez" do gestor em ambientes competitivos, complexos e incertos. A tese é composta por três artigos autônomos, além de uma introdução comum e uma discussão geral. O primeiro artigo é um ensaio teórico no qual eu problematizo o paradigma dominante da governança corporativa (teoria da agência) e desenvolvo o embasamento teórico para os construtos de "rule-taking" e "risk-taking". O segundo e o terceiro artigo são estudos empíricos que investigam se esses construtos podem ajudar a explicar, respectivamente, o "enigma" das empresas com alavancagem zero, e a sensibilidade do investimento ao fluxo de caixa. Os resultados em grande parte corroboram as hipóteses. Assim,

este trabalho expande a discussão sobre temas tradicionais relacionados a finanças corporativas e governança corporativa, reunindo perspectivas sub-representadas na literatura financeira, decorrentes de diferentes áreas de pesquisa, como empreendedorismo e criatividade, e demonstrando que elas podem acrescentar ideias novas e úteis para pesquisa e prática. Finalmente, esta tese também é uma resposta a chamados recentes para a utilização de abordagens mais integrativas e multidisciplinares com o fim de melhor analisar o comportamento da empresa.

Palavras-chave

Anomalias financeiras; Governança corporativa; Risk-taking; Rule-taking; Quadro teórico

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Dissertation Introduction

Some financial puzzles, such as the zero-leverage puzzle and the phenomenon of investment-cashflow sensitivity, have eluded scholars for years. They refer to empirical findings and stylized facts that contradict the predicates of traditional capital structure theories (e.g., Miller, 1977; Modigliani & Miller, 1958). In this doctoral dissertation, I utilize these puzzles both as the background and as empirical challenges to explore a more comprehensive perspective on the financial behavior of firms, integrating into the traditional finance and corporate governance approaches other strands of the literature, such as the managerial discretion perspective (e.g., Hambrick & Finkelstein, 1987; Hambrick & Abrahamson, 1995; Wangrow, Schepker & Barker, 2015); the economic theories of profit and entrepreneurship (Kirzner, 1978; Mises, 1952; Schumpeter, 1983; Shackle, 1970; Knight, 1921); and the theories on creativity and its communication (Simonton, 2016, 2013; Csikszentmihalyi, 2014; Greene, 2013; 1984).

I start by acknowledging that these financial puzzles have been analyzed by major literature strands in finance and corporate governance, including capital structure theories (Miller, 1977; Modigliani & Miller, 1958), agency theory (Jensen & Meckling, 1976) and theories based on asymmetries of information (e.g., Leland & Pyle, 1977). Based on these traditional theoretical approaches, several middle-range theories, that sought to advance particular hypotheses for these financial "anomalies" were advanced. For instance, the trade-off theory (see Kraus & Litzenberger, 1973; Myers, 1984) predicts the use of debt is incentivized by tax benefits and disincentivized by the risk of bankruptcy; therefore, a firm should seek an equilibrium of debt and equity that is marginally optimum and thus maximizes firm value. Furthermore, the free cash flow theory (Jensen & Meckling, 1976; Jensen, 1986) advocates the use of debt because it reduces the resources that could be captured by managers for perquisites or sub-optimal

investments. Additionally, the signaling theory (Ross, 1977) postulates that managers, who possess inside information, can influence the market's perceived stream of returns for the firm by changing its financial structure; i.e., by taking debt. Finally, the pecking order theory (Myers & Majluf, 1984) also builds upon the concept of asymmetric information but in a different manner: since the market cannot certain about key aspects of the firm (e.g., its risk and value), it will demand a premium for its external finance. The theory postulates that a natural pecking order of corporate financing will arise: from cash holdings—the least costly regarding asymmetric information costs—to equity issuance—the costliest—, with debt as an intermediate alternative.

Nevertheless, none of these theories alone could offer a complete explanation for these phenomena. Despite these shortcomings, it was only recently that scholars began to more explicitly integrate perspectives from the "managerial strand" of the literature to better understand these puzzling financial behaviors (Wangrow *et al*., 2015; Dang, 2013; Strebulaev & Yang, 2013). Therefore, there is an important gap in literature to be filled concerning the development of new financial models that can better appreciate aspects of corporate governance, managerial decision-making and economic theories that deal with how the equilibria is disrupted either by external novelties, or by the deliberate action of alert individuals that can see opportunities that are opaque to the rest of the market. Thus, in this work I seek to advance knowledge in the field by bringing ideas from the entrepreneurship and creativity theories that, to the best of the authors' knowledge, have never been integrated before into the discussion of corporate governance and by demonstrating that such integration is both theoretically sound and empirically useful as a strategy to think about and examine capital structure and corporate financing issues. In addition, by viewing the firm as a collection of projects with different degrees of likelihood, expected success and embedded uncertainty, corporate risk-taking can be re-examined of in terms of Knight's uncertainty, Kirzner's alertness, and Simonton's creativity at the same time. Moreover, I highlight that in uncertain environments, over-governance can risk the long-term success of an firm by fending off non-typical behaviors, with implications for financing behavior such as capital structure decisions and the firms (in)dependency on internal financing (ICFS). Finally, I discuss that how optimal long-term governance systems can go beyond the AT

paradigm (without negating the neoclassical traditional) and integrate mechanisms to ensure the managerial alertness necessary for the firm to sustainably pursue high-quality, strategic projects.

Taking as a whole, this doctoral dissertation is an attempt to inquiry into important problems in the finance literature adopting a perspective that can integrate traditional finance theories with the managerial perspectives (agency theory, managerial discretion, upper echelons theory) and entrepreneurship and creativity theories. My main empirical strategy involves the exploration of two constructs that lend themselves to empirical investigations and that can serve as a nexus to investigate important relationships between the environment, firm characteristics, corporate governance systems and firm outcomes. The first construct is a novel construct named here as managerial rule-taking and it reflects the degree to which the CEO is liable to external or board control, intervention or have their discretionary power constrained. The second construct is corporate risk-taking. Despite its long traditional as an empirical construct, in the finance and CG literature, risk-taking is often analyzed under the lens of agency theory. We, then, seek to advance a different view of risk-taking, more consonant with the literature strands of the entrepreneurship and creativity research, incorporating and integrating, for instance, the concepts of Knightian uncertainty (Knight, 1921), alertness (Kirzner, 1978) and creative "surprisingness" (Simonton, 2013).

Given the discussion above, this PhD dissertation is articulated to answer the following interconnected research questions (from the broadest to the most specific):

- What factors regarding board and managerial behavior are underexplored in mainstream research on corporate governance, especially agency theory, and which could help increase understanding regarding firm financial outcomes?
- To what extent is it possible to explain the financial behavior of firms—in special traditional "financial anomalies"—through empirical constructs regarding board and managerial behavior derived not form agency theory but from the interplay of the literature on managerial discretion, entrepreneurship and creativity?
- To what extent can the empirical proxies of the constructs of firm risk-taking and managerial rule-taking explain the traditional financial

puzzles of the zero-leverage behavior and the sensitivity of investment to cash flow?

1.1.
Objective

The objective of this Doctoral Dissertation is to analyze the financial "puzzles" of zero leverage and investment-cash flow sensitivity, which concern both corporate finance and corporate governance, through a perspective that integrates traditional finance theories with the managerial perspectives (agency theory; managerial discretion theory), entrepreneurship and creativity theories. For that, the backbone of the scientific inquiry undertaken in this work is on the analysis, description and systematization of the two constructs—risk-taking and managerial rule taking—, which are utilized as predictors in the empirical models that seek to explain the financial "puzzles" outlined above.

1.1.1.
Specific Objectives

- Identify possible constructs at the intersection of the literature on traditional finance, corporate governance and managerial discretion that can inform the current understating of the financial behavior of firms, especially when it concerns to so-called "financial puzzles".
- Describe and provide the empirical proxies for the foregoing constructs.
- Verify whether the aforementioned empirical proxies can help explain the traditional financial puzzles of the zero-leverage and investment-cash flow sensitivity.

1.2.
Justification and Relevance

The two specific financial puzzles tackled in the dissertation have great value for both theory and practice in corporate finance and corporate governance, thus they are of germane relevance as topics of study. The zero-leverage puzzle stems from the stylized fact that many firms carry substantially less debt than expected (Myers, 1984). As put by Strebulaev (2007, p. 1747), "firms seem to use

debt financing too conservatively, and the leverage of stable, profitable firms appears particularly low." Even more astonishingly, a significant number of firms displays an extreme version of this behavior, carrying no debt at all—they are the zero-leverage firms. Authors such as Dang (2013), Bessler *et al*. (2013) and Strebulaev and Yang (2013) understand that the study of the zero-leverage phenomenon can be useful to shed new light on why firms make their capital structure decisions in a way that is dissonant with the traditional capital structure theories.

The second puzzle, investment-cash flow sensitivity (ICFS), can be traced back to the seminal paper by Fazzari, Hubbard and Petersen (1988). The authors challenged the traditional assumption that a firm's financial structure is irrelevant to investment; i.e., that external funds provide a perfect substitute for internal capital (cf. Modigliani & Miller, 1958). Instead, Fazzari and colleagues argue that because providers of external finance, due to markets frictions, agency problems and asymmetric information, face restrictions—or are unable—to assess the quality of a firm's investment opportunities, they will demand a premium on their financing. As a result, the cost of new debt and equity may differ substantially from the opportunity cost of internal finance generated through cash flow and retained earnings. Under these circumstances, a firm's investment and financing decisions may become interdependent (Fazzari *et al*., 1988, p. 142).

Given the relevance of these puzzles to theory and practice and given that extant theories have not completely unraveled them, this work offers an important contribution to the literature. Moreover, the multidisciplinary and integrative approach of this dissertation is also a response to recent calls for the enrichment of management and organization research through the incorporation of literature of the entrepreneurship strands (Teece, Peteraf, & Leih, 2016) as well as creativity (Mainemelis, 2010) so that it is possible to arrive at a more comprehensive understanding of firm behavior.

1.3. Organization of the dissertation

To achieve the foregoing objectives, the remainder of this doctoral dissertation is composed of four major parts, or chapters. Chapter 2 comprises Paper 1, a theoretical essay that focuses and leverages on the interplay of different

literature strands to help explain the financial behavior of the firm. The two variables that will be utilized in the empirical models presented in this work are derived from the theoretical background developed in Paper 1. The paper begins by investigating the underlying reasons of the constitution of firms, of the agency conflicts and of the existence of CG mechanisms in the light of how these elements can actually contribute for value creation for each party involved, be it a shareholder, a manager, the board of directors or governance activists, providing a comprehensive discussion on the theoretical basis of the hypothesis investigated in the subsequent empirical articles. In sum, the theoretical article seeks to arrive at a better understanding of the firm, its governance mechanisms and its financial behavior by exploring, though different angles, three fundamental issues: (i) the reasons and motivations that bring principals (owners) and agents (managers) together; (ii) the foundation behind the mechanisms that are enacted so that this relationship yields beneficial outcomes for both parties; and (iii) how different sets of incentives (internal and external to the firm) can lead to different arrays of CG mechanisms and different managerial and firm outcomes.

Chapters 3 and 4 are empirical articles (Papers 2 and 3) based on the effects of two operationalizable constructs that emerged from the literature review and are related with managerial creativity and the degree in which corporate governance checks and balances permit the manager to pursue their projects with great latitude of action. The first construct is referred to as risk-taking, meaning in this work the manifestation of a manager's desire to increase the value of the firm by undertaking risks and promoting projects with some amount of uncertainty. The second construct is managerial rule- taking, a novel construct proposed and developed in the dissertation. To which a manager can be overruled, suffer intervention, or have their discretionary power constrained. Following the argument for risk-taking, managerial discretion is a vital predecessor of managerial creativity. The managerial discretion literature posits that when the top manager's ability to influence decisions is high, his or her effect on firm-level outcomes is greater (Wangrow, Schepker & Barker, 2015). However, in some situations, because of the firm's environment, structure or internal organization, the firm will rather constrain managerial discretion (and creativity) in order to safeguard firm's resources from exploitation by a self-serving manager (Jensen & Meckling, 1976; Jensen, 1986; Wangrow, Schepker & Barker, 2015). When

powerful parties in the firm enact governance structures and a system of checks and balances that are too strict, the manager becomes less enfranchised to pursue projects based on his or her subjective perception and valuation. The manager will rather be forced upon to carry out strategies that are easier to communicate—i.e., with smaller information transaction costs—and thus be supported by shareholders and other powerful parties. The empirical papers are explained in further detail below.

Paper 2 is the empirical article "Risk-taking, Rule Taking and the Zero-Leverage Puzzle". The article investigates the following hypotheses:

- H1: Rule taking is negatively associated with the likelihood of zero leverage.
- H1: Risk-taking is positively associated with the likelihood of zero leverage.

Risk-taking is assessed following a similar strategy to Nakano and Nguyen (2012) and Adams *et al*. (2005); that is, by calculating the firm's absolute deviation from expected performance (ROA). To measure our novel construct, rule-taking, we analyzed four variables that have been associated in the literature with more control over the managerial latitude of action: (i) the number of board members, representing the size of the board and calculated by the natural logarithm of the number of board members; (ii) the percentage of shares owned by all directors, representing the ownership of the board; (iii) the ownership of the largest shareholder, representing the existence of blockholders and the existence of a large concentration of power in one or more shareholders; and (iv) CEO non-duality, representing a situation in which the CEO does not accumulate the role of chairman of the board and therefore cannot enjoy such unity of power. Values above the median received the value of '1' and values below the median received the value of '0'. They were then summated to obtain our final rule-taking measure. The empirical strategy consisted in utilizing a cross-sectional probit model with a sample of 11,784 firms, and the results mainly corroborate our hypothesis.

Paper 3 is the second empirical article, "Risk-taking, Rule Taking and Investment Cash Flow Sensitivities". It investigates the following hypotheses:

- H1: Risk-taking has a negative influence on Investment-Cash Flow Sensitivity

- H2: High rule-taking has a positive influence on Investment-Cash Flow Sensitivity

The same predictors of the first paper are used in this article. To measure our dependent variable, we followed the strategy employed by Pawlina and Renneboog (2005), Pindado *et al*. (2011), and Kuo and Hung (2012). Investment is measured as the change in net property, plant and equipment plus depreciation and amortization expenses. Cash Flow is measured by earnings plus depreciation and amortization expenses (Pindado *et al*., 2012). We normalize both Investment and Cash Flow by the beginning-of-year total assets. The empirical strategy consisted in utilizing a cross-sectional robust regression model with a sample of 11,784 firms. Our results lent strong support for the risk-taking hypothesis, but limited support for the rule-taking hypothesis.

Finally, Chapter 5 contains a general discussion informed by and articulating the themes, findings and discussions from the previous chapters. This chapter also contains the conclusion as well as a discussion with implications for theory, practice and future studies.

2
Paper 1. Corporate Governance and the Creativity of the Market: The roles of risk taking and rule taking in the firm behavior

Abstract

This paper investigates the interface between governance and strategic management by utilizing an integrative approach that draws on the literature on entrepreneurship and creativity to offer a more comprehensive theoretical understanding regarding the complex interplay of two key themes in the management literature. We start by introducing the concept of misgovernance hazard, underscoring that even well-meaning governance mechanisms may end up hurting long-term firm value when they systematically disenfranchise good but more opaque projects due to fear of moral hazard. Thus, we also problematize the view that powerful boards represent the "ideal governance arrangement". Next, we develop the constructs of managerial rule-taking of uncertainty-taking, which exist at the interface of governance and strategic management, and between the necessities of checks and balances on managerial behavior and that of providing discretion for the generation of long-term value in an uncertain environment. We then advance a novel typology of entrepreneurial projects in the firm, which goes beyond the explorative-exploitative dichotomy and offers a more integrative and granulated framework regarding the degree of "entrepreneurialness" of a firm's projects. We conclude with implications for future research and policy. This paper contributes to the literature by integrating related but fragmented literature strands into a novel and more comprehensive understanding of firm behavior and by suggesting research opportunities within and across different literature stands, including but not limited to strategic management and corporate governance.

*Keywords***:** Rule-taking; Uncertainty; Corporate governance; Creativity; Strategic management; Upper echelons; Agency theory

2.1.
Introduction

The agency theory (AT) is often used as a general framework for analyzing managerial behavior (Baker & Anderson, 2010). AT deals with the relationship between agents and principals, in which the agent is a person hired by the principal to act of their behalf (e.g., in the management of a firm). Most importantly, AT assumes that this relationship will lead to an inherent loss of value: the agency cost. Thereby, corporate governance (CG) mechanisms should be enacted to limit "the aberrant activities" of the agent, especially via monitoring and incentives (Jensen & Meckling, 1976, p. 308). The AT approach has had a prominent influence not only on research but also on policy, informing what tends to be considered the 'ideal governance structures' (Tang *et al.*, 2011). Thus, if the reasoning behind AT has frailties, it is crucial for the circumstances of the frailty to be brought into light so that our wisdom can move toward a more appropriate and comprehensive understanding.

In this paper, our problematization of the agency theoretic approach and our suggestion for moving forward are developed along three themes. First, we argue that impetus to curb managerial moral hazard can be related to another kind of sub-optimal behavior named here as the "misgovernance hazard". The misgovernance hazard occurs when governance structures—driven by fear of agents' misbehavior—disenfranchise projects that would otherwise be beneficial to both parties (principals and agents). This hazard becomes more prominent when there is uncertainty, ambiguity, volatility or complexity in the means-ends relationships (Hambrick & Abrahamson, 1995), since it exacerbates the wedge of knowledge between insiders and outsiders and makes projects more difficult to value, both of which make the principal more vulnerable to expropriation by the agent (Manso, 2011). Thus, when powerful parties go overboard with monitoring and restrictions, and their attempts for agentic alignment are poorly calculated or executed, the ultimate outcome is the misgovernance hazard, leading to the obstruction of important channels of innovation in the firm, crippling possible or nascent otherwise strategic and positive net present value (NPV) projects.

Second, we utilize the creativity research to underscore that non-typicality (or non-conformity) is in fact at the heart of innovative behavior, which creates an inherent problem of innovation in an environment of excessive constraints,

monitoring, scrutiny and penalties for deviance. Thus, because more creative (less typical) projects necessarily involve a greater wedge of knowledge between insiders and outsiders, they often involve complex and numerous "moving parts" that is hard to comprehend and keep up when one is an outsider and because this wedge is not easily bridged with communication, the undertaking of these more creative projects are crucially dependent on the distribution of discretion and on wise governance mechanisms that can provide oversight without constraining the insider's latitude of action (see also Adams & Ferreira, 2007; Finkelstein, & Peteraf, 2007; Hambrick, 2007; Hambrick & Finkelstein, 1987).

Third, departing from the ideas of misgovernance hazard and the non-typicality of creative behavior, we articulate central concepts from the entrepreneurship and creativity theories to develop the constructs of rule-taking and uncertainty-taking. Rule-taking exists at the interface of corporate governance and the need of managerial discretion and reflects the degree of control over that powerful parties and CG mechanisms have over the manager(s) of the firm. We caution that although setting up a rule-taking environment can fend off non-typical firm behaviors (Tang *et al*., 2011), it can also exacerbate agency problems and hurt long-term firm value by disincentivizing or disenfranchising good but more opaque projects (Le, Nguyen, & Silas, 2020; Lin, C., Liu, S., & Manso, 2016; Johnson *et al*., 2000; Romano, 1991). The construct of uncertainty-taking stems from the integration of Knight (1921)'s uncertainty, Kirzner (1976)'s alertness, and Simonton (2016)'s creative responses. Thus, it exists when organizations need to deal with Knightian uncertainty (which is different from risk, which is amenable to statistical measurement and is often insurable) and when their leaders are capable of being "alert" to new opportunities and undertake creative projects. We also highlight that the two constructs can be important pieces in future empirical investigations, serving as a nexus to investigate important relationships between the environment, firm characteristics, corporate governance systems and firm outcomes.

Fourth, we develop a novel typology of projects, integrating into a single framework the concepts of Knightian uncertainty, creative responses, managerial alertness and structured innovation (Baumol, 2002) to arrive at four types of projects, going beyond the traditional division in the entrepreneurship literature between explorative and exploitative projects (March, 1991), and also associating

the different types of projects with different parameters of creativity and with the constructs of managerial rule-taking and uncertainty-taking.

Finally, we underscore that optimal long-term governance must go beyond the AT paradigm (without negating the neoclassical traditional; cf. Donaldson & Davis, 1991; Davis, Schoorman, & Donaldson, 1997) and integrate mechanisms to ensure the managerial alertness necessary for the firm to sustainably pursue high-quality, strategic projects. This article is also a response to calls for the enrichment of management and organization research through the incorporation of Knightian uncertainty (Teece, Peteraf, & Leih, 2016) as well as insights from the creativity literature (Mainemelis, 2010) into strategic management and organizational behavior.

2.2.
The agency problem, the moral hazard and the misgovernance hazard

Marshall (1890) was a pioneer in the reflection on how the control of businesses tend to end up in the hands of outside managers; or, how the descendants of the successful founders and entrepreneurs will prefer "an abundant income coming to them without effort on their part" (Marshall, 1890, p. 241). For this, they will need to alienate the tasks of the firm's management to others, becoming then 'sleeping partners' in the firm—i.e., sharing in its risks and its profits, but not taking an active part in its management. But for this process to be complete, some other entity must take care of the oversight of the firm and its governance: the board of directors. They duty is to bring "wide general knowledge and sound judgment to bear on the broader problems of its policy" and make sure "that the managers of the company are doing their work thoroughly" (Marshall, 1890, p. 241). Nevertheless, those directors are not generally expected to give their whole time to the firm. Thus, since much before Jensen and Meckling (1976) formalized the modern tenets of agency theory, there has been a problematic presumption of board wisdom when in fact the board members, being outsiders, are in a disadvantaged knowledge position to make good decisions (Hayek, 1945) and, by themselves, would be probably at a loss on how to optimally navigate the firm while dealing with uncertainty (Knight, 1921), let alone capture profit opportunities that require both creativity and fine-tuned

understanding of the conditions of the market (Kirzner, 1976). In the next sections, we explore several situations when excessive or mis-governance can lead to sub-optimal results for the firm's long-term strategy.

2.2.1.

The Misgovernance Hazard and its risk to managerial alertness

As Hart (1995, p. 681, emphasis added) poses, "in view of the managers' ability to pursue their own agenda, it is *obviously* important that there exist checks and balances on managerial behavior". Such pursuit by the agent of their own agenda at the expense of the best interests of the principal is in fact at the heart of one of the most conspicuous issues in the CG literature: the moral hazard. Moral hazard occurs when agents, contrary to the principles laid out by their agreement with the principals, utilize their power and privileged information to engage in self-serving behavior and expropriate value from the principal. The fear of moral hazard is utilized as the main justification for the enactment of CG mechanisms, which ultimately should enhance firm performance (Jensen & Meckling, 1976; Myers, 1984).

Nonetheless, the agency-theoretic focus on the control and monitoring of agents can easily become exacerbated and even turn into a liability for the firm's long-term survival. As described in a survey by PricewaterhouseCoopers, "too much emphasis on monitoring tends to create a rift between non- executive and executive directors" causing misalignment in the firm's strategy (Adams & Ferreira, 2007, p. 217). Research has found that when boards go overboard with their controls, they risk removing important chunks of managerial latitude of action, which could have otherwise been essential for the firm's ability to steer itself successfully in situations where complexity, volatility, ambiguity and uncertainty are high. In addition, external events that led to a decrease in the power of external governance mechanisms were found not to lead to more agency theory problems, but, on the contrary, it allowed firms to start experimenting more with new ideas and investing more in value-maximizing projects (Le, Nguyen, & Silas, 2020; Lin, C., Liu, S., & Manso, 2016; Johnson *et al.*, 2000; Romano, 1991). Finally, the presumption of mistrust underlain in AT has been associated with a downward spiral of increased regulation (Todd, 2010; Turnbull, 2000) and the enactment of myopic managerial incentives pending toward short-term gains.

Thus, ironically, incentive policies that aimed to address moral hazard have been co-opted by misbehaving managers seeking to accrue gains in the short term while potentially destroying value in the long term.

In sum, by its fixation on the losses stemming from the principal-agent relationship, AT overlooks other elements that are equally crucial for the firm's value maximization and that are dependent on the agent's ability and their discretion (e.g., Adams & Ferreira, 2007; Donaldson & Davis, 1991; Davis, Schoorman, & Donaldson, 1997). Arguably, in the complex and often-uncertain environment in which firms operate, one should expect as much heterogeneity in the strategies regarding the firms' governance systems as in any other environment with the same conditions. Nonetheless, driven by AT, the central normative question for corporate governance has been: "how can principals best avoid the agency problem?". We argue that, although important, this question should exist within a bigger context: "what kind of behaviors and structures are more likely to help the firm achieve its long-term goals? And under which circumstances?". The argument is strengthened in the presumption that, in a competitive and complex economy where firms face true uncertainty (Knight, 1921), the capitalist and the manager (principals and agents) depend on each other more than ever to achieve their long-term goals, flourish and even survive. Given this mutuality, the agency-theoretic approach becomes insufficient as a guide for a more comprehensive view of corporate governance, which extends its role beyond the mitigation of losses caused by the agency conflict toward the superordinate goal of value maximization of the firm.

In this paper, we propose the name of *misgovernance hazard* to refer to the risk that even well-meaning CG mechanisms may end up hurting long-range firm value when they systematically disenfranchise or disincentivize good but more opaque projects due to fear of moral hazard. We also highlight that the misgovernance hazard is aggravated to the extent that the firm deals with more ambiguity in the means-ends relationship (Hambrick & Abrahamson, 1995); that is, there is less prior knowledge regarding the usefulness of a given course of action and this knowledge is not easy to acquire or transfer.

This is precisely the situation faced when the firm's manager must choose the best projects for the firm among several alternatives (a lot of them "hidden"; Kirzner, 2009), with incomplete information, in a world of full of complexity and

uncertainty whereby the ultimate value of any project is not known in advance. However, contrary to outsiders, the managers are expected to have a unique aid in dealing with this situation; they have built a unique set of constantly-updated knowledge, owing to their closeness to the operation of the firm (Hayek, 1945, 1937). This unique set of knowledge has the crucial feature of equipping them to not only deal better with the "novelties" of the market (Georgescu-Roegen, 1993) but also capture opportunities that may be hiding "around the corner" (Kirzner, 2009), which are opaque to other people that lack the necessary stock of knowledge and information. For Kirzner (1997, 1978), this special aid that grants managers the possibility to exploit previously unseen opportunities is named *alertness*.

Alertness, however, is necessarily based on the subjective estimates of future values that the manager has been alerted to (Makowski & Ostroy, 2001). Besides, it will tend to require a considerable latitude of action, the same latitude of action that enables moral hazard. Additionally, it requires special knowledge or sets of information, which are also the sources of information asymmetry that can be leveraged to expropriate firm value. Thus, despite the potential benefits that an alert manager can bring to the firm, organizations—due to fear of moral hazard—may turn themselves to stifling governance systems that are hostile to creative projects and that may ultimately hurt their chances of survival in a competitive market driven by innovation (Baumol, 2002, 1968; Makowski & Ostroy, 2001; Schumpeter, 1983). That is also the core of the situation of managerial rule-taking, which will be explored in further sections.

Misgovernance hazard, thus, does not arise due to a divergence between managerial interest and those of the outside shareholders (as expected by agency theory), but due to a divergence regarding insider and outsider knowledge and the insider being curbed in their means to make their superior knowledge actionable. Thus, misgovernance can jeopardize innovative behavior because the latter depends on the unique knowledge harnessed by the managers that is inherently asymmetric, unevenly distributed and possibly opaque to outsiders. Therefore, the estimates of managers are unlikely to perfectly comprehended by other parties (e.g. the board), which, however, can hold the key that (dis)allows managers to pursue such estimates. Finally, when the actionability of these estimates depend on powerful overseers and they put forth CG systems that are not conducive for

these types of projects, they are generating a hindrance to possible optimal investment that would otherwise increase firm value and improve its future competitive prospects.

As a comparison, if moral hazard refers to a misbehavior regarding the managerial misuse of their power for self-serving means, misgovernance hazard is also a governance misbehavior whereby powerful parties misuse of their power to overrule informed agents hindering mutually interesting, positive NPV projects. Thus, by either disallowing or imposing extra costs on NPV projects stemming from the manager's alertness, misgovernance hazard also subtracts value from the firm. In the next section, we explore this discussion further by developing the construct of managerial rule-taking.

2.2.2.
Managerial Rule-Taking: Reflecting the fear of managerial misdeeds

Oliver Hart and colleagues discuss the impossibility of comprehensive contracting and the need of a person endowed with some discretion to be in charge of the firm (Hart, 1996; Hart & Moore, 1990; Grossman & Hart, 1986). This ultimate strategist is the firm's top manager, generally the CEO, who bears the responsibility of determining the firm's long-term goals and objectives and implement corresponding courses of action (Chandler, 1962; Child, 1997; Wangrow, Schepker & Barker, 2015). Very importantly for a sustainable competitive advantage, this manager should not only react to the novelties of the market, but actively engage in strategic risky projects, becoming themselves inductors of innovation in the market (Chatterjee *et al.*, 2003; Bowman & Ambrosini, 2000; Barney, 1986). Despite these potential benefits, oversight and checks and balances on managerial behavior are also important to safeguard firm value, as outlined by AT.

What the literature then presents is a dilemma between two possible stances of governance. On the one hand, because managers can abuse their power for self-serving purposes, hurting firm value, there is a need for checks and balances on managerial behavior (the moral hazard point). On the other hand, because a firm is navigating in a quickly changing in an often-uncertain environment, the top manager is expected to enjoy some discretion to take calculated risks, and eventually carry out projects that are both novel and valuable

(the creativity point). When preoccupation with control greatly outweighs preoccupation with the proactive preparation for the capturing of new opportunities, the firm tends to be institutionalized with more restrictive mechanisms over the CEO, which constitutes a higher level of managerial rule-taking.

Rule-taking is then a novel construct that seeks to reflect the degree to which a manager can be overruled, controlled, monitored, and is liable to intervention or to have their discretionary power constrained. Although rule-taking is intimately connected with (low) managerial discretion, it goes beyond the latter by incorporating several sources of pressures that can be equally or even more disruptive to managerial decision-making than the simple reduction in the latitude of action. Particularly, rule-taking incorporates both the "active monitoring" and the "speculative monitoring" mentioned in Tirole (2010). The former refers to an interference in management by enfranchising a different forward-looking course of action or disenfranchising the current managerial-driven course of action—in extreme cases the intervention is the removal of the manager. The latter refers to backward looking assessments of firm and managerial behavior and includes the utilization of this information to signal appraisal or condemnation of the firm's past actions—in extreme cases, this information can be used to back up legal suits against management. As an illustration, if the manager is a commander behind a steering wheel, sources of rule-taking can be not only a reduction in the range of movement of the steering wheel, but also the distribution of power to observers in different parts of the ship so that they can interfere directly or indirectly with decision-making, by, for example, dictating new pre-sets and configurations of the steering wheel and exerting pressures on decision-making with actionable consequences.

2.3.
The creativity tournament and its underpinnings for creative projects

Some economists argue that the business environment is permeated by a constant influx of *novelties* (Georgescu-Roegen, 1993). This means that the players of the market are obliged to constantly revise their extant models and rearrange their plans and tactics to incorporate new and relevant information (Schumpeter, 1983, 1928; see also Kirzner, 1997; Makowski & Ostroy, 2001).

The entrepreneurship literature deals precisely with this non-serene market where a state of equilibrium is never sustained for a long time. This aggregate "creativity of the market" (Makowski & Ostroy, 2001) is what induces uncertainty in the environment and frustrates the implementation of comprehensive contracting (this will be discussed in later sections). In other words, the entrepreneurial theory pictures the economy as a big "creativity tournament". Every firm is potentially a vector of creativity—generating disruptions that will affect other firms—but also a possible "victim" of the creativity of others, having their plans and projects disrupted by innovations generated elsewhere.

Accordingly, in this scenario, a firm leader must be alert not only to eventual disruptions in the state of the market (Schumpeter, 1928) but also to profit opportunities that require novel approaches, some of them "hitherto untried in practice" (Schumpeter, 1928, p. 78) while others are so surprising that they "had not been suspected of existing at all" (Kirzner, 2009, p. 151). By dealing with uncertainty and by entertaining risky projects, the top manager's role to becomes closer to that of the traditional change-makers and inducers of novelties in the economic literature: the entrepreneurs (Baumol, 2002, 1968; Schumpeter, 1983; Kirzner, 1973). That is, in an environment of increasing uncertainty or where creativity is needed to generate value, a firm leader becomes less and less like Clark's (1899) "manager-coordinator", who is centered on the oversight of the ongoing efficiency of the firm, and more and more like the alert entrepreneur outlined in the works of Kirzner (1973), Shackle (1970) and Schumpeter (1983). In the next section, we examine the remarkable convergence between the assumptions underlying both entrepreneurial and creative behavior. When Kirzner describes opportunities that had not been suspected of existing at all, or that might be hidden "around the corner" (Kirzner, 2009, P. 151), he is depicting what creativity scholar Simonton (2016, 2013) described as a response with both low initial probability and low prior knowledge. In sum, both literature strands are underscoring an inherent blindness and a gamble-like nature in creative-entrepreneurial projects, and both theoretical strands have advanced possible ways to deal with this reality.

2.3.1.
The Three Parameters of Creativity

The processes underlying the generation of novelties appear to have common fundamental components across all domains. Simonton (2013) poses that a creative response is composed of three independent and multiplicative parameters. The first parameter refers to the response's initial probability; more common and usual responses are gauged as less creative than ideas that are non-typical or not immediately accessible. For instance, utilizing commonly adopted market practices (even those regarded as best practices), although potentially useful, reflects little creativity. The second parameter refers to the utility aspect; the more useful, valuable, appropriate, meaningful, adaptive, correct or valid the response is, the greater its creativity. Finally, the third parameter refers to the degree of sightedness, or how much prior knowledge regarding the response's final or actual utility one can harness; ideas whose outcomes obvious are less creative than ideas with more ambiguity in the means-ends relationship (cf. Hambrick & Abrahamson, 1995; Thompson, 1967).

Thus, since the parameters multiple each other, it means that a creative response must be "unlikely" (low probability), "useful" (high final utility), and relatively "opaque" (low sightedness). If any one of these parameters is not met, the creativity score goes to zero. This has remarkable implications for the discussion regarding risk and uncertainty and how the communication of value estimates can become problematic, potentially leading to some "puzzling" firm outcomes found in the management and finance literature strands.

The lack of prior knowledge that underpins creative behavior is intimately tied with Knight's (1921) concept of uncertainty. Knight differentiates between risks—which are amenable to calculations based on known probability distributions and, in many cases, can be insurable—and true uncertainty, in which *a priori* methods of calculation are inapplicable. When there is true uncertainty involved and, for instance, a finance specialist uses a given formal method (e.g., value at risk, decision trees, real options approach) to calculate the value of a project, its net present value (NPV) will be reflecting a series of assumptions of the modeler and will be contingent on the quality and availability of information at the time of the estimate. Thereby, although these methods provide some formalism—which can be a strong asset in what regards communication and

financing needs (e.g., it can facilitate the communication of value estimations to potential external financers, or to external boards and committees)—, they are never truly incorporating Knightian uncertainty.

2.3.2.

Uncertainty-Taking: Exploring the uncharted for the large success

The AT purports that managers will tend to be risk-averse because, unlike shareholders, they have most of their capital in the form of undiversifiable human capital, which is often tied to the firm. Hence, an eventual bankruptcy of the firm would have a more dramatic effect on managers compared to shareholders and, thus, it would make economic sense to be risk-averse (see also Hoskisson *et al*., 2017; Guay, 1999; Smith & Stulz, 1985). Based on these assumptions, AT purports that top executives should be compensated or incentivized so they can abandon their "natural" risk-aversion and adopt optimal risk-taking behavior. Yet, empirical evidence on the effect of equity-based incentives on managerial risk-taking behavior has been inconclusive (Low, 2009).

A strikingly different view of risk-taking, or more precisely uncertainty-taking, is presented by the theories of entrepreneurship and creativity. The entrepreneurship literature pictures the economy as a big "creativity tournament", in which the role of the top manager of the firm must be to deal with an uncertain environment, being alert to the possible disruptions but also taking risks in either commercial or innovation gambles (Shackle, 1970). This engagement with uncertainty in effective and successful ways is sometimes posed as the only way to guarantee the long-term competitive advantage of the firm (see also Hoskisson *et al*., 2017).

Through a different theoretical path, the literature on creativity have elucidated the parameters behind the gamble-like nature of an uncertainty-laden project in a competitive environment. As seen, a fundamental element for creativity is the lack of prior knowledge regarding results by all members in a field. In the business setting, instead of field, it is more adequate to use the concept of industry; i.e., a group of firms offering products or services that are close substitutes for each other, and that are aiming at addressing similar customers' needs (Porter, 1989). In a given industry, a member (firm) can either utilize knowledge, methods, techniques, etc. that are of common knowledge among the field members, or it can strive to generate something new and

surprising (cf. Simonton, 2016, 2013; Csikszentmihalyi, 2014). However, because of lack of prior knowledge regarding results, a firm must blindly generate several ideas until one of them succeeds in meeting both criteria of novelty and usefulness. This is where the parameters of creativity interact with the competition of the market. Ideas with a higher degree of probability (i.e., ideas that are easily available and require little incubation) and lower degree of blindness (i.e., ideas whose ultimate usefulness is relatively easy to assess) will probably have already been harnessed in a competitive environment, with many members actively striving for creativity. In other words, in a competitive industry, the "basic good ideas" will be quickly captured, leaving available only the ideas which are unlikely, or incorporate a lot of uncertainty. Therefore, given the nature of creativity and the competitiveness of the market, the entrepreneurial manager (or any person seeking a creative outcome) is left with no choice but to "gamble" with uncertainty.

The entrepreneurial manager, however, can count with a crucial aid in this pursuit: their alertness. It is their alertness to opportunities that are not as easily accessible to others that allows the manager to tilt toward his or her favor the first parameter of creativity, the initial probability of an idea (Simonton, 2013). That is, because of the insiders' unique accumulated stock of knowledge and because of their privileged position regarding the obtention of valuable information, some ideas that are unlikely to most—if not all—other players in the market might be more likely to the alert manager. Just like different agents have different preference ordering (Debreu, 1954), which can be updated with the discovery of new options, different agents also have different "knowledge orderings", with a different portfolio of information, which is loaded with different "weights". Some non-typical and useful ideas are more likely to stem from non-typical knowledge orderings. However, precisely because highly creative ideas generally stem from non-typical knowledge orderings, they tend to be intrinsically difficult to communicate, as the recipient will more often than not lack the necessary sets of knowledge, schemas, associative networks, procedural records, or processing capacity to fully comprehend the novel idea (Hayek, 1945; Greene, 2013, 1984). In other words, different agents have a different knowledge portfolio with unique weight distribution, and some specific knowledge orderings (cf. Debreu, 1954) will more likely give rise to non-typical and useful ideas, which in turn need the

enactment of a similar knowledge ordering in the mind of the recipient to be fully appreciated. This has severe consequences for the long-term survival of firms. Because most of the disruptive ideas that can critically affect a market tend not to be in the horizon of the incumbents, they might be in a loss to rearrange their organizational knowledge to a new ordering that effective to respond to this change in a timely fashion. Another possibility is to take an offensive position; that is, using their resources to create, harness or control the novelties themselves. Nevertheless, since this path inherently entails a large degree of blindness, and the path for the "large success" also unlocks the possibility of large failures (Shackle, 1970), several powerful players involved may see this option as too risky, preferring other types of projects instead.

2.4.
A new typology of entrepreneurial projects in the firm

In the entrepreneurship literature, March (1991) disseminated the concept of exploration and exploitation activities. While exploration involves looking for new possibilities and exploring uncharted territory, exploitation involves the capitalization "of old *certainties* in organizational learning" (emphasis added). Although this approach has been undoubtedly useful, we propose a more integrative and more granulated typology, which, to the best of the authors' knowledge, is the first to integrate four related but so far fragmented literature strands into the understanding of the (non)entrepreneurial quality of the projects in the firm.

The first strand deals with Knightian uncertainty, which helps to more clearly separate the projects that involve a gamble with risk, but which at their core are dealing with structured risk (e.g. R&D projects for incremental innovation), from projects that deal with Knightian uncertainties that are uninsurable and not amenable to calculation (thus, even models in which a "Schumpeterian" shock is modelled through a given probability distribution are not adequate in this situation; Peñaloza, 2010). The second strand is Simonton's (2016) typology of creative responses that has more clearly laid out the parameters for creativity and innovation and is the basis of our new typology with a small chance in the interpretation of the blindness parameter. The third strand refers to Baumol's conceptualization of structured innovation (Baumol, 2002), as

well as the distinction between replicative projects and innovative projects (Baumol, 2010). The fourth strand deals with Kirzner (1997) entrepreneurial alertness and the capacity of the manager to be perceive new opportunities that are often overlooked by others. Through this approach, and utilizing a variation of Simonton's (2016) approach to creativity, it is possible to arrive at a typology of four projects based on a dichotomous score in two parameters: (i) the initial probability of the project (ρ); that is the probability the idea in which the project will be based upon is available at once, as an immediate and instantaneous option; (ii) the opacity of the project (υ); that is, the quality of being difficult to understand or explain and the lack of clarity or obviousness in its means-ends relationship. Finally, the third parameter of Simonton's typology indicates whether the project ultimately increased in the firm's long-term value. However, since this parameter is only known a posteriori, it cannot be accounted during the stage in which the firm is considering which projects are the best options for investment. Thus, the last parameter, or final utility (μ) only indicates whether the project was successful or not after it is concluded. Table 1 summarizes the four types of projects, with their corresponding parameters, and shows which of the discussed concepts can be associated with each type of project.

Table 1
Typology of Entrepreneurial Projects in the Firm

Types of Projects	Initial Probability	Opacity	Associated with
Replicative project	ρ = 1	υ = 0	Rule taking
Innovative project	ρ = 0	υ = 1	Uncertainty-taking
Incubation project	ρ = 0	υ = 0	Structured Innovation
Insightful project	ρ = 1	υ = 1	Alertness

Replicative projects are those in which the initial probability is high and opacity is low; that is, these projects based on knowledge readily available, with clear or obvious value. Nevertheless, because there is still uncertainty in the world, or the underlying assumptions of the project estimates might be wrong, the estimated final utility may be wrong. Thus, the replicative project will only be successful if its expected utility is actually translated to reality, otherwise it will be a failed project. Given that replicative projects are those that entail clarity or obviousness in its means-ends relationship and are easily justifiable, they are the

kind of projects expected to dominate in organizations with a high level of managerial rule-taking, whose nature and motivations were discussed in previous sections.

Innovative projects are the opposite of replicative projects in the first two parameters. They entail low initial probability and high opacity. Thus, they require a process of preparation, incubation and insight, and even so, it will tend to be unclear and not obvious in its means-ends relationship to those that lack the knowledge elements necessary to enact this project. Because of that, it is associated with the idea of uncertainty-taking, discussed in previous sections.

Incubation projects share characteristics with both replicative and innovative. Like innovative projects, the initial probability, or "initial response strength" is low; there needs to be a considerable incubation time before the illumination that responds the problem occurs. On the one hand, it does not share the same high opacity level of the innovation projects, because incubation projects rely on verified, industry-wide, pervasive structured methods to generate novel and useful products and services. Given the industry-wide and pervasive nature of these practices, many risks can be insured and the drivers of opacity are mitigated through the utilization of well-established and easy-to-communicate processes. Therefore, these projects are associated with the idea of structured innovation.

Finally, insightful projects share the high opacity of innovative projects, but they are available at once, as an immediate and instantaneous option. In terms of the creativity literature, it skips the preparation and incubation processes (Kozbelt, Beghetto, & Runco, 2010; Wallas, 1926). These projects are then associated with Kirzner's alertness to opportunities; that is, because the manager was prepared beforehand, they were able to capture a new opportunity that suddenly appeared. Thus, the preparation phase in fact occurred before and independently from that particular project. Nevertheless, their alertness—fueled by previous preparation—endowed the manager with the resources necessary to exploit the opportunity immediately when it appeared.

2.5.
Discussion

2.5.1.
The "Communication Penalty" and its challenges for firm strategy and governance

In creative, high opacity projects, the firm is dealing with inherently hard-to-explain projects. Thus, different parties (insiders and outsiders) with a stake in the project are much more likely to arrive at potentially irreconcilable valuations. We highlight that in such a case, more communication between the parties is unlikely to solve the discrepancies in valuations.

Communication theories emphasize that there exists a number of states and transitions to craft a message that activates the expected schemas and associative networks in the recipient's mind, and the effectiveness of the process is contingent on the compatibility of the parties' schemas, scripts, associative networks, procedural records and processing capacity (Greene, 2013, 1984). Consequently, the unevenness in the distribution of knowledge outlined by Hayek (1945) and the differences in the ability to "see" an opportunity, as outlined in the concept of alertness (Kirzner, 1973), bring along a substantial challenge for effective communication. Thus, because the project estimates of both insiders and outsiders are based on subjective perceptions and on knowledge that is not easy communicated or transferred, a wedge of information regarding the quality and clarity is created between the different parties. Insiders (managers) will envision a potentially lucrative project for the firm based on their often-tacit knowledge and on their subjective interpretation of current and future prices in the market—in case their perception is in fact "better than the market" (Keynes, 1936, p. 172), the project will succeed, with gains for different parties in the firm, including both managers (agents) and shareholders (principals). Outsiders, on the other hand, are dependent on the information provided by the insiders but should not be expected to give them the benefit of the doubt (Jensen, 1986; Fama, 1980). Thus, until the project is realized, and the envisioned gains come to fruition, the project is subject to all kinds of noise and uncertainties, which can stem from the inherent penalty of communication or from external sources that exacerbate this problem, all adding to the different in the risk perceptions of the different parties involved.

Besides that, in a competitive environment, it is expected that many strategic decisions will be time-sensitive, demanding flexibility and swift action. For communication, it means that more novel and relevant information may appear, generating new gaps of knowledge and thus the need of even further communication. Therefore, if the parties diverged in the first place because of imbalances regarding knowledge, alertness, or other ingredients, the amount of time and effort necessary to bridge this gap may impose an exceedingly high cost on communication. Moreover, in situations where more communicating parties must be involved—especially external parties with even greater imbalances of knowledge (e.g., boards and external committees)—, the problem can become exceedingly challenging. Thus, it is not surprising to find that many firms have chosen either to not justify their choices at all or to offer highly abstract explanations when they were asked to explain their deviance in relation to a corporate governance code (e.g., Seidl, Sanderson, & Roberts, 2013, p. 794).

The difficulty in the communication presented above then poses an interesting challenge to a central axiom of corporate governance, the "comply-or-explain" principle. The "comply-or-explain" principle refers to the idea that companies can either comply with certain established practices or may explain why they do not comply, i.e., why they deviate from the expected behavior (Seidl, Sanderson, & Roberts, 2013). As seen, because of inherent issues in the nature of creativity and of communication, the "explain" part in the comply-or-explain principle may be too costly, often leaving the decision-maker with only two options: either comply (and thus become a rule-taker) or retain the power and discretion to take the actions necessary to capture an opportunity that they have been alerted to, even if it leads to behaviors that might be considered deviant (becoming, then, a non rule-taker). In either case, the inherent problems involving the communication of knowledge generate a "new" penalty, which is not unlike the famous agency loss. While the agency conflict predicts a loss due to inherent discrepancies between principals' and agents' best interests, the communication penalty occurs because of inherent discrepancies between the knowledge of managers and that of their overseers (e.g., the board of directors). Moreover, in the same way that the agency loss can be higher or lower depending on how much the agent abides by what the principal wants, the communication penalty can also be vary depending on the degree of trust of in the manager by the board.

Finally, both the agency loss and the communication penalty generate a cost that prevents the best possible outcome for the firm to occur. Nonetheless, both of them can be mitigated with the implementation of certain strategies. In the next section, we discuss two non-exclusive paths of governance actions that aim to maximize not only immediate value but also maintain the firm's strategic edge in the long term.

2.5.2.
Toward a More Comprehensive Role for Corporate Governance Systems

Given the problems underscored in this paper, it becomes clear that CG measures that only deal with monitoring and incentive alignment cannot appreciate the full spectrum of the complex interplay between managers, capitalists and the market. Therefore, CG actions should be expanded to include measures that entail the possibility of an alliance between managers and capitalists in the common goal of beating the competition and thus allow supernormal economic profits and other benefits to both parties that would be impossible without such cooperation.

Under this approach, it is important to note, principals and agents are not together because there is a presumption of pro-social behavior by the managers (cf. Davis *et al*., 1997). Managers and capitalists are in fact in a "bounded alliance", with a mix of trust and suspicion that can vary cross-sectionally and longitudinally. Very importantly, because this relationship is so precious for the manager (Hermalin & Weisbach, 2017; Holmström, 1999), under some circumstances even a highly self-serving person will behave indistinctively from a pro-organization steward. And because this relationship is also so precious to the capitalist (Schackle, 1970), under some circumstances even a highly rational and utility-maximizing capitalist will tolerate some degree of misbehavior or mismanagement by their agents (the transaction costs of taking action will be higher than the benefits of doing so; see also Simon, 1956; Williamson, 1993).

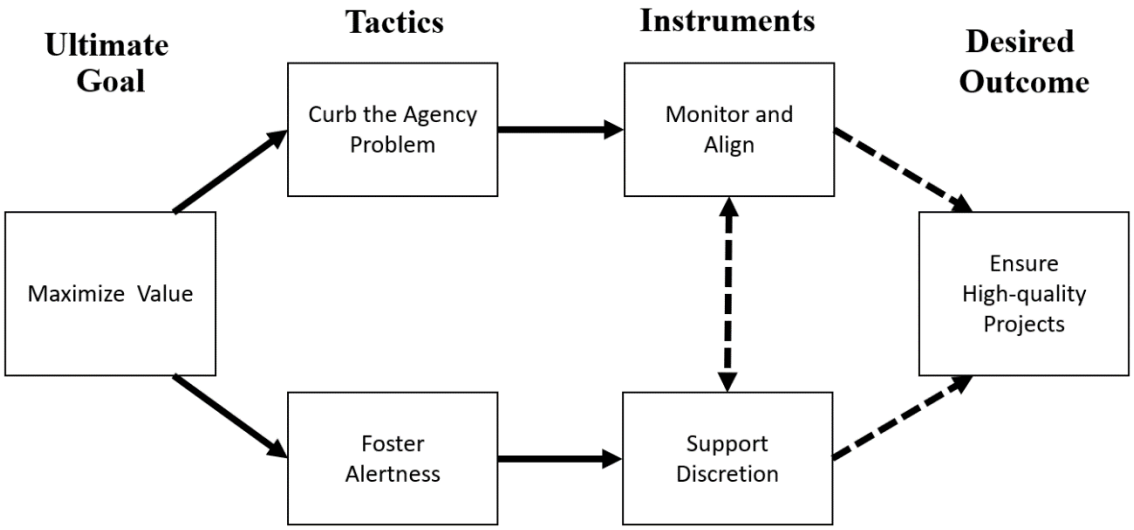
Therefore, the glue that binds managers and capitalists together is that the latter needs the former not only to organize the factors of production effectively—as in Clark's (1899) stationary state—but also, and with increasing relevance, to

deal with uncertainty and pursue the large successes (Shackle, 1970) that are rarely available in fixed claims.

It follows from this reasoning that monitoring and incentive alignment should not be the only preoccupation of boards. They might need to develop their wisdom to know when to intervene, when to step out, and when to act as counsels and encouragers of managers (Adams & Ferreira, 2007; Davis *et al*, 1997). We also highlight that boards will do so because they estimate that, at the margin, this action will yield better benefits for shareholders and not because of a presumption of trust. Thus, it opens the door to a reconciliation between the ideas of the principal-agent alignment, behind stewardship theory, with the principles of neoclassical economics, without the need to resort to a reasoning that deliberately opposes the traditional marginalist approach (e.g., Donaldson & Davis, 1991).

It is then possible to outline a simplified framework for CG measures, composed of two "paths" of governance actions that aim to affect managerial behavior, but which stem from the same objective (maximize firm value) and flow toward the same desirable outcome: guaranteeing the pursuit of high-quality projects. These actions are based on the idea that to maximize firm value, two requirements must be in place: the firm must grow by fostering alertness to opportunities and minimize the possibility of misgovernance hazards, thus CG systems should entail "positive actions", which refer to the provision of discretion for the manager and that will lead to growth and the accrual of supernormal economic profits, and "negative actions", which refer to the monitoring and controlling of managerial actions whose aim is to mitigate the losses caused by agency conflicts. Finally, it is important to note that the intensity and saliency of these actions are not static and should vary to respond to new endogenous and exogenous information.

Figure 1
Simplified Logical Flow of the Integrative Approach

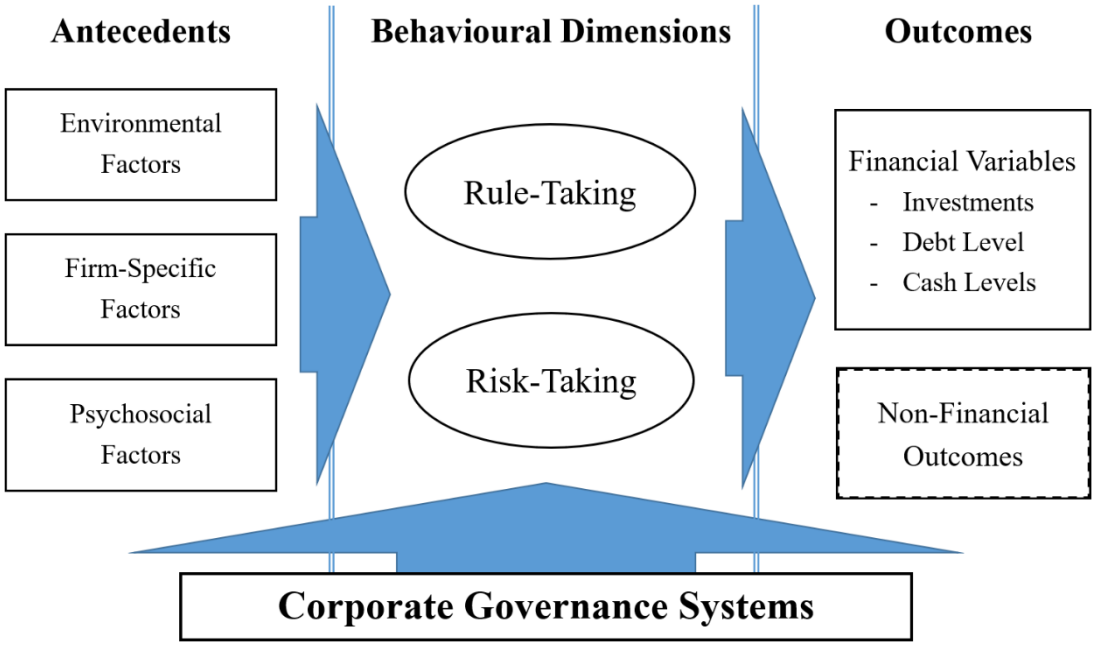


2.6.
A framework for risk taking and rule taking behaviours

In this section, we present a high-level framework for the rule-taking and risk-taking behaviours in the firm. The objective here is to provide an overall organization of the elements discussed in previous sections rather than a comprehensive nomological network with all the possible relationships amongst variables. We pose that this organization can serve as the basis for future studies, including those with theoretical propositions derived from our general framework.

The framework has four major components (Figure 2). At the centre of the diagram are the constructs of rule-taking and risk-taking. Below them are the corporate governance systems. To the left are the antecedents and to the right are the outcomes.

Figure 2
Proposed framework for rule-taking and risk-taking behaviours.



2.6.1.
Corporate Governance Systems

Corporate governance systems are a key component of the framework and permeate all of its aspects. They major influence occurs as antecedents of our behavioural dimensions. Regarding rule-taking, CG systems are in fact an integrative part of the construct since especially for its measurement it will depend on the CG configurations like ownership structure and the presence/absence of monitoring and control mechanisms. Regarding risk-taking, CG systems can be either amicable or hostile to creative venturing, acting as an important antecedent of risk-taking behaviour.

Besides their influence on the behavioural dimensions, CG systems are informed and updated by variables in all other categories. For instance, the degree of independence of the board can not only affect the behavioural dimensions of rule-taking and risk-taking but also be affected by the psychosocial characteristics of the CEO and the board members. Firm outcomes may also affect CG systems. For instance, poor stock performance has been associated with a great appointment of outsiders for the board of directors (Kaplan & Minton, 1994). Thus, although depicted in a simplified fashion in our framework, the relationships among the components are in fact dynamic and amenable to

feedback effects, such as in the example of a firm that begins to demonstrate poor performance, thereby affecting their CG choices, which in turn have already been demonstrated to influence the behavioural dimensions of rule-taking and risk-taking.

2.6.2.
Antecedents

We recognize three categories of antecedents in our framework: environmental factors, firm-specific factors, and psychosocial factors.

***Environmental variables*.** They refer to important factors of influence that are extraneous to the firm. It includes: (i) supranational institutions; i.e., the "rules of the game" (North, 1991), which involves actors such as the media, NGOs and others that can have cross-national impact; (ii) national institutions, such as the law, regulations, the political institutions, and the "variety of capitalism" adopted by the countries in which the firm does business (Hall, 2001); (iii) local institutions, such as local regulations, unions, the community and other stakeholders that may be affected by the business done by the firm (Andres *et al*., 2010); (iv) the market for managerial talent (see Hermalin & Weisback, 2017; Fama, 1980); and (v) the task environment, which refers to factors that exist in the domain in which the organization operates (Wangrow, Schepker & Barker; 2015; Hambrick & Finkelstein, 1987). An example of environmental variable refers to the degree of stability of a market or industry. For instance, markets with a more stable environment and set of rules may make *ex-ante* contracting easier, which in turn diminishes the range of residual actions left to managers, leading to less necessity for risk-taking (see also Finkelstein & Peteraf, 2007; Hambrick & Finkelstein, 1987; Wangrow, Schepker & Barker, 2015). Another important environmental variable is the size of the managerial "talent pool" available for the firm. A "fit" manager is a very specific type of asset because that is "produced" through a series of investments in domain-specific knowledge regarding industry expertise and expertise in conducting a particular kind of business. These resources are valuable, rare, imperfectly substitutable, and may have a slow refreshment rate (see also Ambrosini & Bowman, 2009; Dierickx & Cool, 1989; Penrose, 1959). This grants managers with more bargaining power which in turn they can utilize to build a low rule-taking firm environment. Finally, another

possibility of environmental variables involves the existence of extraneous growth opportunities that an alert manager can seize in order to generate gains for the firm.

Firm-specific factors. They refer to factors of influence that are related with the characteristics and the policies of the firm. They include, for instance, firm age, amount of institutional ownership, the historical intensity of research and development expenditures, and the level of tangible assets and capital expenditures (Gillan *et al.*, 2011). Some especially important firm factors have been called "inertial forces" in previous research (Wangrow *et al*. 2015; Burgelman, 2002; Kelly & Amburgey, 1991). Like in physics, organizational inertia starts with a successful movement initiated in the past, which now offers resistance to change. In the institutionalist approach, when history matters and what has occurred in the past tends to persist because of resistance to change, they often utilize the concept of path dependencies (Teece, Pisano & Shuen 1997). Relatedly, a similar situation may also occur due to a history of strategic orientation (Boyd & Salamin, 2001). All these factors can contribute to an environment more or less conducive to rule-taking and risk-taking. In addition, it is possible to have more dynamic aspects as firm-specific antecedents. For instance, slack resource availability, i.e., the extent to which organizational resources are uncommitted, can offer an opportunity for the firm leader to engage in more risk-taking (Hughes *et al*., 2015). Alternatively, it may be interpreted as sub-optimal investing behaviour and can in fact invite more scrutiny from the board, increasing the level of rule-taking.

Psychosocial factors. They refer to the individual differences regarding a person's temperament, personality, and sociability. In differential psychology, temperament refers to neurochemically-based individual differences in behaviour regulation that are highly consistent throughout a person's life (Trofimova *et al*., 2018). Personality refers rather stable traits, values and worldviews that also influence individual behaviour, but which are largely affected by the socio-cultural context (Bandura, & Walters, 1963; Trofimova *et al*., 2018). Sociability-related variables include social identity; that is, the portion of an individual's self-concept derived from perceived membership in a relevant social group (Turner & Oakes, 1986; Tajfel, 1974). A major way that psychosocial variables can influence the behavioural dimensions in our framework is by directly influencing

or driving managerial actions. For instance, a manager who possesses a great need to self-identify as "innovative" might go to great lengths to make sure that they are perceived this way, which for instance can increase their risk-taking. Likewise, not only the psychosocial profile of managers but also of the board members (e.g., the chairperson of the board) may be influential. For example, a chairperson with greater neuroticism and less tolerance for novelty may influence the board toward more managerial rule-taking. Other psychosocial variables suggested by Child (1997) as having an important impact on managerial behaviour include tolerance for ambiguity, locus of control, and the ability to deal with cognitive complexity. Finally, although some psychosocial variables (e.g., temperament and personality) can be assessed in a very straightforward manner via psychometric measures, it is valid to note that there are also several challenges involved, such as the risk of selection bias, social desirability bias, cognitive biases, and the respondents' manipulation of the signals they send for several reasons (Hermalin & Weisbach, 2017).

2.6.3.
Outcomes

The consequents of the behavioural dimensions of rule-taking and risk-taking fall under the category of outcomes. Our constructs can be particularly relevant to explain firm behaviour related to financing decisions, including a firm's debt level, its investment policy and the level of cash holdings. Interesting relationships are expected because these outcomes are intimately tied with the wedge of information between the receiving end (firms) and the providing end (creditors) of financing, which also drives the concepts of alertness and the communication penalty discussed in this work. For instance, scholars have posed that in the face of asymmetric information, external providers of finance will require a premium on their funds, which in turn may lead managers to rely less on external funds and more on internal funds, causing an eschewing of debt (Myers & Majluf, 1984). High risk-taking firms, for example, may more amenable to this strategy because the wedge between the costs of internal and external funds may be larger to them. Relatedly, the investment policy can also be affected by the interplay of governance systems deal and managerial alertness. Previous empirical work has shown that investment can be sensitive to cash flow despite the fact that

traditional models of finance predict that investments should occur whenever positive NPV are available, independently from the source of finance (Fazzari, Hubbard & Petersen, 1988). Our behavioural dimensions are expected to affect this outcome. For instance, in high rule-taking firms, this behaviour can be interpreted as a sub-optimal investment decision and can be shunned by the board. Finally, there are also a number of non-financial outcomes that could be affected by rule-taking and risk-taking. At the organizational level, some examples include firm innovativeness, climate, and firm orientation. Besides, some outcomes at the group level are also noteworthy, such as team performance, self-efficacy and potency.

2.7. Concluding remarks

Our purpose in this article was to advance future studies of strategic and general management by examining the interplay of corporate governance systems, creativity and entrepreneurship studies along three major themes.

First, we took a detailed look at the tenets underlying the constitution of the firm and the elements that drive the separation of ownership from control. We highlighted that besides the well-underscored risk of moral hazard, firms also face the risk of value loss due to misgovernance hazard; that is, because of sub-optimal CG measures, the firm can disenfranchise creative projects that would otherwise benefit the firm as a whole. We linked this with a construct called managerial rule-taking. We, then, introduced the idea of the economy as a creativity tournament and that, in an increasingly complex and creativity-driven world, the firm leaders are less and less like Clark's (1899) "manager-coordinator" and more and more like the alert entrepreneur outlined in the works of Kirzner (1997), Shackle (1970) and Schumpeter (1983). We linked with a construct called uncertainty-taking. Finally, we advanced a new typology of projects, articulating the different kinds of projects with the constructs presented in the earlier sections.

We underscored that the firm exists in an often noisy, complex, uncertain and competitive environment where one-size-fits-all strategies are rarely optimal. Therefore, CG systems should reflect the heterogeneity so commonly found in other fields when the environment is also noisy, complex, uncertain and competitive. The firm must then strive to find its optimal balance between their

precautions and their gambling for the large success, gauging their CG systems vis-à-vis the characteristics of the firm itself, the environment, the people involved, and the results it has been accruing. In particular, there might be occasions when in order to maximize firm value, the board of directors must act counterintuitively to the tenets of agency theory, despite the risk for morally hazardous behavior by the agents. And we highlight that it will be rational to do so because it will preserve the firm's long-term capacity to generate value. Thereby, when creativity is a must for survival, boards need to be wiser than ever to gauge the right level of monitoring and oversight not to cross the misgovernance hazard line.

Another important point with implications for research and practice involves the communication penalty. Given that the creative pursuit poses inherent challenging to effective communication, it also problematizes the efficacy of standard corporate governance practices, such as the "comply-or-explain" principle. Although it has been devised as a way to promote heterogeneity—that is, it rejects the view of a "one size fits all" governance policy by allowing deviation from the standard and creating a "market sanction" rather than a legal one—, the approach is still based on the premise that effective communication will occur. An indicative that "comply-or-explain" principle can be problematic in practice is that many firms, despite the theoretical amicability of the approach, have chosen either not to justify their deviant choices at all, or they offered principled-based and highly abstract explanations (Seidl, Sanderson, & Roberts, 2013). Therefore, it pays to examine constructs like rule-taking and uncertainty-taking which might shed light on more fundamental reasons for a firm to undertake such behaviors, especially when they are deviant, surprising, or even puzzling.

Accordingly, a relevant contribution for future studies involves the utilization of the constructs suggested in this work to look for new insights on the behavior of the firms. For example, a promising area of research would be the investigation of famous financial "puzzles", such as the low-leverage puzzle (Strebulaev & Yang, 2013), excessive cash holdings (Opler *et al.* 1999), and the phenomenon of investment-cash flow sensitivity (Fazzari, Hubbard & Petersen, 1988), by utilizing the constructs of rule-taking and uncertainty-taking as a nexus for a more integrative approach. Interesting relationships are expected because

these financial outcomes are intimately tied with the wedge of information between the receiving end (firms) and the providing end (creditors) of financing, which also drives the concepts of alertness and the communication penalty discussed in this work. Previous work has shown that in the face of asymmetric information, external providers of finance will require a premium on their funds, which in turn may lead managers to rely less on external funds and more on internal funds than would be expected by traditional finance models (Myers & Majluf, 1984). In firms with a high degree of uncertainty-taking—i.e., which pursue more projects with low initial response strength and higher degree of opacity—this phenomenon may be more common. Conversely, in firms with high rule-taking, this phenomenon may be mitigated because the projects tend to be closer to the replicative spectrum, therefore more immune to the communication penalty. Similar relationships can be investigated regarding the coupling of investments with the availability of internally generated cash flows (Fazzari, Hubbard & Petersen, 1988) and the "excessive" cash holdings found in previous empirical studies (Opler et al. 1999).

Finally, this paper demonstrates that the articulation between theories on corporate governance, entrepreneurship and creativity may lead to interesting and useful insights that can inform research and policy in the field. We encourage more theoretical advances in the direction of joining different research strands to investigate firm behavior, with the expectation that interdisciplinary conversations of this type may help illuminate long-standing issues in the field and may empower researchers to tackle complex and difficult questions in a more comprehensive and integrative way.

2.8.

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3
Paper 2: Risk-Taking, Rule-Taking and The Zero-Leverage Puzzle

Abstract

In this paper, we take a novel theoretical approach to examine the puzzling phenomenon of zero-leverage firms. First, we delve into different theories of economics, management, entrepreneurship and creativity with the aim of arriving at a more integrative perspective regarding a firm's financial behavior. This effort culminates in the development of the construct of managerial rule-taking in the re-examination of the construct of risk-taking, both of which exist at the interface of corporate governance and managerial decision-making, and can be informed by principles stemming from the literature on entrepreneurship, managerial discretion and creativity. We hypothesize that because managerial rule-taking is associated with compliance to the norms dictated by the board and the "best practices" of corporate governance, the firm is less likely to adopt the "anomalous" behavior of zero leverage. Additionally, we hypothesize that because risk-taking is associated with both a wider gap of knowledge and information between insiders and outsiders and a greater wedge between the costs of internal and external financing, firms that are more risk-taking are also more likely to radically eschew debt. Using a cross-sectional probit model with a sample of 11,784 firms, the results mainly corroborate our hypothesis. By taking a novel and multidisciplinary look at elements at the interface of corporate governance, managerial decision-making and corporate financing, we provide a novel line of inquiry that is useful to tackle issues that have puzzled researchers for decades.

*Keywords***:** Zero leverage, Debt financing, Managerial discretion, Risk taking, Rule taking

3.1.
Introduction

"How do firms choose their capital structures?" remain as a central question in the literature on corporate finance (Strebulaev & Yang, 2013; Myers, 1984). Traditional capital structure theories (e.g., Miller & Orr, 1966; Modigliani & Miller, 1963, 1958) predict an optimal balance between a firm's level of debt and equity. Notwithstanding, it is a puzzling stylized fact that some firms carry substantially less debt than expected (Bessler, 2013; Dang, 2013; Myers, 1984). Additionally, a significant number of firms across countries displays an extreme version of this behavior, carrying no debt at all: the zero-leverage firms.

The phenomenon of low- and zero-leverage firms has been studied across different theoretical lenses. Departing from some "grand theories", such as capital structure theories (Modigliani & Miller, 1958), the agency theory (Jansen & Meckling, 1976) and theories based on asymmetries of information (e.g., Leland & Pyle, 1977), scholars have advanced several smaller-range theories with the specific goal of explaining the low-leverage behavior, including the trade-off theory (see Kraus & Litzenberger, 1973; Myers, 1984), the free cash flow theory (Jensen & Meckling, 1976; Jensen, 1986), the pecking order theory (Myers & Majluf, 1984), and the signaling theory (Ross, 1977). Nevertheless, despite the advancements brought by these approaches, this literature has not yet focused much on managerial perspectives beyond the premises of the agency theory. Furthermore, if the zero-leverage behavior is understood as a deviance from the "best" governance practices, the extant literature almost completely ignores the discussion of deviance which occurs at the interface of organizational and creativity theories (e.g., Mainemelis, 2010). Thus, this article focuses on some less trodden "managerial" strands of the literature (cf. Myers, 1984) and on their underexplored interconnections with governance and finance problems to generate novel and useful insights regarding how firms end up with "puzzling" capital structures.

More specifically, we take an interdisciplinary perspective on the problem by integrating three different strands of literature, with a high potential for synergies, but which have rarely been articulated with one another: the managerial discretion literature (e.g., Hambrick & Finkelstein, 1987; Hambrick & Abrahamson, 1995; Wangrow, Schepker & Barker, 2015); the economic theories

of profit and entrepreneurship (Kirzner, 1979; Mises, 1952; Schumpeter, 1936; Knight, 1921); and the theories on creativity and its communication (Simonton, 2016; Csikszentmihalyi, 2014, 1999; Greene, 1984; Mednick, 1962).

Based on this approach, we derive two constructs that lend themselves to empirical investigations and can shed new light on the behavior of zero-leverage firms. The first construct is rule-taking; it refers to the situation in which the desire of compliance to corporate governance codes and best practices leads to the suppression of the firm leaders' latitude of action (i.e., managerial discretion; Hambrick & Finkelstein, 1987). We pose that a high level of rule-taking disenfranchises actions that are seen as deviant or "surprising" (the latter a crucial component of creativity; see Simonton, 2011). Thus, the rule-taking manager will be more likely to follow only strategies that are aligned with the "best practices" of corporate governance. Since these practices are informed by approaches that predict—and recommend—the utilization of some amount of debt (e.g., the trade-off theory and the agency theory) and since the rule-taking manager must be a compliant to those practices, it is expected that firms with a high level of rule-taking will be unlikely to adopt the radically deviant capital structure configuration of zero leverage. Our second construct is firm risk-taking, which is operationalized as deviance (more variability) in expected performance, following the works of Adams, Almeida and Ferreira (2005) and Nakano and Nguyen (2012). We pose that deviance in performance and risk-taking are associated with the behavior of undertaking "greater gambles" (Hoskisson *et al*., 2017) and looking out "for large successes" (Shackle, 1970, p. 100) in an environment of uncertainty and competition. Moreover, we pose that this behavior is associated with high levels in the three parameters of creativity: low initial likelihood, low level of *ex-ante* sightedness, and high *ex-post* utility of a response (Simonton, 2016, 2011). Since the two first parameters (low likelihood, low level of sightedness) entail greater asymmetries of information and knowledge, managers may face difficulties in communicating effectively their estimates to either powerful parties (the board) or to external financers (creditors). Consequently, this may create a large wedge between the costs of internal and external funds, inducing managers to eschew debt not because of agentic motivations, but because the large premium on debt is not conducive to the pursuit of more innovative projects.

By utilizing a cross-sectional probit model with a sample of 11,784 firms from the *ORBIS - Bureau Van Dijk* database, the results found lend support for both our hypotheses. This paper, then, offers a quite novel contribution by examining how a particularly puzzling instance of financing behavior can be partially explained by variables that exist at the interface of the literatures on corporate governance, managerial discretion, entrepreneurship, and creativity and its communication.

3.2.
Literature review and hypotheses development

3.2.1.
Zero-Leverage Studies

In one of the first empirical papers studying the phenomenon, Agrawal and Nagarajan (1990) compared the financial, managerial, and ownership characteristics of zero-leverage firms with those of a control sample of levered firms. They found that zero-leverage firms exhibit greater equity ownership by top managers, more extensive family involvement and greater liquidity positions. The authors suggested that the zero-leverage found on these types of firms corroborates the agency theory hypothesis. That is, in firms in which ownership is more distributed and more separated from control, owners should encourage the use of debt because it reduces the resources that could be captured by managers for perquisites or sub-optimal investments (Jensen & Meckling, 1976; Jensen, 1986). However, the Agrawal and Nagarajan's (1990) interpretation that managerial entrenchment drives the zero-leverage behavior has been the target of many important challenges in the last years.

Several recent studies on zero leverage have in common the rejection that the agency-theoretic approach is sufficient to explain the zero-leverage phenomenon (see Devos *et al.*, 2012; Caban, 2018). That is, a firm can be underleveraged not due to managerial misbehavior but due to other reasons, mainly concerning either "financial constraints" or the desire to keep a "reserve borrowing capacity". The financial constraints explanation asserts that low-leveraged firms would prefer to carry more debt, but they are unable to do so because they face restrictions in the debt market owing to the firms' low debt

capacity or to unfavorable macroeconomic factors, such as a wider term structure of interest rates or a low or negative growth in their countries of operation (Dang, 2013; Huang, Li & Gao, 2017). Supporting this hypothesis, Devos *et al*. (2012) and Bessler *et al* (2013) compared firms worldwide regarding their debt level and concluded that most zero-leverage firms are in fact constrained by their debt capacity and only a small number of firms deliberately seek a zero-leverage strategy. The reserve borrowing capacity argument asserts that firms deliberately—and strategically—seek to eschew debt so as to maintain its financial flexibility and take advantage of growth opportunities that may be waiting to be discovered or need more maturation time (see also Bessler *et al*., 2013; Dang, 2013; Strebulaev & Yang; 2013; Huang, Li & Gao, 2017; Caban, 2018).

All these explanations have in common the idea that debt-eschewing is not due to risk-aversion or the desire for less managerial control, as purported by the agency theory. Instead, firms can utilize this strategy and a means to maximize value, being consonant with the best interests of both managers and owners. Nevertheless, to the best of our knowledge no previous studies have investigated this phenomenon by looking at the interfaces among financing decisions and governance structures bringing insights from the literature strands on entrepreneurship and creativity to shed new light on this financial "puzzle".

3.2.2.
The Interplay of Strategic Decisions, Creativity, Deviance and the Financing Behavior of Firms

The CEO bears the responsibility of determining the firm's long-term goals and objectives and implementing corresponding courses of action, which includes making strategic decisions for the firm, implementing structural changes, determining the environmental domain in which to compete, altering performance standards, and undertaking or forgoing projects (Chandler, 1962; Child, 1972; Wangrow, Schepker & Barker, 2015). In an environment of uncertainty and competition, the firm leader has the job of both responding to and being a vector for the "creativity of the market" (Makowski & Ostroy, 2001). By dealing with uncertainty, entertaining risky projects and exploiting the unknown (Shackle, 1970), the top manager's role resembles more and more that of the change-makers

and inducers of novelties in the market, the entrepreneurs (Baumol, 1996; Schumpeter, 1983; Kirzner, 1973), and they become less and less like Clark's (1902) "manager-coordinator", whose job is centered on the oversight of the ongoing efficiency of the firm. In this scenario, a deeper examination on the processes that underlie the creativity of not only the market but also the managers may shed new light on various matters of great importance in the management, governance and finance literature and may open new avenues of research for a variety of topics, including the "puzzling" behavior of the zero-leverage firms.

Interestingly, the processes underlying the generation of novelties appear to have common fundamental components across all domains. Simonton (2016) poses that a creative response is composed of three independent and multiplicative parameters. The first parameter refers to the response's initial probability; that is, the likelihood of a response. In other words, common and obvious responses receive a low score in this parameter. In the management perspective, utilizing commonly adopted market practices (even those regarded as best practices), although potentially useful, reflects little or no creativity. The second parameter refers to the utility aspect. The more useful, valuable, appropriate, meaningful, adaptive, correct or valid the response is, the greater the value of this parameter, and the greater its final creativity. Since the parameters multiple each other, it means that a creative response must be both "unlikely" and "useful". Thus, it does not suffice to generate a project that is novel, it must also generate (financial) value to be deemed as creative. Finally, the third parameter refers to the degree of sightedness, or how much prior knowledge regarding the response's final or actual utility one can access. That is, the greater the ambiguity between the means-ends relationship (cf. Kirzner, 1973; Hambrick & Abrahamson, 1995), the higher the value of this parameter and the greater its contribution to a response's creativity. This third parameter has remarkable implications for the discussion regarding risk and uncertainty and how the communication of value estimates can become problematic, potentially leading to "puzzling" outcomes.

The lack of prior knowledge that underlies creative behavior is intimately tied with Knight's (1921) concept of uncertainty. Knight differentiates between risks—which are amenable to calculation based on known probability distributions and, in many cases, can be insurable—and true uncertainty, in which *a priori* methods of calculation are inapplicable. For instance, when there is true

uncertainty involved and a finance specialist uses a formal method (e.g., value at risk, decision trees, real options approach) to calculate the value of a project, its net present value (NPV) will be reflecting a series of assumptions of the modeler and will be contingent on the quality and availability of information at the time of the estimate. Thereby, although these methods provide some formalism, they are never actually taming uncertainty into something amenable to calculation (Knight, 1921). It should be highlighted, however, that the formalism and the reduction of complexity into a single number (e.g., the NPV) can be a strong asset in what regards communication needs (e.g., between the top manager and potential external financers, or the board of directors). On the other hand, in creative projects, where (i) prior knowledge of results is generally low (Simonton, 2016); (ii) knowledge is unevenly distributed (Hayek, 1945); (iii) parties display different degrees of alertness (Kirzner, 1973); (iv) the estimates are not rid from uncertainty (Knight, 1921); (v) and the estimates are highly informed by subjective creativity processes of preparation, incubation and insight (Kozbelt, Beghetto, & Runco, 2010; Wallas, 1926), this apparent simplicity may be misleading.

In creative projects, different parties are much more likely to arrive at different and potentially irreconcilable valuations for the same project since each party departs from significantly different initial sets of assumptions, knowledge and information. Although communication might be a tool to remedy this problem, there are a number of challenges that hamper its effectiveness. Communication theories emphasize the existence of several stages to craft a message that activates the "correct" schemas and associative networks in the recipient's mind, and, in each stage, there is the possibility of disruption in the process because of noise. Moreover, the effectiveness of the process is contingent on the compatibility of the parties' schemas, scripts, associative networks, procedural records and processing capacity (Greene, 2013, 1984). Consequently, an initial unevenness in the distribution of knowledge, as outlined by Hayek (1945), and the differences in ability to "see" an opportunity, as outlined in the concept of alertness (Kirzner, 1973), bring along a substantial challenge for effective communication.

Besides the inherent problem of communication, in a competitive environment, several relevant situations will be time-sensitive, requiring fast processing and fast decision-making. For instance, during the process of

communication of a complex idea, novel and relevant information may appear, generating new gaps of knowledge and thus the need of even further communication. Thus, if the parties diverged in first place because of imbalances regarding knowledge, alertness to information, or other ingredients, the amount of time and effort necessary to bridge this gap may render effective communication too costly. Moreover, in situations where more communicating parties must be involved (e.g. boards and external committees), the problem can become exceedingly challenging. Thus, it is not surprising to find that in situations where there was an expectation of communication of the reasons for "deviant behavior" in a corporate governance setting, many firms chose either not to justify their choices at all, or they offered principled-based and highly abstract explanations (e.g., Seidl, Sanderson, & Roberts, 2013, p. 794).

The difficulty in the communication presented above then poses an interesting challenge to a central axiom of corporate governance, the "comply-or-explain" principle. The "comply-or-explain" principle refers the idea that companies can either comply with certain established practices or may explain why they do not comply, i.e., why they deviate from the expected behavior (Seidl, Sanderson, & Roberts, 2013). As seen, because of inherent issues in the nature of creativity and of communication, the "explain" part in the comply-or-explain principle may be too costly, often leaving the decision-maker with two mutually exclusive options: either comply to the commonly accepted and easy-to-communicate practices (become a rule-taker), or exercise the power and discretion to take the actions necessary to capture an opportunity, even if it involves behaviors that might be considered "abnormal" (become a non rule-taker).

3.2.3.
Rule-taking: High board power and low managerial discretion

Some economists argue that the environment of business is permeated by a constant influx of *novelties* (Georgescu-Roegen, 1993). This means that the players of the market are obliged to constantly revise their extant models and rearrange their plans and tactics to incorporate new and relevant information (Schumpeter, 1983; see also Kirzner, 1997; Makowski & Ostroy, 2001). In a similar view, Oliver Hart and colleagues propose that a key element to understand firm behavior is the impossibility to prepare *ex-ante* to all possible events and

outcomes via comprehensive contracts (Hart, 1996; Hart & Moore, 1990; Grossman & Hart, 1986). Thereby, since a firm must deal with contingencies that cannot be resolved via *ex-ante* mechanisms or *ex-ante* contracts, it will need a person endowed with some degree of discretion to make decisions and navigate the firms across all the possible paths not covered by these contracts.

Despite the importance of managerial discretion for steering the firm successfully in changing conditions, this is counterbalanced with the need for checks and balances on managerial behavior, as outlined by agency-theoretic approaches. Thus, it poses a crucial dilemma for corporate governance. On the one hand, because a firm is navigating in a quickly changing in an often-uncertain environment, the top manager is expected to enjoy some discretion to take calculated risks, and eventually carry out projects that are both novel and valuable (the creativity issue). On the other hand, because managers can abuse their power for self-serving purposes, hurting firm value, it is "obviously important" (Hart, 1995, p. 681) to exist checks and balances on managerial behavior (the moral hazard issue). One way to solve the dilemma is via managerial rule-taking; i.e., when preoccupation with the latter problem takes precedence over the former and the preferred governance structure is to restrain the managerial latitude of action with the aim of curbing the possibility of expropriation of firm value.

The institutionalization of managerial rule-taking will be, then, via governance structures in which more power is retained by the board and less power is distributed to the CEO. This reduction of power in turn affects the extent to which the top manager can take active roles in exercising independent and substantial sovereignty in pursuing complex problems with uncertain outcomes (Yan, Chong, & Mak, 2010).

In addition, as posed by the managerial discretion literature, an important source of rule-taking is the board's understanding that there is relatively little ambiguity in means-ends relationships, and therefore "only a narrow range of options holds any plausibility in the eyes of powerful parties" (Hambrick & Abrahamson, 1995, p. 1429; see also, Thompson, 1967; Hambrick & Finkelstein, 1987; Hambrick, 2007). Besides the judgment of little means-ends ambiguity, which approximates the role of the CEO to that of a manager-coordinator (Clark, 1902), high rule-taking may also be expected in situations in which mistrust trumps the need for creativity. That is, because owners (and the board) fear the

loss of firm value due to managerial self-serving behavior, they will establish a strict set of governance controls, aiming at curbing such misbehavior and preventing the loss of value due to the agency conflict (Jensen & Meckling, 1976).

However, high rule-taking organizations may find another way to lose value—and eventually be driven out of a competitive market—by disenfranchising creative projects that would otherwise keep the firm competitive (Schumpeter, 1936; Baumol, 1996). For instance, in a high rule-taking environment, the creative "intrepidness"—or being out for Shackle's large success—can be confounded with sheer deviance or misbehavior, and can be discouraged, curbed or disincentivized by more typical CG policies that are hostile to non-typicality or the temporary opacity that exists in the period between the birth of a creative project and its final delivery of value. Additionally, institutionalized rule-taking may also permeate the firm's culture, making some behaviors associated with the pursuit of creativity even less likely in the organization. In sum, in high rule-taking environments, the actions left for managers will be those that offer more security, are easier to communicate, and are clearly in line with the preferred policies of powerful parties (e.g., the board of directors), going back to Hambrick and Abrahamson's (1995) point of firms in which only a narrow range of options seem plausible in the eyes of their ultimate controllers.

3.2.4.
Rule-taking and Leverage Decisions

Since managerial rule-taking by definition involves compliance to the rules dictated by the board, the actions undertaken by those firms are unlikely to deviate from the "best practices" of corporate governance. In the case of leverage decisions, it is quite unequivocal that the preferred financial behavior of corporate governance activists is a structure with debt, since in their eyes debt is expected to (i) maximize firm value and act as a tax shield (Graham, 2000; Mayers, 1984; Kraus & Litzenberger, 1973; Modigliani & Miller, 1963, 1958); (ii) offer shareholder protection, making managerial exploitative actions more difficult (Jensen, 1986; Fama, 1980; Jensen & Meckling, 1976); and (iii) send a positive signal to the market (Ross, 1977). Thereby, given that the rule-taking manager is a

follower of the policies of shareholders, the board of the directors and corporate governance activists, and given that for the above reasons they should prefer a capital structure with some amount of debt, it is hypothesized that:

H1: Rule-taking is negatively associated with the likelihood of zero leverage.

3.2.5. Risk-taking: Being out for the large success

The agency theory (Jensen & Meckling, 1976; Jensen, 1986) purports that managers will tend to be risk averse because they, unlike shareholders, have most of their capital in the form of undiversifiable human capital, which is often tied to the firm. Therefore, an eventual bankruptcy of the firm would have a more dramatic effect on managers compared to shareholders and, thus, it would make economic sense to be risk-averse (see also Hoskisson, Chirico, Zyung & Gambeta, 2017; Guay, 1999; Smith and Stulz, 1985; Van Wesep & Wang, 2014). Based on these assumptions, agency theory assumes that top managers should be compensated or incentivized so they can abandon their "natural" risk-aversion and adopt optimal risk-taking behavior (e.g., Smith and Stulz, 1985; Guay, 1999). However, empirical evidence on the effect of equity-based incentives on managerial risk-taking behavior has been inconclusive (Low, 2009).

A strikingly different view of risk-taking is presented by both the theories of entrepreneurship and creativity. The entrepreneurship literature deals with a non-serene market (Georgescu-Roegen, 1993) where a state of equilibrium is never maintained and would not last long enough for a project to be carried out without any disrupting novelties. This aggregate "creativity of the market" (Makowski & Ostroy, 2001) is what induces uncertainty in the environment and frustrates the implementation of Hart's comprehensive contracting (see also Finkelstein & Peteraf, 2007; Tirole, 1988; Williamson, 1975). In other words, the entrepreneurial theory pictures the economy as a big "creativity tournament". Every firm is potentially a vector of creativity—generating disruptions that will affect other firms—but also a possible "victim" of the creativity of others, having their plans and projects disrupted by innovations generated elsewhere.

Accordingly, the role of the top manager of the firm must be to deal with an uncertain environment, being alert to the possible disruptions but also to opportunities of profit "which hitherto had not been suspected of existing at all"

(Kirzner, 2009, p. 151). In the entrepreneurship view, this is the only way to guarantee the long-term competitive advantage of the firm (see also Hoskisson, Chirico, Zyung & Gambeta, 2017). Another remarkable point is the convergence between the depictions of the entrepreneurial leader in the entrepreneurship literature and of creative behavior in the creativity literature and their implications to risk-taking. When Kirzner describes opportunities that had not been suspected of existing at all, or that might be hidden "around the corner" (Kirzner, 2009, P. 151), he is depicting what Simonton described in the field of creativity as a response with both low initial probability and low prior knowledge; in other words, both of them are underscoring the blindness and the gamble-like nature of the creative-entrepreneurial process.

Lack of prior knowledge regarding results is a fundamental element of creativity and it is linked with the gambling-like nature of generating something that is novel and effective in any field of endeavor (Simonton, 2011; Csikszentmihalyi, 1999). In the business setting, the concept of field can be compared to that of an industry; i.e., a group of firms offering products or services that are close substitutes for each other, and that are aiming at addressing similar customers' needs (Porter, 1989). In a given industry, a member (firm) can either utilize knowledge, methods, techniques, etc. that are of common knowledge among the field members, or it can strive to generate something new and surprising (cf. Simonton, 2011; Csikszentmihalyi, 1999). However, because of lack of prior knowledge regarding results, a firm must blindly generate several ideas until one of them succeeds in meeting both criteria of novelty and usefulness. This is where the parameters of creativity interact with the competition of the market. Ideas with a higher degree of probability (i.e., ideas that are easily available and require little incubation) and lower degree of blindness (i.e., ideas whose ultimate usefulness is relatively easy to assess) will probably have already been harnessed in a competitive environment, with many members actively striving for creativity. In other words, in a competitive industry, the "basic good ideas" will be quickly captured, leaving only the ideas which are unlikely, or which incorporate a lot of uncertainty, available. Therefore, given the nature of creativity and the competitiveness of the market, the entrepreneurial manager (or any firm leader seeking creativity) is left with no choice but to "gamble" with uncertainty.

The entrepreneurial manager, however, can count with two important aids in this pursuit: their previous knowledge and their alertness. They may provide the entrepreneurial manager with a better sense for growth opportunities that are not as easily accessible to others—therefore tilting in his or her favor Simonton's (2011) first parameter of creativity; i.e., the initial probability of an idea. Still, it is important to highlight that this manager is never completely free from the uncertainty. Consequently, a good deal of errors may be expected, which can be manifested as greater variability in performance. After all, if there is a degree of blindness involved, the path for the "large success" (Shackle, 1970) also unlocks the possibility of large failures.

Equally important, the risk-taking manager also faces the communication problem outlined in the previous sections. Even though an alert manager might be capable of judging the future prices of the products more correctly than other people (Mises, 1952, p. 190), see a "hidden opportunity" (Kirzner, 1973), or have a perception that is in fact better than that of the market (Keynes, 1936), the manager might be in a loss when they have to communicate the drivers of a strategic decision they might have been alert to (while others have not since they lacked the necessary sets of knowledge, schemas, associative networks, procedural records, or processing capacity to enable that given alertness; cf. Hayek, 1945; Greene, 2013, 1984). Therefore, it should be expected that in order to capture those profit opportunities, the entrepreneurial manager might have to go beyond the mainstream perception of the market and even opt for financing behaviors that have been regarded as "puzzling".

3.2.6.
Risk-taking and Leverage Decisions

In the previous section, we utilized creativity theory to underscore that non-typicality (or ab-normality) is in fact at the heart of innovative behavior. This behavior is, nevertheless, necessarily accompanied by a greater wedge of information between the alert manager and outsiders (e.g. the board), which in turn generate the "communication penalty" which can make innovative behaviors costly especially in an environment of excessive constraints, monitoring, scrutiny and penalties for deviance (misgovernance hazard). Thus, this situation leads to a crucial governance and strategy dilemma. On the one hand, because more creative

(less typical) projects necessarily involve a greater wedge of knowledge between insiders and outsiders—driven by the existence of several complex, ambiguous and "moving" bits of information, which are opaque to outsiders—and because this wedge is not easily bridged with communication, the undertaking of these more creative projects are crucially dependent on the distribution of discretion and on wise governance mechanisms that can provide oversight without constraining the latitude of action of those equipped with superior information.

We theorize that the risk-taking firms are those in which their leaders are gambling more with uncertainty than the usual. This behavior, not surprisingly, is expected to have an important bearing on the financial results of the firm and on choices regarding the firm's capital structure. The literature has explored at least two channels through which high-risk taking can affect a firm's leverage choices. Notably, both channels rely on the intrepidness of managers—that is, their ability to deal with the new and unknow, and become alert to opportunities that are beyond the radar of other players in the market.

The first channel refers to risk-taking driven by the managerial ambition to climb the ladder in the job market with the goal to assume the position of the CEO in the leading firm in their industries. This has been refereed in the literature as "industry tournament incentives" (Coles, Li, & Wang, 2018), a phenomenon that has been associated with higher levels of risk-taking across different studies (Lonare, Nart, & Kong, 2019; Coles et al. 2018; Kubick and Lockhart, 2016). The rationale is that the desirable characteristics of being in the CEO position at a higher-ranked company in the same or related industries will provide incentives to CEOs at their own companies. Thus, if the CEO can deliver outstanding performance in their own firm, this will signal their superior capacity to the job-market, which in turn will increase the chances of climbing upwards in the tournament and therefore attaining higher compensation, enhanced span of control, higher visibility, and status (Coles *et al*., 2018). In sum, because this tournament provides option-like and convex payoffs, CEOs can be induced to undertake riskier corporate policies aiming to increase their odds of winning (Lonare, Nart, & Kong, 2019; Kini & Williams, 2012). Finally, research has found that this kind of risk-taking leads to higher cost of debt because the pursuit of more aggressive policies driven by option-like, convex payoffs may be viewed negatively by the financing market, which in turn will demand a premium on their

funds making debt more costly (Kubick, Lockhart and Mauer, 2018; see also Myers & Majluf, 1984).

The second channel refers to the alert manager pursuing creative projects for the firm while facing constraints regarding the communication of their innovative ideas to outsiders. That is, when the CEO wants to perform above and beyond the market, they need to seek responses that are at least not obvious, or not readily available, and which will ultimately work, generating benefits to both managers and shareholders. This kind of risk-taking "principled", in opposition to the expropriative investment behaviors depicted in AT. Thus, it seeks growth beyond expectations based on the opportunities to which a firm leader has been alerted—and the markets and competitors have not, therefore allowing for supernormal profits. This investing behavior, however principled, comes with a caveat. The opportunity is only clear to the alert manager and opaque to outsiders, which leads to a wide wedge of information between those parties. Thus, when the execution of these alertness-based projects depend on the goodwill of powerful external parties, an impasse can be created due to the unevenness in the distribution of knowledge and information. Because creditors are in the less informed end of the transaction and because they have no good reason to give the benefit of doubt to managers, they will deal with this increased opacity and risk-taking by demanding larger premiums for their external financing. Finally, if it comes to a point that debt becomes too costly to fund alertness-based growth opportunities, the manager may see the eschewing debt as a strategic measure and, in contrast with the predictions of agency theory, it would be a principled decision, with the best interests of the firm in mind.

This line of thought is consonant with previous research that have shown a triple association among more ambiguity in the information environment, more risk-taking by the firm, and more investment in long-term, strategic projects (such as research and development projects; Nguyen, Phan, & Sun, 2018; Lin, Liu, & Manso, 2016). This is also consonant with previous arguments regarding the connection between risk-taking and "principled" investing, as well as prior discussion on the role of creativity and innovativeness in environments of uncertainty and competitiveness (García-Granero, Llopis, Fernández-Mesa & Alegre, 2015; Latham & Braun, 2009; Makri & Scandura, 2010; Baumol, 1996).

In sum, the risk-taking behaviors discussed above entail a significant deal of managerial intrepidness, which can be interpreted as incursions in less charted territories, where there is a greater level of uncertainty and a great distance between the managerial valuation of a project and that of external parts. Because this behavior involves a wider gap regarding the information and knowledge held by insiders and outsiders, this increased opacity and risk-taking can be met with larger premiums for external financing. Therefore, if external funds (borrowing) becomes increasingly expensive in the eyes of the management, firms that are adopting such risk-taking policies may be more likely to forego the use of debt and rely more—or only—on internal funds. Due to this reasoning, it is hypothesized that:

H2: Risk-taking is positively associated with the likelihood of zero leverage.

3.3. Empirical Design

3.3.1. Data source, sample selection and data treatment

Our sample was collected from *ORBIS - Bureau Van Dijk*. This database possesses accounting, financial, ownership and governance data from more than 200 million companies, and a significant amount of them are of private capital. Thus, this database was especially appropriate for our objective to study the interplay of zero leverage, governance and other financial variables across private and publicly traded companies.

Our sample included firms from all countries with at least 50 observations in the database. We excluded firms belonging to the financial sector and firms with negative or missing total assets and gross sales, as well as firms with negative or missing capital stock (net property, plant and equipment). Furthermore, to alleviate the effect of extreme observations, we winsorize the data at 1% in both tails. For missing values, we performed a listwise deletion, with 10,845 observations deleted due to missing values in the rule-taking variable and 53,890 deleted due to missing values in the risk-taking variable. The final sample

comprises 11,784 firms from 37 countries. Because ORBIS only contains director-level data for the last fiscal year, we study a cross-sectional sample in the year of 2017.

3.3.2.
Variables measurement

To measure zero-leverage firms, we utilize a similar strategy to Strebulaev and Yang (2013). We classify firms as ZL (zero leveraged) if the outstanding amount of both short-term and long-term debt scaled by total assets is zero or very close to zero (we utilize 0.5% as a threshold). For our probit model, we create the variable ZL=1 when this condition is met, otherwise, it receives a value of zero (see also Fischer, Heinkel & Zechner, 1989; Leland, 1994, 1998; Leland & Toft,1996; Goldstein, Ju & Leland, 2001; Ju, Parrino, Poteshman, & Weisbach, 2005; Strebulaev & Yang, 2013).

To measure risk-taking (RISK1), we utilize a similar strategy to Nakano and Nguyen (2012) and Adams *et al*. (2005). That is, risk-taking by is gauged by calculating the firm's absolute deviation from expected performance based on return on assets (ROA). The equation for regression model follows:

$$ROA_i = \gamma_1 + \gamma_2 LNTA_i + \gamma_3\, CAPEX_i + \gamma_4\, DEBT_i + \phi.IND + \psi.COUNTRY + \varepsilon_i \quad (1)$$

Where ROA is return on assets; LNTA is the log of total assets; CAPEX is capital expenditures divided by sales; DEBT is the ratio of total debt to total assets; IND is a vector of industry dummies based on the Fama-French 30 industry classification; COUNTRY is a vector of country dummies; and ε is the error term.

To measure our novel construct, rule-taking, we utilized an aggregation of variables that have been consensually associated in the literature with more control over the managerial latitude of action (Hoskisson, Chirico, Zyung & Gambeta, 2017; Wangrow, Schepker & Barker, 2015; Chen *et al*., 2010; Hambrick, 2007; Finkelstein & Boyd, 1998; Hambrick & Abrahamson, 1995; Hambrick & Finkelstein, 1987). These variables are: (i) the number of board members (LNBS), representing the size of the board and calculated by the natural

logarithm of the number of board members; (ii) the percentage of shares owned by all directors (DIROWN), representing the ownership of the board; (iii) the ownership of the largest shareholder (LSHR), representing the existence of blockholders and the existence of a large concentration of power in one or more shareholders; and (iv) CEO non-duality (NONDUAL), representing a situation in which the CEO does not accumulate the role of chairman of the board and therefore cannot enjoy such unity of power. Thus, our primary proxy of rule-taking (RUL1) is constituted by the summation of these four variables dichotomized at the median. That is, we create a dummy for each component that receives the value of '1' if the variable is above the median; otherwise, it receives a value of '0'. Since the variable NONDUAL is already a dummy variable, it remained unchanged. Thus, the values of RULE1 range from '0' to '4', where a final score of '0' occurs when the values of LNBS, DIROWN and LSHR are all below the median and NONDUAL equals '0'. Conversely, a final score of '4' occurs when all the former variables are above the median and NONDUAL is true.

To add robustness to our estimations, we also included alternative measures to our dependent variable and explanatory variables of interest. For our dependent variable, we include an extra measures for *almost* zero leverage firms, with a threshold of debt at 1% (AZL@1%). For risk-taking, we calculated an alternative measure (RISK2) utilizing Tobin's Q (LNQ) instead ROA in the left-hand side of Equation (1). For rule-taking, we calculated two alternative proxies. RULE2 follows a similar strategy to RULE1, but instead of dichotomizing the three sub-components at the median, we utilized terciles for a more granulated distribution. If the variable was in the bottom tercile, it received a value of '-1'; if the variable was in the middle tercile, it received a value of '0'; and a value of '1' was attributed for variables in the upper tercile. To have a consistent interval, the dichotomous variable NONDUAL received the value of '1' if true and '-1' if not true. Finally, for RULE3, we conducted a factor analysis of the four elements of rule-taking (LNBS; DIROWN; LSHR and NONDUAL) utilizing a varimax rotation. The first factor extracted became the RULE3 variable. This factor had an Eigenvalue of 1.11 and a proportion value of 27.83%, thus representing adequately the distribution of the loadings by each component. The final scoring

coefficients after the regression based on varimax rotated factors were NONDUAL = 0.48; LNBS = 0.40; DIROWN = 0.46; and LSHR = 0.55.

For the purposes of matching and to further verify the robustness of our results, we also classified the firms into sub-samples according to their score (low or high) in risk-taking and rule-taking. Firms with a score in the upper tercile were classified into the 'high score' group whereas firms with a score in the bottom tercile were part of the 'low score' group. By repeating the procedure for our main variables of interest and their alternative proxies, we obtained five dummies representing high score on the target variables (H-RISK1, H-RISK2, H-RULE1, H-RULE2 and H-RULE3, respectively) and another five dummies representing low score on the same variables (L-RISK1, L-RISK2, L-RULE1, L-RULE2 and L-RULE3, respectively). A summary of all variables and their descriptions is found in Table A1.

3.3.3. Empirical Model

To test our hypotheses, we use a probit model in which we regress a series of explanatory variables on our dichotomous dependent variable, which takes the value '1' for zero-leverage firms and '0' for leveraged firms. We also include a series of control variables in our models. For controls regarding accounting and financial variables, we include the Tobin's Q or Market Capitalization to Total Assets (LNQ); Firm Size as measured by the log of the total assets (LNTA); Investment level, as measured by the difference in Net Property, plant and equipment over Total Assets (INV); and free cash flow, as measured by profit plus depreciation over total assets (FCF). All variables are lagged by one time period in the main estimations.

Equation (2) describes the cross-section model utilized in this study. For firm i we estimate the likelihood of this firm being zero leveraged based on a probit model, as follows:

$$Pr(ZL_i = 1) = \beta_1 + \beta_2 RISK_i + \beta_3 RULE_i + \gamma_4 \chi_i + \phi.IND + \psi.COUNTRY + \varepsilon_i \quad (2)$$

where ZL is the dummy variable with a value of ‘1’ representing a zero leveraged firm and RISK and RULE representing our explanatory variable. The controls are represented by χ while IND represents the controls at the industry level and COUNTRY the controls at the country level.

3.4.
Results

3.4.1.
Descriptive Statistics

Table 1 shows the summary statistics for our variables, including the dependent variables (ZL and AZL@1%), the controls (LNQ, LNTA, INV, FCF, TANG, ALTMANZ, and SGA), and our variables of interest along with their alternative versions for robustness (RISK1, RISK2, RISK3 and RISK4; and RULE1, RULE2, RULE3, RULE4, RULE5 and RULE6). About 0.56% of the firms in our sample met our strictest threshold for zero leverage (ZL) counting 1,003 observations. 2,203 were categorized as AZL@1% and 5,557 as AZL@5%. The risk-taking proxies, being composed of absolute values, showed an expected positive skew, and their values ranged from zero to .54, with a standard deviation between .05 and .08. RUL1-3 proxies ranged with between '0' and '7', with their maximum value reflecting the number of second-order elements utilized in the summation of the construct. RULE4, which was extracted through exploratory factor, ranged from -3.39 to 2.89, while RULE5, obtained through confirmatory factor analysis, ranged from -11.79 to 8.76. Finally, RULE6, which was obtained through the summation of the tercile scores, ranged from '-6' to '7'. Other details such as the standard deviations (S.D.), the median (p50) and the 25% and 75% percentiles (p25 and p75, respectively), as well as the number of observations (N) are also shown in Table 1:

Table 1
Summary Statistics

	Min.	p25	Mean	p50	p75	Max.	S.D.	N
ZL	0.00	0.00	0.06	0.00	0.00	1.00	0.23	11784
AZL@1%	0.00	0.00	0.09	0.00	0.00	1.00	0.28	11784
RISK1	0.00	0.02	0.06	0.04	0.08	0.54	0.07	11784
RISK2	0.00	0.02	0.05	0.03	0.06	0.45	0.05	11784
RISK3	0.00	0.02	0.06	0.04	0.08	0.53	0.08	11784
RISK4	0.00	0.02	0.06	0.04	0.07	0.54	0.07	10899
LNQRES	0.00	0.22	0.60	0.47	0.84	3.78	0.51	11784
ROASD	0.00	0.02	0.04	0.03	0.05	0.31	0.04	7732
LNQSD	0.00	0.19	0.35	0.29	0.45	2.58	0.22	7732
RULE1	0.00	3.00	3.44	4.00	4.00	7.00	1.42	11119
RULE2	0.00	3.00	3.46	4.00	4.00	7.00	1.39	11119

RULE3	0.00	3.00	3.42	3.00	4.00	7.00	1.22	11119
RULE4	-3.39	-0.69	0.00	0.21	0.73	2.89	1.00	9945
RULE5	-11.79	-3.68	-0.02	0.65	3.73	8.76	4.25	9945
RULE6	-6.00	1.00	2.47	3.00	4.00	7.00	1.95	8400
LNQ	-3.06	-1.05	-0.44	-0.44	0.19	1.85	0.96	11784
LNTA	7.43	11.33	12.73	12.68	14.14	17.68	2.11	11784
INV	-0.23	-0.01	0.01	-0.00	0.02	0.32	0.07	11784
CF	-0.30	0.03	0.07	0.07	0.11	0.35	0.09	11784

The pair-wise correlation matrix in shown in Table 2. Our main dependent variable (ZL) is moderately correlated with our robustness measures AZL@1% and AZL@5%, with coefficients of 0.76 and 0.35, respectively. ZL has also a significant positive correlation with risk-taking and a negative correlation with the measures of rule-taking, with exception of RUL4 and RULE5, which were obtained through factor analysis. The measures for risk-taking (RISK1-4) are highly correlated with each other, ranging from 0.74 to 0.86. The measures for rule-taking (RULE1-6) are moderately to highly correlated with each other, ranging from 0.35 to 0.90. LNQ, representing market to book value, or Tobin's Q, has a positive correlation with zero leverage measures and with RISK1 while being negatively correlated with the rule-taking measures. LNTA, representing firm size, is negatively correlated with ZL, as well as with all alternative measures of both risk-taking and rule-taking. INV, representing investment, had a negative correlation with RISK1 and a positive correlation with measures of rule-taking, with similar results for free cash flow (FCF) and tangibility (TANG).

Table 2

Pair-wise Correlation Matrix

Panel A. Variables of Interest

	1	2	3	4	5	6	7	8	9	10	11	12	13
ZL	1.00												
AZL@1%	0.76***	1.00											
AZL@5%	0.35***	0.46***	1.00										
RISK1	0.10***	0.11***	0.12***	1.00									
RISK2	0.09***	0.10***	0.13***	0.74***	1.00								
RISK3	0.11***	0.12***	0.15***	0.89***	0.77***	1.00							
RISK4	0.10***	0.12***	0.14***	0.86***	0.75***	0.92***	1.00						
RULE1	-0.01	-0.01	-0.02	0.04**	0.05***	0.05***	0.05***	1.00					
RULE2	-0.02	-0.01	0.00	0.03*	0.04**	0.04***	0.05***	0.84***	1.00				
RULE3	-0.02+	-0.02	-0.01	0.01	0.01	0.02	0.01	0.74***	0.80***	1.00			
RULE4	0.03*	0.04**	0.08***	0.02+	0.02	0.02	0.03*	0.45***	0.64***	0.60***	1.00		
RULE5	0.03*	0.04**	0.09***	0.02+	0.02+	0.02	0.04**	0.13***	0.31***	0.29***	0.80***	1.00	
RULE6	-0.02	-0.01	-0.01	0.01	0.00	0.01	0.02	0.73***	0.81***	0.74***	0.66***	0.27***	1.00

Panel B. Control Variables

	1	2	3	4	5	6	7	8	9	10	11	12
ZL	1.00											
AZL@1%	0.78***	1.00										
AZL@5%	0.39***	0.49***	1.00									
RISK1	0.10***	0.11***	0.12***	1.00								
RULE1	-0.03**	-0.01	-0.01	-0.02*	1.00							
LNQ	0.05***	0.07***	0.16***	0.20***	-0.14***	1.00						
LNTA	-0.20***	-0.23***	-0.33***	-0.19***	-0.06***	-0.04***	1.00					
INV	-0.05***	-0.06***	-0.09***	-0.04***	0.03**	0.08***	0.06***	1.00				
FCF	-0.05***	-0.03***	0.04***	-0.04***	0.03**	0.40***	0.14***	0.19***	1.00			
TANG	-0.20***	-0.24***	-0.38***	-0.12***	0.08***	-0.03**	0.31***	0.30***	0.13***	1.00		
ALTMANZ	0.20***	0.24***	0.34***	0.15***	-0.04***	0.59***	-0.14***	0.04***	0.41***	-0.16***	1.00	
SGA	-0.08***	-0.08***	-0.08***	-0.08***	-0.05***	0.21***	0.22***	0.20***	0.28***	0.11***	0.09***	1.00

*** p<0.001, ** p<0.01, * p<0.05 + p<0.10

3.4.2.
Main Results

We report the estimations of Equation (2) in Table 3. All models obtained a likelihood ratio Wald chi-square of at least 1208.70 with a p-value<0.001, which demonstrates that all models are statistically significant at very stringent levels. Models 1 to 4 show the effect of each alternative measure for risk-taking; that is, RISK1, RISK2, RISK,3 and RISK4, respectively. In consonant with our hypothesis, all risk-taking proxies had a positive and significant relationship with the likelihood of ZL. The results for our controls were also in line with previous literature on zero-leveraged firms (e.g., Caban, 2018; Huang, Li & Gao, 2017; Ghose & Cabra, 2016; Bessler *et al*., 2013; Dang, 2013; Strebulaev & Yang, 2013; Devos *et al*. 2012; Agrawal and Nagarajan, 1990). Additionally, all variables in the base model were significant, showcasing their importance as controls. Particularly, we note that the control variables size (LNTA) has been previously found to be negatively associated with the occurrence of zero leverage (Huang, Li & Gao, 2017; Dang, 2013; Bessler *et al*., 2013; Devos *et al*. 2012).

In Panel A, Model 5, we also observe that the absolute deviation from expected Tobin's Q was also not a significant predictor of ZL (Model 5), and in Models (6-7), we observe that unlike our risk-taking variables, which were measured with absolute deviations from expected performance, the variables measured with the standard deviations of expected performance were not significant predictors of ZL.

In Panel B, Models (8-13) show the results for each Rule-taking proxy. In consonant with our hypothesis, RULE1-3 had a negative and significant relationship with the likelihood of ZL, demonstrating the having a higher rule-taking score diminishes the probability of the firm being zero leveraged (Models 8-10). However, the rule-taking proxies based on factor analysis (RULE4-5) and RULE6, which utilized terciles for the summation of the construct, were not significant in the models. In the next sections, we employ a series of robustness tests and alternative models to further examine the validation of these results.

Table 3

Results of the Probit Models

Panel A. Probit Models with the Different Risk-Taking Explanatory Variables

	Dependent Variable = ZL						
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	0.98**	1.19**	0.81**	0.94**	-0.00	1.05	0.10
	[3.22]	[3.14]	[2.87]	[3.13]	[-0.09]	[1.42]	[0.70]
LNQ	-0.11***	-0.11***	-0.12***	-0.11***	-0.09**	-0.06	-0.05
	[-3.66]	[-3.56]	[-3.72]	[-3.53]	[-2.95]	[-1.36]	[-1.21]
LNTA	-0.16***	-0.16***	-0.16***	-0.17***	-0.16***	-0.15***	-0.15***
	[-9.68]	[-9.61]	[-9.67]	[-9.53]	[-9.86]	[-6.99]	[-7.07]
INV	0.07	0.03	0.06	0.03	0.07	-0.28	-0.32
	[0.16]	[0.06]	[0.14]	[0.06]	[0.16]	[-0.45]	[-0.50]
FCF	-0.43	-0.38	-0.40	-0.39	-0.54+	-1.22**	-1.34***
	[-1.54]	[-1.34]	[-1.41]	[-1.35]	[-1.86]	[-3.12]	[-3.44]
TANG	-1.50***	-1.51***	-1.51***	-1.47***	-1.52***	-1.43***	-1.44***
	[-11.66]	[-11.71]	[-11.71]	[-11.01]	[-11.86]	[-8.23]	[-8.23]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[12.10]	[12.08]	[12.12]	[11.99]	[11.82]	[9.51]	[9.45]
SGA	-0.90***	-0.90***	-0.88***	-0.84***	-0.97***	-0.62	-0.70+
	[-3.81]	[-3.81]	[-3.71]	[-3.41]	[-4.09]	[-1.64]	[-1.85]
Constant	-0.31	-0.28	-0.28	-0.17	-0.12	-0.28	-0.20
	[-0.80]	[-0.73]	[-0.74]	[-0.42]	[-0.32]	[-0.63]	[-0.47]
Observations	10971	10971	10971	10066	10971	7028	7028
Pseudo-R2	0.28	0.28	0.28	0.28	0.28	0.25	0.25
Log-Likelihood	-1777.63	-1778.08	-1778.72	-1661.92	-1783.19	-1040.50	-1041.20

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Probit Models with the Different Rule-Taking Explanatory Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	(8)	(9)	(10)	(11)	(12)	(13)
	-0.07*	-0.06*	-0.05*	-0.03	-0.03	-0.03
	[-2.54]	[-2.46]	[-2.08]	[-0.56]	[-1.12]	[-1.48]
LNQ	-0.10**	-0.10**	-0.10**	-0.11**	-0.11**	-0.12***
	[-3.05]	[-3.08]	[-3.06]	[-2.89]	[-2.85]	[-3.52]
LNTA	-0.17***	-0.17***	-0.17***	-0.16***	-0.16***	-0.16***
	[-10.14]	[-10.11]	[-10.08]	[-8.25]	[-8.17]	[-8.49]
INV	0.08	0.08	0.08	-0.29	-0.29	0.03
	[0.17]	[0.16]	[0.17]	[-0.54]	[-0.55]	[0.06]
FCF	-0.49+	-0.50+	-0.51+	-0.86*	-0.86*	-0.04
	[-1.67]	[-1.69]	[-1.71]	[-2.52]	[-2.53]	[-0.12]
TANG	-1.56***	-1.56***	-1.56***	-1.48***	-1.48***	-1.53***
	[-11.91]	[-11.95]	[-11.96]	[-9.70]	[-9.72]	[-10.93]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.07***	0.07***
	[11.74]	[11.77]	[11.78]	[10.85]	[10.84]	[10.80]
SGA	-0.89***	-0.89***	-0.89***	-1.40***	-1.40***	-0.77**
	[-3.67]	[-3.69]	[-3.69]	[-4.87]	[-4.86]	[-2.93]
Constant	0.21	0.19	0.08	0.34	0.32	-0.29
	[0.53]	[0.48]	[0.22]	[1.13]	[1.07]	[-0.74]
Observations	10448	10448	10448	9132	9132	7929
Pseudo-R2	0.28	0.28	0.28	0.29	0.29	0.28

Log-Likelihood	-1723.46	-1723.65	-1724.31	-1255.68	-1255.30	-1339.76

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

3.4.3.
Results Validation

To check the validity of the main results in Table 3, as well as to verify the robustness of our models and to address the issues of selection bias and endogeneity, we conduct a series of additional investigations in the next sections, which aim to separate the effects of family firms, different legal systems, and the ZL behavior due to financial constraints in our models. After that, we discuss our findings as a whole in the discussion section.

Almost Zero Leverage Firms

Our dependent variable, ZL, aimed to capture stricter zero leveraged firms. However, the literature sometimes extends this concept to almost zero leveraged firms (e.g., Ghoul, 2017; Ghose & Kabra, 2016; Strebulaev & Yang, 2013). We then utilize the variable AZL@1% is used as a dummy for firms with book leverage (the ratio of the sum of current liabilities and long-term debt to total assets) lower than 1%.

The results for AZL@1% were similar to those for strict zero-leverage firms and consonant with both our hypotheses. With AZL@1% as the dependent variable, the constructs representing risk-taking retained its direction and significance, and two proxies of rule-taking (RULE 4 and RULE5), which were not significant in the first model, reached the 10% and 5% significant threshold, respectively.

Table 4

Robustness Tests with Zero-Leverage Firms at the 1% Threshold

Panel A. Probit Models with the Different Risk-Taking Explanatory Variables

	Dependent Variable = AZL1%						
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	0.97***	0.99**	0.82**	0.89**	0.00	1.01	-0.03
	[3.49]	[2.79]	[3.23]	[3.23]	[0.05]	[1.56]	[-0.21]
LNQ	-0.10***	-0.10***	-0.11***	-0.11***	-0.08**	-0.07+	-0.06
	[-3.81]	[-3.57]	[-3.90]	[-3.87]	[-3.04]	[-1.78]	[-1.54]
LNTA	-0.17***	-0.17***	-0.17***	-0.17***	-0.17***	-0.16***	-0.16***
	[-12.02]	[-12.03]	[-12.04]	[-11.92]	[-12.33]	[-8.99]	[-9.27]
INV	-0.24	-0.27	-0.25	-0.31	-0.23	-0.66	-0.71
	[-0.64]	[-0.72]	[-0.66]	[-0.80]	[-0.62]	[-1.38]	[-1.47]
FCF	-0.19	-0.16	-0.15	-0.14	-0.27	-0.86*	-0.96**

	[-0.73]	[-0.61]	[-0.58]	[-0.54]	[-1.01]	[-2.42]	[-2.76]
TANG	-1.50***	-1.51***	-1.51***	-1.50***	-1.52***	-1.59***	-1.59***
	[-13.67]	[-13.74]	[-13.71]	[-13.07]	[-13.85]	[-10.88]	[-10.89]
ALTMANZ	0.08***	0.08***	0.08***	0.08***	0.08***	0.08***	0.08***
	[13.60]	[13.58]	[13.62]	[13.55]	[13.35]	[11.20]	[11.01]
SGA	-0.74***	-0.75***	-0.71***	-0.62**	-0.81***	-0.55+	-0.62*
	[-3.58]	[-3.62]	[-3.45]	[-2.86]	[-3.88]	[-1.77]	[-2.00]
Constant	1.15**	1.18**	1.17**	1.23**	1.28***	1.28**	1.40**
	[2.95]	[3.01]	[2.99]	[2.81]	[3.30]	[2.91]	[3.20]
Observations	11134	11134	11134	10346	11134	7263	7263
Pseudo-R2	0.27	0.27	0.27	0.28	0.27	0.26	0.26
Log-Likelihood	2479.38	2481.75	2480.36	2311.39	-2486.18	1529.15	1530.33

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Probit Models with the Different Rule-Taking Explanatory Variables

	Dependent Variable = AZL1%					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	(8)	(9)	(10)	(11)	(12)	(13)
	-0.05*	-0.04+	-0.05*	-0.08+	-0.05*	-0.01
	[-2.09]	[-1.93]	[-2.12]	[-1.70]	[-2.35]	[-0.79]
LNQ	-0.08**	-0.08**	-0.08**	-0.07*	-0.07*	-0.10***
	[-2.86]	[-2.88]	[-2.86]	[-2.19]	[-2.13]	[-3.38]
LNTA	-0.18***	-0.17***	-0.17***	-0.16***	-0.15***	-0.17***
	[-12.49]	[-12.47]	[-12.41]	[-10.06]	[-9.94]	[-10.61]
INV	-0.23	-0.23	-0.23	-0.46	-0.46	-0.37
	[-0.59]	[-0.59]	[-0.59]	[-1.06]	[-1.08]	[-0.87]
FCF	-0.22	-0.22	-0.22	-0.80**	-0.81**	0.08
	[-0.80]	[-0.82]	[-0.83]	[-2.60]	[-2.63]	[0.25]
TANG	-1.55***	-1.55***	-1.55***	-1.53***	-1.53***	-1.50***
	[-13.84]	[-13.85]	[-13.87]	[-11.76]	[-11.77]	[-12.40]
ALTMANZ	0.07***	0.07***	0.07***	0.08***	0.08***	0.08***
	[13.02]	[13.04]	[13.04]	[12.04]	[12.02]	[11.71]
SGA	-0.73***	-0.74***	-0.74***	-1.19***	-1.19***	-0.50*
	[-3.50]	[-3.52]	[-3.52]	[-4.79]	[-4.78]	[-2.22]
Constant	1.55***	1.50***	1.47***	0.63*	0.60*	1.18**
	[3.86]	[3.77]	[3.74]	[2.57]	[2.46]	[2.93]
Observations	10611	10611	10611	9321	9321	8079
Pseudo-R2	0.27	0.27	0.27	0.28	0.28	0.27
Log-Likelihood	-2414.78	-2415.11	-2414.76	-1809.75	-1808.64	-1894.62

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Risk-Taking x Rule-taking Sensitivity

To address the preoccupation that the risk-taking proxies are affected by variables that compose the proxies of rule-taking, and capture whether confounding effects exist between risk-taking and rule-taking, we perform a series of regressions testing all combinations of each pair of variables with the aim to examine the degree of sensitivity of the different risk-taking variables to rule-

taking, and vice-versa. The results show that the four proxies of risk-taking are insensitive to all proxies of rule-taking, except for RULE6. The proxies of rule-taking were, likewise, unaffected by risk-taking, with RULE1-3 retaining the direction and significance of the base results.

Table 5

Probit Results Matrix for Risk-Taking Vs. Rule-Taking

Panel A. Sensitivity of RISK1 to the Different Rule-Taking Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.07*	-0.07*	-0.05*	-0.02	-0.02	-0.03
	[-2.54]	[-2.50]	[-2.06]	[-0.44]	[-1.02]	[-1.53]
RISK1	0.87**	0.88**	0.87**	1.25***	1.25***	0.44
	[2.78]	[2.82]	[2.77]	[3.68]	[3.67]	[1.16]
LNQ	-0.12***	-0.12***	-0.13***	-0.13***	-0.15***	-0.12***
	[-3.71]	[-3.71]	[-3.81]	[-3.79]	[-3.99]	[-3.71]
LNTA	-0.17***	-0.16***	-0.15***	-0.15***	-0.15***	-0.17***
	[-9.85]	[-9.77]	[-8.35]	[-8.30]	[-7.93]	[-9.85]
INV	0.09	0.08	0.02	0.03	-0.28	0.09
	[0.18]	[0.17]	[0.04]	[0.05]	[-0.52]	[0.18]
FCF	-0.37	-0.38	0.03	0.03	-0.63+	-0.37
	[-1.27]	[-1.31]	[0.08]	[0.10]	[-1.89]	[-1.27]
TANG	-1.54***	-1.55***	-1.53***	-1.53***	-1.44***	-1.54***
	[-11.72]	[-11.77]	[-10.78]	[-10.84]	[-9.38]	[-11.72]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.08***	0.07***
	[11.79]	[11.84]	[10.80]	[10.80]	[11.10]	[11.79]
SGA	-0.83***	-0.84***	-0.74**	-0.75**	-1.30***	-0.83***
	[-3.44]	[-3.47]	[-2.81]	[-2.83]	[-4.53]	[-3.44]
Constant	-0.00	-0.10	-0.43	-0.43	0.07	-0.00
	[-0.01]	[-0.26]	[-1.06]	[-1.07]	[0.23]	[-0.01]
Observations	10388	10388	7887	7887	9074	10388
Pseudo-R2	0.28	0.28	0.28	0.28	0.29	0.28
Log-Likelihood	-1711.00	-1711.38	-1331.20	-1330.80	-1241.41	-1711.00

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Sensitivity of RISK2 to the Different Rule-Taking Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.07**	-0.07*	-0.05*	-0.03	-0.02	-0.03
	[-2.58]	[-2.54]	[-2.09]	[-0.48]	[-1.05]	[-1.52]
RISK2	1.09**	1.10**	1.08**	1.31**	1.31**	0.58
	[2.80]	[2.84]	[2.77]	[3.01]	[3.01]	[1.24]
LNQ	-0.12***	-0.12***	-0.13***	-0.13***	-0.14***	-0.14***
	[-3.63]	[-3.63]	[-3.81]	[-3.80]	[-3.70]	[-3.72]
LNTA	-0.16***	-0.16***	-0.15***	-0.15***	-0.15***	-0.15***
	[-9.77]	[-9.70]	[-8.35]	[-8.30]	[-7.88]	[-7.87]
INV	0.04	0.04	-0.00	0.01	-0.33	-0.33
	[0.09]	[0.09]	[-0.00]	[0.01]	[-0.61]	[-0.61]
FCF	-0.33	-0.34	0.05	0.06	-0.61+	-0.61+
	[-1.11]	[-1.15]	[0.15]	[0.17]	[-1.80]	[-1.80]
TANG	-1.55***	-1.55***	-1.53***	-1.54***	-1.45***	-1.45***
	[-11.76]	[-11.81]	[-10.83]	[-10.89]	[-9.45]	[-9.43]

ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[11.78]	[11.82]	[10.78]	[10.78]	[11.04]	[11.04]
SGA	-0.83***	-0.84***	-0.74**	-0.74**	-1.32***	-1.32***
	[-3.44]	[-3.47]	[-2.80]	[-2.82]	[-4.59]	[-4.59]
Constant	0.03	-0.08	-0.41	-0.42	0.12	0.13
	[0.07]	[-0.19]	[-1.04]	[-1.06]	[0.38]	[0.42]
Observations	10388	10388	7887	7887	9074	9074
Pseudo-R2	0.28	0.28	0.28	0.28	0.29	0.29
Log-Likelihood	-1711.31	-1711.71	-1331.22	-1330.81	-1243.81	-1243.89

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel C. Sensitivity of RISK3 to the Different Rule-Taking Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.07*	-0.07*	-0.05*	-0.03	-0.02	-0.03
	[-2.54]	[-2.48]	[-2.04]	[-0.44]	[-1.03]	[-1.52]
RISK3	0.73*	0.73*	0.72*	1.02**	1.02**	0.41
	[2.53]	[2.55]	[2.50]	[3.21]	[3.20]	[1.19]
LNQ	-0.12***	-0.12***	-0.13***	-0.13***	-0.16***	-0.16***
	[-3.74]	[-3.74]	[-3.83]	[-3.81]	[-3.98]	[-4.01]
LNTA	-0.17***	-0.17***	-0.15***	-0.15***	-0.15***	-0.15***
	[-9.84]	[-9.77]	[-8.39]	[-8.34]	[-7.88]	[-7.87]
INV	0.08	0.07	0.01	0.02	-0.29	-0.29
	[0.16]	[0.15]	[0.02]	[0.04]	[-0.54]	[-0.53]
FCF	-0.34	-0.35	0.05	0.05	-0.60+	-0.60+
	[-1.17]	[-1.21]	[0.13]	[0.15]	[-1.78]	[-1.78]
TANG	-1.55***	-1.55***	-1.53***	-1.53***	-1.45***	-1.45***
	[-11.77]	[-11.82]	[-10.80]	[-10.86]	[-9.47]	[-9.44]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[11.81]	[11.86]	[10.81]	[10.81]	[11.07]	[11.06]
SGA	-0.81***	-0.82***	-0.73**	-0.73**	-1.28***	-1.28***
	[-3.35]	[-3.38]	[-2.74]	[-2.76]	[-4.44]	[-4.44]
Constant	0.02	-0.08	-0.42	-0.43	0.10	0.11
	[0.05]	[-0.21]	[-1.05]	[-1.07]	[0.33]	[0.36]
Observations	10388	10388	7887	7887	9074	9074
Pseudo-R2	0.28	0.28	0.28	0.28	0.29	0.29
Log-Likelihood	-1711.78	-1712.19	-1331.21	-1330.81	-1242.99	-1243.06

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel D. Sensitivity of RISK4 to the Different Rule-Taking Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.07*	-0.07*	-0.05+	-0.04	-0.03	-0.02
	[-2.37]	[-2.40]	[-1.86]	[-0.40]	[-1.07]	[-1.00]
RISK4	0.86**	0.87**	0.85**	1.06**	1.06**	0.50
	[2.77]	[2.80]	[2.72]	[3.10]	[3.10]	[1.33]
LNQ	-0.12***	-0.12***	-0.13***	-0.13***	-0.14***	-0.14***
	[-3.48]	[-3.47]	[-3.53]	[-3.52]	[-3.50]	[-3.54]
LNTA	-0.17***	-0.17***	-0.16***	-0.16***	-0.15***	-0.15***
	[-9.84]	[-9.78]	[-8.42]	[-8.41]	[-7.68]	[-7.69]
INV	0.04	0.03	-0.04	-0.03	-0.20	-0.20
	[0.09]	[0.06]	[-0.07]	[-0.06]	[-0.35]	[-0.35]
FCF	-0.37	-0.38	0.02	0.02	-0.68*	-0.68*
	[-1.22]	[-1.27]	[0.06]	[0.07]	[-1.97]	[-1.97]

TANG	-1.50***	-1.50***	-1.45***	-1.45***	-1.42***	-1.41***
	[-11.00]	[-11.04]	[-9.85]	[-9.89]	[-8.94]	[-8.92]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[11.64]	[11.68]	[10.63]	[10.63]	[11.06]	[11.06]
SGA	-0.75**	-0.76**	-0.69*	-0.69*	-1.28***	-1.28***
	[-3.00]	[-3.03]	[-2.48]	[-2.48]	[-4.27]	[-4.27]
Constant	0.15	0.04	-0.28	-0.28	0.06	0.08
	[0.35]	[0.10]	[-0.66]	[-0.67]	[0.18]	[0.24]
Observations	9562	9562	7129	7129	8442	8442
Pseudo-R2	0.28	0.28	0.28	0.28	0.29	0.29
Log-Likelihood	-1602.01	-1602.58	-1227.29	-1227.15	-1172.73	-1172.82

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Family Firms

In this section, we investigate whether our results differ significatively regarding firms that are family controlled and those that are not. The literature has posed that family firms are expected to be more conservative, as it aims for long-term survival and the undertaking of default-risky debt can be perceived as a less desirable risk by the family owners (Becker, 1981; Bertrand & Schoar, 2006). Our results show that our proxies for risk-taking are largely insensitive to family control. However, the standard deviation of ROA is highly sensitive to this dummy. That is, although ROASD does not predict ZL for the general sample, when family-controlled firms are concerned, it has a significant and positive coefficient, meaning that the family firms with performance above expected are more likely to be ZL firms. A similar phenomenon occurs for the variables RULE3 and RULE6, their absolute coefficient and significant are magnified when family-controlled firms are concerned. This effect is also seen at a smaller scale for the other rule-taking proxies, meaning that when a rule-taking firm is also family controlled, it has an even smaller likelihood of being zero leveraged.

Table 6

Family Firm Dummy as Interaction Variable

Panel A. Risk-Taking and Interaction with Family Firms Dummy

	Dependent Variable = ZL						
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD
	0.87*	1.06*	0.65*	0.76*	-0.02	0.25	0.19
	[2.46]	[2.44]	[2.02]	[2.19]	[-0.32]	[0.29]	[1.07]
Family Firm	-0.06	-0.06	-0.08	-0.09	-0.06	-0.14	0.10
	[-0.92]	[-0.84]	[-1.14]	[-1.32]	[-0.80]	[-1.45]	[0.80]
Risk-Taking *	0.49	0.58	0.62	0.63	0.05	2.75*	-0.26
Family Firm	[0.77]	[0.70]	[1.07]	[1.02]	[0.56]	[1.96]	[-0.94]
LNQ	-0.12***	-0.11***	-0.12***	-0.12***	-0.10**	-0.06	-0.05
	[-3.76]	[-3.63]	[-3.80]	[-3.53]	[-3.07]	[-1.44]	[-1.19]

LNTA	-0.16***	-0.16***	-0.16***	-0.17***	-0.16***	-0.15***	-0.15***
	[-9.49]	[-9.42]	[-9.50]	[-9.49]	[-9.68]	[-6.90]	[-6.98]
INV	0.08	0.03	0.07	0.02	0.07	-0.24	-0.31
	[0.17]	[0.06]	[0.16]	[0.05]	[0.16]	[-0.39]	[-0.50]
FCF	-0.40	-0.35	-0.36	-0.39	-0.51+	-1.21**	-1.34***
	[-1.41]	[-1.22]	[-1.27]	[-1.32]	[-1.75]	[-3.09]	[-3.44]
TANG	-1.51***	-1.52***	-1.52***	-1.47***	-1.53***	-1.43***	-1.44***
	[-11.64]	[-11.70]	[-11.71]	[-10.95]	[-11.86]	[-8.29]	[-8.28]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[12.09]	[12.07]	[12.10]	[11.93]	[11.87]	[9.50]	[9.45]
SGA	-0.90***	-0.90***	-0.88***	-0.83***	-0.98***	-0.63+	-0.68+
	[-3.79]	[-3.80]	[-3.69]	[-3.36]	[-4.08]	[-1.65]	[-1.80]
Constant	-0.30	-0.27	-0.27	-0.13	-0.10	-0.24	-0.24
	[-0.77]	[-0.71]	[-0.70]	[-0.32]	[-0.27]	[-0.53]	[-0.54]
Observations	10905	10905	10905	10019	10905	7027	7027
Pseudo-R2	0.28	0.28	0.28	0.28	0.28	0.25	0.25
Log-Likelihood	-1768.27	-1769.01	-1769.09	-1658.67	-1773.58	-1038.73	-1040.88

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Rule-Taking and Interaction with Family Firms Dummy

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.05+	-0.05+	-0.03	-0.02	-0.01	0.01
	[-1.79]	[-1.79]	[-1.07]	[-0.28]	[-0.24]	[0.24]
Family Firm	0.11	0.09	0.19	-0.11+	-0.11+	0.06
	[0.86]	[0.68]	[1.28]	[-1.79]	[-1.81]	[0.66]
Rule-Taking *	-0.05	-0.07	-0.07+	-0.05	-0.01	-0.06+
Family Firm	[-1.37]	[-1.52]	[-1.71]	[-0.89]	[-0.77]	[-1.74]
LNQ	-0.10**	-0.10**	-0.13***	-0.13***	-0.12**	-0.12**
	[-3.20]	[-3.21]	[-3.72]	[-3.64]	[-3.18]	[-3.20]
LNTA	-0.17***	-0.17***	-0.16***	-0.16***	-0.16***	-0.16***
	[-9.98]	[-9.92]	[-8.41]	[-8.33]	[-8.31]	[-8.28]
INV	0.09	0.09	0.02	0.02	-0.31	-0.31
	[0.19]	[0.18]	[0.03]	[0.04]	[-0.56]	[-0.56]
FCF	-0.46	-0.47	0.00	0.01	-0.79*	-0.79*
	[-1.55]	[-1.58]	[0.01]	[0.02]	[-2.30]	[-2.31]
TANG	-1.56***	-1.57***	-1.54***	-1.54***	-1.48***	-1.48***
	[-11.91]	[-11.97]	[-10.90]	[-10.95]	[-9.68]	[-9.67]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[11.76]	[11.79]	[10.86]	[10.84]	[10.92]	[10.92]
SGA	-0.88***	-0.89***	-0.77**	-0.77**	-1.39***	-1.39***
	[-3.64]	[-3.65]	[-2.92]	[-2.92]	[-4.82]	[-4.80]
Constant	0.11	0.02	-0.38	-0.38	0.39	0.40
	[0.28]	[0.04]	[-0.94]	[-0.95]	[1.28]	[1.31]
Observations	10387	10387	7886	7886	9073	9073
Pseudo-R2	0.28	0.28	0.28	0.28	0.29	0.29
Log-Likelihood	-1713.62	-1713.73	-1330.21	-1329.73	-1246.27	-1246.29

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Pledgeability

Financial constraints play a crucial part on the capital structure of firms.

Very importantly, a common hypothesis in the literature is that some of the low leverage firms would rather not be in this condition and would take more debt if they could, what prevents them from taking debt is not then strategic actions, but constraints in raising debt. One of the most important elements associated with the facilitation of undertaking debt is high pledgeability, after all with more pledgeable assets the firm can offer more security in the debt market. As a proxy of pledgeability, we utilize a dummy variable (H-TANG) representing the firms in the upper tercile of tangibility (fixed asset over total assets).

Table 7

High Pledgeability Dummy as Interaction Variable

Panel A. Probit Models with the Different Risk-Taking Explanatory Variables

	Dependent Variable = ZL						
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD
	0.90**	1.09**	0.74*	0.87**	0.01	1.26+	0.15
	[2.82]	[2.77]	[2.54]	[2.77]	[0.13]	[1.65]	[0.98]
H-TANG	-0.09	-0.07	-0.08	-0.08	0.02	0.02	0.01
	[-1.04]	[-0.82]	[-0.87]	[-0.87]	[0.20]	[0.16]	[0.09]
Risk-Taking *	0.52	0.51	0.33	0.67	-0.09	-1.17	-0.16
H-TANG	[0.86]	[0.65]	[0.59]	[1.14]	[-1.17]	[-0.88]	[-0.80]
LNQ	-0.12***	-0.11***	-0.12***	-0.11***	-0.10**	-0.06	-0.05
	[-3.72]	[-3.61]	[-3.76]	[-3.48]	[-3.06]	[-1.35]	[-1.21]
LNTA	-0.16***	-0.16***	-0.16***	-0.16***	-0.16***	-0.15***	-0.15***
	[-9.53]	[-9.46]	[-9.52]	[-9.46]	[-9.75]	[-6.99]	[-7.06]
INV	0.09	0.03	0.07	0.02	0.05	-0.30	-0.34
	[0.18]	[0.06]	[0.14]	[0.05]	[0.11]	[-0.48]	[-0.54]
FCF	-0.41	-0.36	-0.37	-0.40	-0.51+	-1.22**	-1.35***
	[-1.46]	[-1.28]	[-1.33]	[-1.40]	[-1.73]	[-3.10]	[-3.46]
TANG	-1.55***	-1.55***	-1.55***	-1.53***	-1.45***	-1.37***	-1.36***
	[-10.68]	[-10.57]	[-10.67]	[-10.10]	[-9.64]	[-6.91]	[-6.55]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[12.13]	[12.11]	[12.15]	[11.97]	[11.91]	[9.54]	[9.49]
SGA	-0.90***	-0.90***	-0.88***	-0.84***	-0.99***	-0.63+	-0.70+
	[-3.79]	[-3.80]	[-3.69]	[-3.39]	[-4.15]	[-1.67]	[-1.87]
Constant	-0.33	-0.30	-0.30	-0.17	-0.16	-0.30	-0.23
	[-0.85]	[-0.78]	[-0.79]	[-0.43]	[-0.42]	[-0.67]	[-0.53]
Observations	10906	10906	10906	10020	10906	7028	7028
Pseudo-R2	0.28	0.28	0.28	0.28	0.28	0.25	0.25
Log-Likelihood	-1768.42	-1769.25	-1769.77	-1659.04	-1773.23	-1040.14	-1040.94

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Probit Models with the Different Rule-Taking Explanatory Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.10***	-0.09**	-0.06*	-0.04	-0.03	-0.04+
	[-3.34]	[-3.01]	[-2.27]	[-0.74]	[-1.17]	[-1.93]
H-TANG	-0.39*	-0.29+	-0.15	-0.05	-0.05	-0.09
	[-2.32]	[-1.79]	[-0.91]	[-0.56]	[-0.55]	[-0.89]

Rule-Taking *	0.02	0.00	0.02	-0.00	0.05	0.03
H-TANG	[1.06]	[0.15]	[0.88]	[-0.14]	[0.74]	[0.45]
LNQ	[-3.17]	[-3.17]	[-3.69]	[-3.66]	[-3.06]	[-3.08]
	-0.17***	-0.17***	-0.16***	-0.15***	-0.15***	-0.15***
LNTA	[-10.02]	[-9.92]	[-8.46]	[-8.38]	[-8.07]	[-8.09]
	0.10	0.08	0.03	0.03	-0.30	-0.30
INV	[0.21]	[0.18]	[0.06]	[0.05]	[-0.55]	[-0.56]
	-0.45	-0.47	0.00	0.01	-0.82*	-0.82*
FCF	[-1.51]	[-1.57]	[0.01]	[0.04]	[-2.39]	[-2.38]
	-1.66***	-1.58***	-1.60***	-1.53***	-1.49***	-1.48***
TANG	[-9.71]	[-9.21]	[-9.58]	[-9.68]	[-9.68]	[-9.64]
	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
ALTMANZ	[11.76]	[11.81]	[10.88]	[10.85]	[10.95]	[10.92]
	-0.88***	-0.89***	-0.75**	-0.77**	-1.40***	-1.40***
SGA	[-3.62]	[-3.69]	[-2.85]	[-2.94]	[-4.85]	[-4.86]
	0.19	0.06	-0.33	-0.37	0.30	0.31
Constant	[0.48]	[0.15]	[-0.84]	[-0.93]	[0.98]	[1.05]
	10388	10388	7887	7887	9074	9074
Observations	0.28	0.28	0.28	0.28	0.29	0.29
Pseudo-R2	-1714.37	-1715.24	-1331.39	-1331.34	-1247.76	-1248.01
Log-Likelihood	[-3.17]	[-3.17]	[-3.69]	[-3.66]	[-3.06]	[-3.08]

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Small Firms

Another important determinant of ZL behavior is firm size. To investigate whether our results differ significatively regarding firm size, we employ a dummy variable for small firms, based on the value of their assets (LNTA). In our model, small firms are defined as those in the lower tercile regarding their LNTA value. We found that for small firms, the risk-taking proxies are less significant while the two principal proxies of rule-taking (RULE1-2) became more significant.

Table 8

Small Firm Sub-Sample

Panel A. Probit Models with the Different Risk-Taking Explanatory Variables

	Dependent Variable = ZL						
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD
	0.66*	0.73+	0.57+	0.60+	-0.03	1.26	0.14
	[2.03]	[1.78]	[1.90]	[1.85]	[-0.54]	[1.51]	[0.84]
LNQ	-0.10**	-0.09*	-0.10**	-0.10**	-0.08*	-0.05	-0.04
	[-2.66]	[-2.52]	[-2.67]	[-2.60]	[-2.17]	[-1.01]	[-0.86]
LNTA	-0.17***	-0.17***	-0.17***	-0.19***	-0.18***	-0.14***	-0.15***
	[-6.89]	[-6.87]	[-6.89]	[-7.09]	[-6.94]	[-4.25]	[-4.29]
INV	0.07	0.03	0.06	-0.09	0.07	-0.09	-0.13
	[0.13]	[0.07]	[0.12]	[-0.17]	[0.14]	[-0.13]	[-0.19]
FCF	-0.53+	-0.50	-0.49	-0.51	-0.65*	-1.38**	-1.51***
	[-1.75]	[-1.64]	[-1.62]	[-1.61]	[-2.09]	[-3.24]	[-3.59]
TANG	-1.51***	-1.51***	-1.51***	-1.51***	-1.53***	-1.55***	-1.55***
	[-10.05]	[-10.10]	[-10.09]	[-9.62]	[-10.21]	[-7.23]	[-7.23]
ALTMANZ	0.06***	0.06***	0.06***	0.06***	0.06***	0.07***	0.07***
	[9.99]	[9.97]	[10.00]	[9.86]	[9.87]	[7.71]	[7.67]
SGA	-1.23***	-1.24***	-1.21***	-1.20***	-1.30***	-0.97*	-1.07*
	[-4.66]	[-4.68]	[-4.56]	[-4.32]	[-4.89]	[-2.16]	[-2.38]
Constant	-0.25	-0.20	-0.24	-0.03	-0.08	-0.36	-0.29
	[-0.48]	[-0.40]	[-0.46]	[-0.06]	[-0.16]	[-0.59]	[-0.49]
Observations	5532	5532	5532	5091	5532	3500	3500
Pseudo-R2	0.23	0.23	0.23	0.23	0.23	0.21	0.21
Log-Likelihood	-1343.42	-1343.92	-1343.66	-1254.74	-1345.31	-766.18	-766.92

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Probit Models with the Different Rule-Taking Explanatory Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.08**	-0.08*	-0.05+	0.01	-0.01	-0.03
	[-2.58]	[-2.52]	[-1.66]	[0.13]	[-0.38]	[-1.38]
LNQ	-0.08*	-0.08*	-0.08*	-0.12**	-0.11**	-0.09*
	[-2.27]	[-2.30]	[-2.33]	[-2.74]	[-2.69]	[-2.34]
LNTA	-0.18***	-0.18***	-0.18***	-0.17***	-0.17***	-0.15***
	[-6.86]	[-6.79]	[-6.82]	[-5.82]	[-5.75]	[-5.25]
INV	0.06	0.06	0.07	0.01	0.01	0.05
	[0.12]	[0.11]	[0.13]	[0.02]	[0.02]	[0.08]
FCF	-0.59+	-0.60+	-0.60+	-0.91*	-0.91*	-0.16
	[-1.90]	[-1.92]	[-1.93]	[-2.54]	[-2.55]	[-0.44]
TANG	-1.53***	-1.54***	-1.53***	-1.44***	-1.44***	-1.51***
	[-10.12]	[-10.15]	[-10.13]	[-8.55]	[-8.57]	[-9.18]
ALTMANZ	0.06***	0.06***	0.06***	0.07***	0.07***	0.06***
	[9.77]	[9.81]	[9.83]	[9.60]	[9.58]	[8.67]
SGA	-1.22***	-1.24***	-1.23***	-1.55***	-1.55***	-1.18***
	[-4.56]	[-4.60]	[-4.59]	[-5.08]	[-5.08]	[-4.00]
Constant	0.25	0.21	0.06	0.50	0.48	-0.38
	[0.48]	[0.41]	[0.11]	[1.28]	[1.23]	[-0.71]
Observations	5296	5296	5296	4696	4696	4194
Pseudo-R2	0.23	0.23	0.23	0.23	0.23	0.24
Log-Likelihood	-1306.12	-1306.29	-1307.83	-1009.67	-1009.61	-995.63

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Table 9

Small Firm Dummy as Interaction Variable

Panel A. Probit Models with the Different Risk-Taking Explanatory Variables

	Dependent Variable = ZL						
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD
	0.80*	0.94*	0.70*	0.82*	-0.02	1.72*	0.13
	[2.44]	[2.29]	[2.35]	[2.53]	[-0.47]	[2.14]	[0.77]
Small Firm	-0.00	0.00	0.03	0.02	0.03	0.24+	0.10
	[-0.03]	[0.02]	[0.28]	[0.26]	[0.28]	[1.93]	[0.69]
Risk-Taking *	1.06	1.15	0.53	0.83	0.05	-4.58*	-0.10
Small Firm	[1.39]	[1.21]	[0.74]	[1.10]	[0.47]	[-2.29]	[-0.30]
LNQ	-0.12***	-0.11***	-0.12***	-0.11***	-0.09**	-0.06	-0.05
	[-3.72]	[-3.62]	[-3.79]	[-3.52]	[-2.99]	[-1.38]	[-1.22]
LNTA	-0.17***	-0.17***	-0.17***	-0.18***	-0.17***	-0.16***	-0.16***
	[-7.75]	[-7.60]	[-7.64]	[-7.82]	[-7.73]	[-5.63]	[-5.65]
INV	0.08	0.03	0.06	0.01	0.07	-0.29	-0.32
	[0.16]	[0.07]	[0.13]	[0.03]	[0.15]	[-0.46]	[-0.51]
FCF	-0.42	-0.39	-0.39	-0.42	-0.53+	-1.15**	-1.33***
	[-1.48]	[-1.35]	[-1.37]	[-1.45]	[-1.78]	[-2.92]	[-3.42]
TANG	-1.51***	-1.52***	-1.52***	-1.47***	-1.53***	-1.44***	-1.44***
	[-11.69]	[-11.73]	[-11.73]	[-10.97]	[-11.86]	[-8.34]	[-8.30]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[12.04]	[12.00]	[12.08]	[11.88]	[11.86]	[9.56]	[9.44]
SGA	-0.90***	-0.91***	-0.89***	-0.85***	-0.99***	-0.65+	-0.70+
	[-3.80]	[-3.82]	[-3.72]	[-3.43]	[-4.13]	[-1.73]	[-1.87]
Constant	-0.18	-0.17	-0.18	-0.00	-0.02	-0.21	-0.10
	[-0.44]	[-0.41]	[-0.45]	[-0.01]	[-0.05]	[-0.43]	[-0.20]
Observations	10906	10906	10906	10020	10906	7028	7028
Pseudo-R2	0.28	0.28	0.28	0.28	0.28	0.26	0.25
Log-Likelihood	-1767.47	-1768.41	-1769.36	-1658.58	-1773.60	-1037.87	-1041.03

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Probit Models with the Different Rule-Taking Explanatory Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.08**	-0.06*	-0.00	-0.02	-0.04	-0.03
	[-2.82]	[-2.34]	[-0.07]	[-1.10]	[-0.69]	[-0.55]
Small Firm	-0.15	-0.09	0.05	0.00	0.01	0.00
	[-1.01]	[-0.53]	[0.41]	[0.03]	[0.06]	[0.04]
Rule-Taking *	0.06+	0.04	-0.01	0.01	0.04	0.06
Small Firm	[1.65]	[0.96]	[-0.21]	[0.51]	[0.59]	[0.88]
LNQ	-0.10**	-0.10**	-0.13***	-0.12***	-0.12**	-0.12**
	[-3.12]	[-3.13]	[-3.68]	[-3.61]	[-3.04]	[-3.07]
LNTA	-0.18***	-0.18***	-0.16***	-0.16***	-0.15***	-0.16***
	[-7.90]	[-7.80]	[-6.45]	[-6.44]	[-5.91]	[-5.94]
INV	0.08	0.08	0.02	0.02	-0.29	-0.29
	[0.16]	[0.16]	[0.03]	[0.05]	[-0.54]	[-0.53]
FCF	-0.44	-0.46	0.01	0.02	-0.81*	-0.81*
	[-1.50]	[-1.55]	[0.03]	[0.05]	[-2.36]	[-2.35]
TANG	-1.57***	-1.57***	-1.53***	-1.54***	-1.48***	-1.48***
	[-11.91]	[-11.96]	[-10.87]	[-10.93]	[-9.66]	[-9.64]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[11.74]	[11.77]	[10.80]	[10.77]	[10.92]	[10.92]
SGA	-0.89***	-0.90***	-0.77**	-0.77**	-1.40***	-1.41***

	[-3.70]	[-3.73]	[-2.93]	[-2.94]	[-4.87]	[-4.87]
Constant	0.32	0.19	-0.31	-0.30	0.30	0.33
	[0.77]	[0.46]	[-0.73]	[-0.70]	[0.87]	[0.94]
Observations	10388	10388	7887	7887	9074	9074
Pseudo-R2	0.28	0.28	0.28	0.28	0.29	0.29
Log-Likelihood	-1713.35	-1714.59	-1331.66	-1331.16	-1247.83	-1247.71

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Dividend-paying firms

Previous studies have linked dividend policy with the phenomenon of ZL. For instance, Strabulaev and Yang (2013) found that dividend-paying zero-leverage firms pay substantially higher dividends. In this section, we examine whether our results for risk-taking and rule-taking are affected by dividend policy.

Table 10

Dividend-payer Dummy as Interaction Variable

Panel A. Probit Models with the Different Risk-Taking Explanatory Variables

	Dependent Variable = ZL						
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD
	0.97**	1.14**	0.78**	0.94**	-0.02	1.12	0.10
	[3.15]	[2.99]	[2.77]	[3.11]	[-0.41]	[1.49]	[0.66]
Div. Payer	0.21	0.22	0.21	0.18	0.01	0.31	0.10
	[1.28]	[1.45]	[1.32]	[1.03]	[0.04]	[1.57]	[0.39]
Risk-Taking *	-0.72	-1.13	-0.77	-0.35	0.23	-4.91	0.31
Div. Payer	[-0.36]	[-0.71]	[-0.45]	[-0.19]	[1.11]	[-1.03]	[0.46]
LNQ	-0.12***	-0.11***	-0.12***	-0.11***	-0.10**	-0.06	-0.05
	[-3.73]	[-3.61]	[-3.76]	[-3.48]	[-3.01]	[-1.37]	[-1.21]
LNTA	-0.16***	-0.16***	-0.16***	-0.17***	-0.17***	-0.16***	-0.16***
	[-9.37]	[-9.29]	[-9.35]	[-9.31]	[-9.46]	[-6.96]	[-7.03]
INV	0.07	0.02	0.06	0.01	0.06	-0.29	-0.33
	[0.14]	[0.05]	[0.12]	[0.03]	[0.13]	[-0.47]	[-0.53]
FCF	-0.39	-0.34	-0.35	-0.39	-0.52+	-1.20**	-1.33***
	[-1.38]	[-1.19]	[-1.25]	[-1.32]	[-1.78]	[-3.05]	[-3.41]
TANG	-1.51***	-1.51***	-1.51***	-1.46***	-1.53***	-1.43***	-1.43***
	[-11.61]	[-11.67]	[-11.67]	[-10.92]	[-11.81]	[-8.19]	[-8.19]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[12.11]	[12.08]	[12.13]	[11.96]	[11.88]	[9.49]	[9.43]
SGA	-0.91***	-0.91***	-0.89***	-0.84***	-0.98***	-0.63+	-0.71+
	[-3.82]	[-3.83]	[-3.72]	[-3.40]	[-4.11]	[-1.66]	[-1.88]
Constant	-0.27	-0.23	-0.24	-0.12	-0.08	-0.20	-0.12
	[-0.69]	[-0.61]	[-0.63]	[-0.29]	[-0.20]	[-0.45]	[-0.27]
Observations	10906	10906	10906	10020	10906	7028	7028
Pseudo-R2	0.28	0.28	0.28	0.28	0.28	0.25	0.25
Log-Likelihood	-1768.10	-1768.76	-1769.26	-1659.15	-1772.96	-1039.82	-1040.69

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Probit Models with the Different Rule-Taking Explanatory Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6

	-0.07*	-0.06*	-0.01	-0.02	-0.03	-0.02
	[-2.51]	[-2.32]	[-0.36]	[-1.18]	[-0.66]	[-0.36]
Div. Payer	-0.34	-0.41	-0.04	-0.05	0.07	0.01
	[-0.94]	[-0.92]	[-0.14]	[-0.19]	[0.39]	[0.03]
Rule-Taking *	0.16+	0.17	0.08	0.10	0.21	0.46+
Div. Payer	[1.72]	[1.53]	[0.95]	[1.17]	[1.13]	[1.71]
LNQ	-0.10**	-0.10**	-0.13***	-0.13***	-0.12**	-0.12**
	[-3.17]	[-3.16]	[-3.70]	[-3.67]	[-3.05]	[-3.10]
LNTA	-0.18***	-0.17***	-0.16***	-0.16***	-0.16***	-0.16***
	[-9.94]	[-9.87]	[-8.36]	[-8.29]	[-7.70]	[-7.76]
INV	0.07	0.07	0.02	0.02	-0.29	-0.29
	[0.15]	[0.15]	[0.03]	[0.04]	[-0.54]	[-0.53]
FCF	-0.44	-0.46	0.02	0.02	-0.81*	-0.81*
	[-1.49]	[-1.53]	[0.05]	[0.07]	[-2.36]	[-2.36]
TANG	-1.56***	-1.56***	-1.53***	-1.54***	-1.48***	-1.48***
	[-11.85]	[-11.89]	[-10.83]	[-10.89]	[-9.66]	[-9.62]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.08***	0.08***
	[11.76]	[11.78]	[10.84]	[10.83]	[10.93]	[10.92]
SGA	-0.90***	-0.91***	-0.78**	-0.78**	-1.42***	-1.42***
	[-3.73]	[-3.74]	[-2.95]	[-2.96]	[-4.91]	[-4.92]
Constant	0.25	0.15	-0.28	-0.29	0.32	0.35
	[0.65]	[0.40]	[-0.71]	[-0.72]	[1.05]	[1.13]
Observations	10388	10388	7887	7887	9074	9074
Pseudo-R2	0.28	0.28	0.28	0.28	0.29	0.29
Log-Likelihood	-1712.67	-1713.18	-1330.64	-1329.95	-1246.86	-1245.77

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Legal Systems

Legal systems have a major influence on firm-level the governance practices (Aguilera & Jackson, 2003; La Porta et al., 2000). In particular, we seek to differ the results from firms that are under the English common law system from those which are not. For this, we test our models with a sub-sample containing only observations under the English common law system (Table 11). The remaining firms (in non-English common law systems) are analysed in Table 12.

Table 11

Results for firms in the English Legal System

Panel A. Probit Models with the Different Risk-Taking Explanatory Variables

	Dependent Variable = ZL						
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD
	0.79*	0.74	0.83*	0.67+	-0.00	1.20	-0.03
	[2.21]	[1.61]	[2.53]	[1.89]	[-0.00]	[1.48]	[-0.17]
LNQ	-0.19***	-0.18***	-0.20***	-0.18***	-0.16***	-0.13**	-0.11*
	[-5.20]	[-4.96]	[-5.36]	[-4.86]	[-4.56]	[-2.59]	[-2.38]
LNTA	-0.10***	-0.10***	-0.10***	-0.11***	-0.10***	-0.08***	-0.08***
	[-6.20]	[-6.20]	[-6.18]	[-6.33]	[-6.30]	[-3.73]	[-3.75]
INV	-0.42	-0.45	-0.43	-0.40	-0.44	-0.86	-0.92
	[-0.76]	[-0.81]	[-0.76]	[-0.69]	[-0.77]	[-1.09]	[-1.15]
FCF	-1.12***	-1.13**	-1.04**	-1.09**	-1.29***	-2.09***	-2.32***
	[-3.31]	[-3.26]	[-3.05]	[-3.15]	[-3.71]	[-4.54]	[-5.14]
TANG	-1.77***	-1.78***	-1.78***	-1.73***	-1.79***	-1.56***	-1.56***
	[-10.83]	[-10.85]	[-10.88]	[-10.45]	[-10.93]	[-7.35]	[-7.35]
ALTMANZ	0.08***	0.08***	0.08***	0.08***	0.08***	0.09***	0.09***
	[10.61]	[10.57]	[10.63]	[10.63]	[10.25]	[8.79]	[8.59]
SGA	-0.74*	-0.75*	-0.69*	-0.72*	-0.80*	-0.63	-0.71
	[-2.39]	[-2.43]	[-2.23]	[-2.27]	[-2.57]	[-1.29]	[-1.46]
Constant	-0.06	-0.03	-0.07	-0.02	0.06	-0.44+	-0.30
	[-0.27]	[-0.15]	[-0.35]	[-0.08]	[0.29]	[-1.68]	[-1.03]
Observations	6025	6025	6025	5771	6025	4215	4215
Pseudo-R2	0.24	0.24	0.24	0.24	0.24	0.20	0.20
Log-Likelihood	-993.37	-994.61	-992.59	-949.18	-995.93	-620.74	-621.66

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Probit Models with the Different Rule-Taking Explanatory Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.02	-0.01	-0.04	0.01	0.01	-0.04+
	[-0.89]	[-0.67]	[-1.45]	[0.38]	[0.93]	[-1.92]
LNQ	-0.09**	-0.09**	-0.11***	-0.11***	-0.10**	-0.09**
	[-3.19]	[-3.16]	[-3.32]	[-3.49]	[-2.72]	[-2.59]
LNTA	-0.17***	-0.17***	-0.17***	-0.17***	-0.15***	-0.15***
	[-12.26]	[-12.37]	[-10.50]	[-10.53]	[-8.86]	[-8.61]
INV	-0.07	-0.06	-0.33	-0.27	-0.69	-0.60
	[-0.15]	[-0.12]	[-0.63]	[-0.53]	[-1.40]	[-1.22]
FCF	-0.83**	-0.82**	-0.42	-0.40	-1.09***	-1.09***
	[-3.04]	[-3.03]	[-1.33]	[-1.25]	[-3.36]	[-3.37]
TANG	-1.46***	-1.47***	-1.46***	-1.47***	-1.28***	-1.30***
	[-11.84]	[-11.88]	[-10.97]	[-11.03]	[-8.85]	[-8.98]
ALTMANZ	0.07***	0.07***	0.07***	0.07***	0.07***	0.07***
	[12.44]	[12.43]	[11.51]	[11.57]	[11.36]	[11.34]
SGA	-0.30	-0.30	-0.12	-0.14	-1.15***	-1.17***
	[-1.24]	[-1.26]	[-0.44]	[-0.52]	[-4.02]	[-4.12]
Constant	0.75**	0.75***	0.60*	0.65**	-0.01	-0.04
	[3.26]	[3.39]	[2.45]	[2.69]	[-0.03]	[-0.14]
Observations	10852	10852	8199	8199	9598	9598
Pseudo-R2	0.22	0.22	0.20	0.21	0.25	0.25
Log-Likelihood	-1879.63	-1879.42	-1482.76	-1480.99	-1332.58	-1333.59

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.

Table 12

Results for firms in other Legal Systems

Panel A. Probit Models with the Different Risk-Taking Explanatory Variables

	Dependent Variable = ZL						
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD
	0.82	1.52*	0.38	1.05*	0.02	1.71	0.37*
	[1.55]	[2.52]	[0.76]	[2.01]	[0.24]	[1.46]	[2.00]
LNQ	-0.01	-0.02	-0.01	-0.01	0.00	-0.03	-0.02
	[-0.31]	[-0.40]	[-0.20]	[-0.18]	[0.02]	[-0.48]	[-0.43]
LNTA	-0.20***	-0.20***	-0.20***	-0.21***	-0.21***	-0.18***	-0.18***
	[-9.35]	[-9.31]	[-9.44]	[-9.26]	[-9.64]	[-6.32]	[-6.51]
INV	0.29	0.25	0.29	-0.04	0.29	0.54	0.48
	[0.48]	[0.41]	[0.48]	[-0.07]	[0.47]	[0.70]	[0.61]
FCF	-0.60	-0.55	-0.59	-0.50	-0.56	-0.56	-0.66
	[-1.47]	[-1.37]	[-1.44]	[-1.18]	[-1.35]	[-0.99]	[-1.18]
TANG	-1.18***	-1.18***	-1.19***	-1.13***	-1.19***	-1.46***	-1.46***
	[-6.70]	[-6.67]	[-6.74]	[-6.09]	[-6.80]	[-5.45]	[-5.44]
ALTMANZ	0.06***	0.06***	0.06***	0.06***	0.06***	0.06***	0.06***
	[7.65]	[7.58]	[7.68]	[7.02]	[7.52]	[5.35]	[5.36]
SGA	0.00	0.01	-0.02	0.09	-0.05	0.29	0.18
	[0.01]	[0.04]	[-0.05]	[0.22]	[-0.14]	[0.51]	[0.31]
Constant	1.09***	1.04***	1.15***	1.18***	1.19***	0.85*	0.84*
	[4.06]	[3.94]	[4.29]	[4.17]	[4.52]	[2.31]	[2.38]
Observations	5571	5571	5571	4969	5571	3398	3398
Pseudo-R2	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Log-Likelihood	-980.99	-979.00	-982.10	-892.18	-982.44	-528.80	-528.16

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Panel B. Probit Models with the Different Rule-Taking Explanatory Variables

	Dependent Variable = ZL					
Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	-0.04	-0.02	-0.01	-0.19***	-0.05***	-0.00
	[-1.42]	[-0.71]	[-0.42]	[-3.64]	[-4.57]	[-0.19]
LNQ	0.01	0.02	0.02	0.06	0.05	0.02
	[0.20]	[0.36]	[0.39]	[1.02]	[0.93]	[0.39]
LNTA	-0.23***	-0.22***	-0.22***	-0.17***	-0.17***	-0.24***
	[-9.95]	[-9.90]	[-9.93]	[-5.76]	[-5.57]	[-9.81]
INV	0.32	0.34	0.33	-0.05	-0.01	-0.36
	[0.53]	[0.55]	[0.53]	[-0.06]	[-0.01]	[-0.44]
FCF	-0.58	-0.63	-0.63	-1.07*	-1.11*	-0.19
	[-1.27]	[-1.38]	[-1.40]	[-2.06]	[-2.13]	[-0.33]
TANG	-1.20***	-1.23***	-1.24***	-1.00***	-0.99***	-1.16***
	[-6.49]	[-6.65]	[-6.68]	[-4.25]	[-4.16]	[-5.46]
ALTMANZ	0.06***	0.06***	0.06***	0.06***	0.07***	0.05***
	[7.13]	[7.10]	[7.08]	[6.43]	[6.48]	[5.27]
SGA	0.14	0.13	0.13	-1.06*	-1.03*	0.74
	[0.37]	[0.34]	[0.32]	[-2.12]	[-2.03]	[1.59]
Constant	1.60***	1.53***	1.52***	0.49	0.38	1.70***
	[5.52]	[5.44]	[5.39]	[1.39]	[1.06]	[5.36]
Observations	4944	4944	4944	4399	4399	3693
Pseudo-R2	0.19	0.19	0.19	0.21	0.21	0.19
Log-Likelihood	-910.87	-911.68	-911.85	-573.93	-569.72	-632.41

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.

3.4.4.
Matched samples

The nature of our variables of interest (i.e., Zero Leverage, Risk-Taking, and Rule-Taking) draws our attention to possible confounding factors and selection bias in our previous empirical design. To mitigate these concerns and to help us infer causality from our estimations, we present a new set of robustness tests with matched samples. Our identification strategy is to match the subsample of firms with “high” risk-taking with firms with “low” risk-taking. firms with "high" risk-taking are those in the upper tercile of risk-taking, while firms with “low” are those in the bottom tercile. we use propensity score matching to match one firm in each group and in each industry based on the LN of total assets. Thus, we conducted a size-same industry matching. We allow for replacement and used the 3 closest neighbors. Then, we return to our base models using the matched companies only. These new estimations are presented in Table 7 for strict zero-leveraged firms and in Table 8 for almost zero-leveraged firms.

The results of our models utilizing propensity score matching largely replicate those in previous models, with the risk-taking variables showing great robustness, maintaining its significance across different models, with different specifications, lending strong support for H2. Our results regarding our rule-taking variables showed important consistency regarding their coefficients, maintaining the predicted directions and significance for RUL1-2 in most models. The Probit Model with Propensity Score Matching showed significant results for RULE5 and for RULE4 and RULE6 at $p<0.10$. When we change the dependent variable to AZL@1%, RULE1 ceases to be significant but the other proxies with exception of RULE6 maintain their direction and significance.

Table 13

Probit Model with Propensity Score Matching

Panel A. Risk-Taking Explanatory Variables					Panel B. Rule-Taking Explanatory Variables						
	Dependent Variable = ZL					Dependent Variable = ZL					
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	1.19**	1.50**	1.21***	1.27**		-0.07*	-0.09**	-0.05	-0.14+	-0.06*	-0.03+
	[3.25]	[3.28]	[3.46]	[3.19]		[-2.36]	[-2.77]	[-1.60]	[-1.95]	[-1.99]	[-1.72]
LNQ	-0.16***	-0.11**	-0.13**	-0.12*	LNQ	-0.11**	-0.10*	-0.14***	-0.10+	-0.12+	-0.11**
	[-3.81]	[-2.69]	[-2.92]	[-2.55]		[-2.76]	[-2.54]	[-3.70]	[-1.72]	[-1.84]	[-2.64]
LNTA	-0.13***	-0.16***	-0.15***	-0.14***	LNTA	-0.17***	-0.16***	-0.15***	-0.19***	-0.21***	-0.15***
	[-5.87]	[-7.14]	[-7.05]	[-5.96]		[-8.11]	[-7.80]	[-7.29]	[-6.67]	[-7.36]	[-6.73]
INV	-0.18	0.44	-0.57	-0.03	INV	-0.62	-0.66	-0.05	-0.57	-1.80*	-0.49
	[-0.28]	[0.67]	[-0.82]	[-0.05]		[-1.03]	[-1.07]	[-0.08]	[-0.64]	[-2.01]	[-0.76]
FCF	-1.00*	-1.06*	-0.92*	-0.46	FCF	-0.64+	-0.79*	-0.59	-1.12*	-1.21*	-0.14
	[-2.49]	[-2.56]	[-2.19]	[-0.97]		[-1.69]	[-2.10]	[-1.52]	[-2.25]	[-2.42]	[-0.33]
TANG	-1.54***	-1.75***	-1.72***	-1.72***	TANG	-1.52***	-1.53***	-1.73***	-1.54***	-1.71***	-1.64***
	[-8.67]	[-10.34]	[-9.28]	[-8.59]		[-9.61]	[-9.42]	[-10.83]	[-6.97]	[-7.53]	[-9.67]
ALTMANZ	0.10***	0.08***	0.09***	0.10***	ALTMANZ	0.07***	0.08***	0.08***	0.07***	0.07***	0.07***
	[11.33]	[10.02]	[9.96]	[10.01]		[10.09]	[10.53]	[10.33]	[6.47]	[6.35]	[9.14]
SGA	-0.70*	-0.56+	0.08	-0.85*	SGA	-0.41	-0.32	-0.60*	-0.86+	-0.11	-0.68*
	[-2.19]	[-1.76]	[0.23]	[-2.46]		[-1.39]	[-1.08]	[-1.96]	[-1.95]	[-0.26]	[-2.20]
Constant	-1.00+	-0.16	-0.62	-0.71	Constant	0.22	0.28	-0.57	0.49	1.00+	-0.11
	[-1.95]	[-0.37]	[-1.18]	[-1.31]		[0.44]	[0.64]	[-1.09]	[0.85]	[1.69]	[-0.25]
Observations	6110	5973	5465	5155	Observations	7234	7256	7198	3984	3726	5411
Pseudo-R2	0.28	0.28	0.28	0.30	Pseudo-R2	0.28	0.28	0.29	0.28	0.29	0.27
Log-Likelihood	-1016.60	-1037.66	-974.16	-824.99	Log-Likelihood	-1149.40	-1165.25	-1127.88	-616.83	-578.61	-1018.43

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

Table 14

Probit Model with Propensity Score Matching for Almost ZL Firms

Panel A. Risk-Taking Explanatory Variables					Panel B. Rule-Taking Explanatory Variables						
	Dependent Variable = AZL@1%					Dependent Variable = AZL@1%					
Risk-Taking:	RISK1	RISK2	RISK3	RISK4	Rule-Taking:	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	0.99**	1.07*	1.15***	1.23***		-0.04	-0.05*	-0.05*	-0.15*	-0.05+	-0.02
	[3.00]	[2.48]	[3.66]	[3.38]		[-1.36]	[-1.96]	[-2.07]	[-2.51]	[-1.86]	[-0.95]
LNQ	-0.15***	-0.09*	-0.15***	-0.10*		-0.09*	-0.11**	-0.06	-0.06	-0.10**	-0.09*
	[-4.07]	[-2.36]	[-3.67]	[-2.48]		[-2.48]	[-3.24]	[-1.20]	[-1.22]	[-2.64]	[-2.48]
LNTA	-0.15***	-0.18***	-0.17***	-0.16***		-0.17***	-0.16***	-0.20***	-0.20***	-0.16***	-0.17***
	[-8.16]	[-9.55]	[-9.35]	[-8.38]		[-9.72]	[-9.35]	[-8.66]	[-8.43]	[-8.44]	[-9.72]
INV	-0.48	-0.41	-0.88	-0.78		-0.68	-0.43	-0.36	-0.79	-0.66	-0.68
	[-0.92]	[-0.79]	[-1.57]	[-1.39]		[-1.38]	[-0.88]	[-0.52]	[-1.13]	[-1.27]	[-1.38]
FCF	-0.45	-0.70+	-0.33	-0.05		-0.48	0.08	-0.46	-0.57	-0.27	-0.48
	[-1.26]	[-1.90]	[-0.85]	[-0.12]		[-1.40]	[0.22]	[-1.04]	[-1.25]	[-0.72]	[-1.40]
TANG	-1.62***	-1.67***	-1.60***	-1.65***		-1.41***	-1.56***	-1.51***	-1.71***	-1.52***	-1.41***
	[-10.67]	[-11.55]	[-10.35]	[-9.91]		[-10.34]	[-11.42]	[-7.85]	[-8.66]	[-10.50]	[-10.34]
ALTMANZ	0.09***	0.08***	0.09***	0.09***		0.08***	0.08***	0.07***	0.07***	0.08***	0.08***
	[11.45]	[10.58]	[10.30]	[9.68]		[11.65]	[10.74]	[6.89]	[6.95]	[10.29]	[11.65]
SGA	-0.51+	-0.41	-0.12	-0.43		-0.22	-0.45+	-0.99**	-0.45	-0.27	-0.22
	[-1.86]	[-1.49]	[-0.40]	[-1.44]		[-0.85]	[-1.72]	[-2.59]	[-1.19]	[-1.01]	[-0.85]
Constant	0.29	1.19+	1.02*	1.36*		1.03+	0.87	0.98*	1.11**	0.94	1.03+
	[0.51]	[1.95]	[1.98]	[2.54]		[1.81]	[1.47]	[2.37]	[2.62]	[1.58]	[1.81]
Observations	6221	6096	5768	5294		7415	7406	4241	4177	5628	7415
Pseudo-R2	0.27	0.26	0.27	0.28		0.27	0.27	0.27	0.29	0.26	0.27
Log-Likelihood	-1447.78	-1450.59	-1347.02	-1207.51		-1646.08	-1636.85	-871.32	-849.71	-1415.41	-1646.08

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05 + p<0.10

3.5.
Discussion

Overall, our results were consonant with both our hypotheses. As predicted in H1, our main rule-taking proxy (RULE1), as well as RULE2 and RULE3, were negatively associated with the likelihood of zero leverage and showed robustness throughout several models. Likewise, our main risk-taking proxy (RISK1), as well as RISK2, RISK3 and RISK4, were positively associated with the likelihood of zero leverage and showed robustness throughout several models, lending strong support for H2. The coefficients for risk-taking were highly significant across models, often with $p<0.001$, a very stringent threshold. The rule-taking variables tended to reach lesser thresholds of significance. Nevertheless, in general, our results indicate that rule-taking and risk-taking variables can help explain the occurrence of zero leverage above and beyond traditional controls. Our models with more stringent specifications had a Pseudo-R^2 in the range of 26-30%, suggesting that those models offer a significant level of improvement over models without our risk-taking or rule-taking explanatory variables.

We interpret these results as in line with our theoretical background. Regarding rule-taking, there is a consensus regarding the benefits of leverage, and since the firm with higher levels of managerial rule-taking is expected to be a follower of the "best practices" of the market, of recommend policies by corporate governance activists, the board of the directors, and that non-zero leverage is a much easier to communicate policy, one could expect a theoretical negative association between rule-taking and zero leverage.

On the other hand, firms with higher levels of risk-taking are expected to be more immerse in less charted territories and more dependent on the alertness and creativity of their managers to capture opportunities that involve estimates that are better than the market's. However, because the more immerse in uncertainty a firm is, the greater its expected opacity to outsiders, and the less likely this gap can be overcome by communication, outsiders such as creditors, uneasy with increased opacity and risk-taking, will demand a greater premium on their external funds, thus widening the wedge between the costs of internal and external financing. Finally, because of this extended wedge, eschewing debt may become a strategic decision for the risk-taking firm.

3.6.
Conclusion

In this paper, we offer a novel outlook to a phenomenon that has puzzled researchers for decades. We derived new propositions from the integration of different disciplines, each of them bringing a unique perspective to issue of making decisions in an uncertain world. We developed the construct of rule rule-taking, which reflects a situation of high board power and low managerial discretion, and we underlined two hypotheses concerning how the interplay of governance, managerial discretion and creativity can affect a firm's financing behavior in apparently surprising ways. We hypothesize that our novel construct of rule taking is negatively associated with zero leverage whereas that risk-taking is positively associated with zero leverage. Using a cross-sectional probit model with a sample of 11,784 firms, our overall results lend moderate support for our hypotheses.

Finally, this paper demonstrates that the articulation of traditional finance problems with theories on entrepreneurship and creativity may lead to interesting and useful insights that can inform research and policy in the field. We encourage more theoretical advances in the direction of joining different research strands to investigate surprising phenomena, as well as further refinement and exploration of the novel construct of rule-taking in future studies. We believe that interdisciplinary conversations of the type proposed in the paper may help illuminate long-standing issues in the fields of finance and governance and can empower researchers to tackle complex and difficult questions in a more comprehensive and integrative way.

3.7.
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3.8.
Appendix (Paper 2)

Table A1
Variable Description

Panel A. Dependent variables and Controls		
	Description	Source
ZL	Dummy that equals '1' if Short-Term Debt and Long-Term Debt / Total Assets is lower than 0.1%	Orbis
AZL@1%	Dummy that equals '1' if Short-Term Debt and Long-Term Debt / Total Assets is lower than 1%	Orbis
AZL@5%	Dummy that equals '1' if Short-Term Debt and Long-Term Debt / Total Assets is lower than 5%	Orbis
LNQ	Natural logarithm of Market Capitalization / Total Assets	Orbis
ROA	Return on Assets	Orbis
LNTA	Natural logarithm of total assets	Orbis
CAPEX	Capital Expenditures / Gross Sales	Orbis
DEBT	Total Debt / Total Assets	Orbis
INV	Δ Net Property, Plant & Equipment / Lagged Total Assets	Orbis
FCF	Net Profit – Total Depreciation Amortization and Depletion / Lagged Total Assets	Orbis
TANG	Fixed Assets / Total Assets	
ALTMANZ	Altman's Z score = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5, where X1 = working capital / total assets; X2 = retained earnings / total assets; X3 = EBIT / total assets. X4 = market value of equity / total liabilities; X5 = Gross sales / total assets	Orbis
SGA	Gross Sales – Gross Sales in previous year / Gross Sales in previous year	Orbis
IND	Vector of industry dummies based on the Fama-French 30 industry classification	Orbis
COUNTRY	Vector of country dummies	Orbis
Panel B. Governance-related variables		
	Description	Source
LNBS	Natural logarithm of the number of board members	Orbis
DIROWN	Percentage of shares owned by all directors,	Orbis
LSHR	Ownership of the largest shareholder	Orbis
NONDUAL	Dummy that equals '1' if the CEO does not accumulate the role of Chairperson of the Board of Directors	Orbis
Panel C. Proxies for the Risk-Taking and Rule-Taking Constructs		

	Description	Based on
RISK1	Absolute value of the residuals from the regressing ROA on LNTA, CAPEX, DEBT and IND and COUNTRY dummies.	Nakano & Nguyen, 2012; Adams *et al*., 2005
RISK2	Absolute value of the residuals from the regressing ROA on LNTA, CAPEX, DEBT and COUNTRY dummies per industry.	
RISK3	The difference between the firm expected ROA and the expected ROA of its industry.	
RISK4	The difference between the firm expected ROA and the expected ROA of its industry and country.	
LNQRES	Absolute value of the residuals from the regressing LNQ on LNTA, CAPEX, DEBT and IND and COUNTRY dummies.	
ROASD	Standard Deviation of ROA in the last 9 years.	
LNQSD	Standard Deviation of LNQ in the last 9 years.	
RULE1	The summation of LNBS, DIROWN, LSHR converted to dummies that equal '1' if the value of that variable is above the median and '0' if the value is below the median plus NONDUAL	Developed for this study
RULE2	The same as RULE1 but with the median calculated by legal system.	Developed for this study
RULE3	The same as RULE1 but with the median calculated by country.	Developed for this study
RULE4	The first factor extracted from the factor analysis of the same variables that composed RULE1 utilizing a varimax rotation..	Developed for this study
RULE5	The latent variable from the confirmatory factor analysis utilizing the same variables that composed RULE1 as observed variables.	Developed for this study
RULE6	The summation of LNBS, DIROWN, LSHR converted to dummies that equal '1' if the value of that variable is in the upper tercile; '0' if the value is the middle tercile; and '-1' if the value is in the bottom tercile plus NONDUAL where the dummy takes a value of '1' if true and a value of '-1' if not true.	Developed for this study
H-RISK	Dummy that equals '1' if the value of RISK is in the upper tercile.	Developed for this study
H-RULE	Dummy that equals '1' if the value of RULE is in the upper tercile.	Developed for this study
L-RISK	Dummy that equals '1' if the value of RISK is in the bottom tercile.	Developed for this study
L-RULE	Dummy that equals '1' if the value of RULE is in	Developed for

the bottom tercile. this study

Table A2

Observations by Country

Country	N	Percentage	Country	N	Percentage
Australia	322	2.73	Mexico	42	0.36
Bangladesh	35	0.30	New Zealand	55	0.47
Belgium	70	0.59	Nigeria	42	0.36
Bermuda	282	2.39	Norway	66	0.56
Brazil	107	0.91	Oman	35	0.30
Canada	231	1.96	Pakistan	158	1.34
Cayman Isl.	316	2.68	Philippines	109	0.92
Chile	72	0.61	Poland	80	0.68
China	445	3.78	Russia	77	0.65
Cyprus	33	0.28	Saudi Arabia	87	0.74
Denmark	56	0.48	Singapore	221	1.88
Egypt	82	0.70	South Africa	143	1.21
Finland	53	0.45	South Korea	461	3.91
France	299	2.54	Spain	60	0.51
Germany	83	0.70	Sri Lanka	116	0.98
Greece	86	0.73	Sweden	164	1.39
Hong Kong	107	0.91	Switzerland	113	0.96
India	1,339	11.36	Taiwan	831	7.05
Indonesia	195	1.65	Thailand	334	2.83
Iran	60	0.51	Turkey	130	1.10
Israel	177	1.50	U.K.	453	3.84
Italy	113	0.96	U.S.A.	1,451	12.31
Japan	1,096	9.30	U.A.E.	39	0.33
Jordan	46	0.39	Vietnam	286	2.43
Kwait	64	0.54			
Malaysia	462	3.92	Total	11,784	100.00

4
Paper 3: Risk-Taking, Rule-Taking and Investment-Cash Flow Sensitivity

Abstract

We examine whether firm's investment-cash flow sensitivity (ICFS) is affected by corporate risk-taking and by a novel construct called managerial rule-taking. We take an entrepreneurial view of risk-taking, integrating principles from the economics and creativity literature, to lay the theoretical background regarding risk-taking behavior and ICFS. We hypothesize that because risk-taking is associated with the undertaking of opportunities driven by managerial alertness, and not be the firm's cash flow situation, risk-taking mitigates ICFS. Our novel construct, managerial rule-taking, reflects the degree to which a CEO can be overruled, suffer intervention, or have their discretionary power constrained. We hypothesize that because rule-taking exacerbates agency conflicts, creating a more conducive environment for the CEO to incur in the traditional self-serving behaviors, such as shirking and overinvesting, rule-taking augments ICFS. Using a cross-sectional robust regression model with a sample of 11,784 firms, our results lend strong support for the risk-taking hypothesis, but modest support for the rule-taking hypothesis. Overall, this study offers an important contribution to the understanding of the determinants of ICFS, expanding knowledge on how different firm-level configurations regarding corporate governance and managerial investment behavior can influence a firm's financing behavior.

*Keywords***:** Corporate Governance, Investment-cash flow sensitivity, Financing behavior, Risk-taking, Rule-taking

4.1.
Introduction

Investment-cash flow sensitivity (ICFS) reflects the extent to which firms' capital investment depends on the availability of internal cash flow (Almeida & Campello, 2007; Hubbard, 1998). The occurrence of ICFS violates the premises of traditional finance models (e.g. Modigliani & Miller, 1958), which assume that external funds can provide a perfect substitute for internal capital. In those models, a firm's investment decisions should be independent of its financial condition and firms should neither forgo investing in projects with a positive net present value (NPV) because of constraints on finance nor overinvest when there is plenty of internally generated cash flows. However, in a world of imperfect markets, asymmetry of information, agency conflicts and other transaction costs, the perfect substitutability assumption is broken, ultimately resulting in either underinvestment when cash flows are low or overinvestment when cash flows are high (Chowdhury, Kumar & Shome, 2016; Attig, Cleary, El Ghoul & Guedhami, 2012; Agca & Mozumdar, 2008; Hubbard, 1998; Kaplan & Zingales, 2000, 1997; Fazzari, Hubbard & Petersen, 1988).

Although previous studies have identified important firm- and market-level predictors of investment- cash flow sensitivity, including information asymmetry (Ascioglu *et al*., 2008), ownership structure (Pindado *et al*., 2011; Pawlina and Renneboog, 2005), the existence of labor unions (Chen and Chen, 2013); and R&D and equity market development (Brown & Petersen, 2009), the literature is still inconclusive regarding the determinants of this sensitivity (Han & Pan, 2015; Lamont, 1997). Despite this contentious state, few studies have addressed this question from the perspective of "managerial strands" (Mayers, 1984) other than that of the agency theory.

In this paper, we provide a new explanation for investment-cash flow sensitivity from the perspective of the 'alertness' (Kirzner, 1973) and creativity (Simonton, 2013) of the firm leader, also exploring the role of firm-level governance systems in supporting or restraining the CEO's latitude of action. Our perspective is novel to the extent that it integrates three different strands of literature, with a high potential for synergies, but which have rarely been articulated with one another: the managerial discretion literature (e.g., Hambrick & Finkelstein, 1987; Hambrick & Abrahamson, 1995; Wangrow, Schepker &

Barker, 2015); the economic theories of profit and entrepreneurship (Kirzner, 1979; Mises, 1952; Schumpeter, 1936; Knight, 1921); and the theories on creativity and its communication (Simonton, 2016; Csikszentmihalyi, 2014, 1999; Greene, 1984; Mednick, 1962). Based on this approach, we advance a novel perspective on risk-taking, which incorporates insights from creativity research, and we develop the novel construct of managerial rule-taking, which incorporates insights from the managerial discretion literature and from the hazards of overruling managerial initiative when knowledge distribution is uneven (Hayek, 1945). Then, we develop how these constructs can affect the occurrence of ICFS in firms.

Risk-taking is hypothesized to diminish ICFS because we associate risk-taking with more "principled" investment decisions, driven by the CEO alertness and their peculiar inside knowledge (H1). Thus, alertness-based investment decisions should occur independently of whether the firm has been enjoying positive cash flows. A high degree of rule-taking, on the other hand, is hypothesized to augment ICFS (H2). When board enacts a high rule-taking structure, it tends to foster conservatism in decision-making as well as exacerbate the principal-manager differences, which tend to create the environment for typical self-serving behaviors that have been associated with the occurrence of ICFS.

By utilizing a cross-sectional probit model with a sample of 11,784 firms from the *ORBIS - Bureau Van Dijk* database, the results found lend strong support for H1, but modest support for H2. This study, however, offer an important contribution to the understanding of the behavior of ICFS when different firm-level configurations regarding corporate governance and managerial investment stance are at play.

4.2.
Literature review and hypotheses development

4.2.1.

Investment-cash flow sensitivity (ICFS)

The discussion on ICFS can be traced back to the seminal paper by Fazzari, Hubbard and Petersen (1988)—hereinafter, FHP. They showed that contrary to the traditional assumption that a firm's financial structure is irrelevant to investment, a firm's decision to invest may depend on financial factors such as the availability of internal finance, access to new debt or equity finance, or the functioning of credit markets. In their view, ICFS arises mainly because of asymmetric information, which along with other capital markets imperfections, can make it very costly or even impossible for providers of external finance to assess the quality of a firm's investment opportunities. This leads to a wedge between the costs of internal and external financing, which in turn creates a dependency between investment and the availability of internally generated cash, ultimately creating the sensitivity.

Since FHP, ICFS has been placed as an important empirical phenomenon concerning the impact of market imperfections on financial markets and firms' behavior. It also has inspired several subsequent studies, with FHP's original analysis being replicated with different choices of methods and design (see Hubbard, 1998, for a review). Additionally, the IFCS analysis was extended to other types of investment, including R&D expenses (Himmelberg & Petersen, 1994), inventory investments (Carpenter *et al*., 1998), cash savings (Almeida *et al*., 2004; Ferreira & Vilela, 2004) and total assets (Carpenter & Petersen, 2002) (see also Bertoni, Colombo & Croce, 2010, p. 530). Despite the impact of FHP, their claim that ICFS represents financial constraints have been challenged by several authors. Kaplan and Zingales (2000, 1997) contend that instead of representing financial restrictions, IFCS may be driven by firm-specific effects on the level of investment, or by model misspecifications. Almeida, Campello & Weisbach (2004) argue that ICFS represents demand for liquidity. Finally, Moyen (2004), Alti (2003) and Gomes (2001) show that measurement errors and identification problems can generate positive results even when financing restrictions are absent.

Another discussion, more relevant for the goals of this article, concerns the different arguments advanced to explain the occurrence of ICFS itself. Two major explanations have received wide interest in the literature: the pecking order

argument and the arguments based on the agency theory (AT). The pecking order argument (Myers & Majluf, 1984) poses that ICFS arises due to an inflated cost of external funds, which causes firms to rely more on internal funds and pass up projects, even though they may have positive net present value (NPV). Investment is resumed when internal funds become available again. In this perspective, the major source of the problem is information asymmetry, which creates the wedge between internal and external funds (Myers & Majluf, 1984; Greenwald, Stiglitz & Weiss, 1984).

The AT proposes that because managers lack the diversification possibilities of shareholders and have most of their capital tied to the firm in the form of undiversifiable human capital, they tend to be more risk averse. This is because an event of great loss of firm value, or an eventual bankruptcy, would have a more dramatic effect on them than on shareholders (Jensen & Meckling, 1976; Fama, 1980; Jensen, 1986). Due to this risk aversion, managers may forgo risky but positive NPV projects, causing an underinvestment problem (see also Grossman & Hart, 1982; Stulz, 1990; and Hart & Moore, 1995). The other side of ICFS, overinvestment, is explained by AT via the free cash-flow argument (Jensen, 1986). It posits that a misbehaving manager can take advantage of the lower cost of internal funds and overspend firm's cash on self-serving, but unprofitable projects. The theory also predicts that efficient governance mechanisms should mitigate the manager's ability to overinvest, especially in the presence of lower cost internal funds.

4.2.2.
Risk-taking, Managerial Creativity and Alertness to Opportunities

Risk-taking is commonly associated with investments of higher financial risk, as well as the behavior of seeking higher potential returns. However, much of the literature regarding risk-taking and IFCS is based on the tenets of AT. As seen, AT is based on a presumption of mistrust between principals and agents and purports that managers may increase their personal utility by being risk averse. We argue that this managerial behavior is closer to the more traditional view of firm leadership, in which the firm leader behaves like Clark's (1902) "manager-coordinator": solely centered on the oversight of the ongoing efficiency of the firm. However, in an environment of increasing uncertainty or where creativity is

needed to generate value, the firm leaders are less and less like the "manager-coordinator" depicted by Clark (1902) and more and more like the alert entrepreneurial manager outlined in the works of Kirzner (1973), Shackle (1970) and Schumpeter (1983).

The entrepreneurship literature pictures the economy as a big "creativity tournament" in which every firm is potentially a vector of creativity—generating disruptions that will affect other firms—but also a possible "victim" of the creativity of others, having their plans and projects disrupted by innovations generated elsewhere. Accordingly, the role of the top manager of the firm must be to deal with an uncertain environment, being alert to the possible disruptions but also to opportunities of profit "which hitherto had not been suspected of existing at all" (Kirzner, 2009, p. 151). In the entrepreneurship view, this is the only way to guarantee the long-term competitive advantage of the firm (see also Hoskisson *et al*., 2017). Thus, according to scholars of this strand (e.g., Schumpeter, Baumol, Kirzner), risk-taking is a vital element for both (economical) profit-making and the long-term survival of the firm. In sum, this approach views the role of the firm leader as to constantly envision and implement projects with a potential to grow the firm's value, generating gains for different parties in the firm, including both managers (agents) and shareholders (principals). However, as there is competition and uncertainty in the market, the manager must often go beyond the obvious and venture into less trodden paths to discover those "hidden opportunities".

This entrepreneurial view of risk-taking converges with what the creativity literature implies regarding risk-taking and decision-making under uncertainty. In fact, it is quite remarkable that the depictions by Kirzner of the firm leader finding opportunities that had "not been suspected of existing at all", or that might be hidden "around the corner" (Kirzner, 2009, P. 151), are so in line with what Simonton (2013), probably independently, described in the field of creativity as a response with both low initial probability and low prior knowledge.

Simonton (2016) argues that a creative response is a function of the values of three parameters: the initial probability of the response; the actual utility of the response; and prior knowledge of the actual utility for that particular response. The initial probability of the response p refers to the likelihood of that response coming immediately to the mind. A value of p=1 indicates that the response is instantaneously or automatically available whereas p=0 indicates that the response

will not be immediately available and thus may require an incubation period before the response can be even concatenated. The actual utility of the response *u* is a straightforward parameter and refers to meeting the standards of usefulness of an idea. In finance, we can conceive of a useful idea that which leads to a positive net present value project. It is important to note that *u* can only be assessed *a posteriori*. Aprioristic knowledge, or prior knowledge of the actual utility for the response, is in fact the last parameter, *v*. A value of *v*=1 indicates a perfect match between, say, the estimates of a project and its realized NPV whereas *v*=0 indicates complete uncertainty regarding the outcome.

Based on these parameters, a very creative response is one that is unexpected and surprising (low probability and low *a priori* knowledge of value), and that turns out to be useful (high *a posteriori* value) (Simonton 2016, 2013; see also Gabora, 2017). That implies a mix of both divergence and convergence. That is, the creativity seekers must go after responses that diverge from other common, obvious, or immediately available responses, but they also must arrive at a solution that is ultimately perceived as valuable. In the case of firm management, it often means undertaking a project that may be perceived as deviant, or as a gamble at first, but whose final result increases the firm's value, thus being in line with the interests of both principals and agents.

4.2.3.
Risk-Taking, "environmental scanning" and ICFS

As seen, a CEO who wants to perform above and beyond the market should often seek responses that are not readily available and that may require a significant incubation period or the acquisition of unique knowledge before the actual investment prospect can become clear. Wee pose at least to ways that a risk-taking CEO can invest in a way that should be independent from the firm's cash flows.

The first way is called "principled investing", named here in opposition to the expropriative investment behaviors depicted in AT; i.e., either overinvestment, driven by self-serving behavior, or underinvestment, driven by shirking and risk-aversion. Thus, it is a type of investment that seeks growth beyond expectations based on the opportunities that a firm leader has been alerted to and the markets and competitors have not, therefore allowing for supernormal profits. It is also

important to note that principled investing also goes beyond the traditional understanding of a good project; i.e., that with a positive NPV. Principled investing means that the CEO seeks not only any positive NPV projects, but those that are consonant with the firm's long-term growth strategy and that will allow the firm to have a sustainable competitive advantage.

Signaling investing, in a sharp contrast with principled investing, stems from the CEO's desire to climb the ladder in the race to win the job-market contest in which CEOs compete to assume the position in the leading firm in their industries. To reach this position, the CEO is incentivized to take more risks in order to signal to the market their superior ability. This phenomenon is explored in literature on industry tournament incentives, with well-reported associations between these industry tournament incentives and managerial risk-taking (Coles *et al*., 2017 ; Kini & Williams, 2012)

Despite the differences in the nature and motivation of the principled and signaling investment behaviors, we argue that they both involve the "environmental scanning" (Sauner- Leroy, 2004) that is typical of those investments seeking calculated risks, which are nevertheless primed on the alertness of managers. Thus, even though signaling investing is expected to be more associated with short-term results and managerial career concerns, contrasting with principled investing, which is expected to be associated with strategic and long-term investments for the firm, both of them involve a careful environment scanning that should be independent of firms endogenous variables such as its cash flows. Thus, in both situations strategic risks are undertaken by the CEO, but they are not determined by whether the firm has been enjoying positive cash flows or not; instead, it is determined by the external environment, which provides the perceived growth opportunity, as well as the maturation time for the CEO to be alerted to this opportunity.

In sum, the risk-taking that involves the attempt to go beyond the market perception involves a process with its own timing and there is no good reason for it to be related with previous cash flow in the firm. A risk-taking CEO, driven by their alertness, is expected to invest based on the perceived value of an opportunity and its perceived maturation, and not on the situation of the firm's cash flows. Therefore, in firms with a greater level of risk-taking, the sensitivity

between investment and cash flows should be lower. Due to this reasoning, we hypothesize that:

H1: Risk-taking has a negative influence on Investment-Cash Flow Sensitivity

4.2.4.
Rule-taking and Managerial Latitude of Action

The entrepreneurship literature deals with a "non-serene" market in which novelties disrupt plans and frustrate the implementation of Grossman and Hart's (1986) comprehensive contracting. It also drives a "creativity tournament" in which firm leaders must increasingly go beyond the obvious and venture into less trodden paths to discover better opportunities (Schumpeter, Baumol, Kirzner). However, despite the importance of managerial creativity for firm growth and survival, some companies, because of their environment, structure or internal organization, will see other dilemmas as equally—or even more—important. One of the major problems that a firm faces which can outweigh the necessity for creativity is the agency conflict (Jensen & Meckling, 1976). Like Akerlof's (1970) unscrupulous seller that can "spoof" items and defraud the buyer without the latter's notice, a misbehaving manager can take advantage of their discretion to pursue their self-serving interests at the expense of the firm, generating loss of firm value. Because of that, it is "obviously important" (Hart, 1995, p. 681) to exist checks and balances on managerial behavior.

However, when these checks and balances are so high that it significantly narrows the latitude of action of the manager, it leads to a configuration of high managerial rule taking. In this situation, *a priori* trust is reduced, and the manager is disenfranchised to pursue the projects that they perceive as valuable based on their differential knowledge, but which can generate some ambiguity in the minds of the powerful parties that monitors the CEO. The checks and balances will demand a justification that is costly, given that projects are innovative precisely because they are embedded with special knowledge and understanding that is peculiar of insiders—and may be lacking in outsiders, such as the board of directors. As a result, only a narrow range of options that hold plausibility in the eyes of powerful parties (cf. Hambrick & Abrahamson, 1995, p. 1429) will be really available to the manager and pursuing projects with greater uncertainty or

ambiguity—as assessed by external parties—becomes increasingly difficult, unless the opportunity can be communicated precisely and pass through the checks imposed on the management. In other words, the greater transaction costs for the communication of creative projects make the rule-taking manager, and the organization, less likely to "create a world that is much different from that which they find" (Kirzner, 2009, p. 146).

4.2.5.
Rule-Taking, Managerial Constraints and ICFS

Since the rule-taking manager has their creativity highly constrained, the actions undertaken by the firm are likely to be those that are perceived to offer more security for the shareholder, or that are more aligned with the "best practices" of the market and preferred policies of corporate governance activists. This steers the organization toward a more conservative position.

Excessive conservatism by managers has been associated with the phenomenon of ICFS in previous research (Kaplan & Zingales, 1997; Han & Pan, 2015). We argue that the firm's governance structure can also contribute or exacerbate this conservatism in the investment decisions by imposing more barriers to ambiguous or uncertainty-laden projects and reducing them to projects in which the board understands that there is higher *a priori* confidence of the positivity its NPV. Besides reinforcing Hambrick and Abrahamson's (1995) point of firms in which only a narrow range of options seem plausible in the eyes of powerful parties, it will affect the distribution of the pool of projects a manager can choose. With a smaller range and lower deviance in the pool of possible projects (either in the present or in the future), each growth opportunity is more likely to resemble any other opportunity in terms of risks, uncertainty and novelty, and is less likely to make a large impact on itself, either in comparison with past choices or with alternative projects. Thus, the more future growth opportunities are expected to be like each other and past opportunities, the less they are expected to weigh in the decision to invest. As a consequence, more room is created for other elements, such as the availability of resources from cash flows, to have a lager effect in decision-making.

In addition, high managerial rule-taking is expected to be indicative of greater underlying misalignment between managers' and shareholders' interests.

Davis, Schoorman and Donaldson (1997) proposed a principal-agent choice model in which both the board and the manager can choose between acting in a self-interest, agentic-type fashion, or in a more collective, steward-type fashion. In this game, there are two "honest" strategies: either both act like agents, or both act like stewards. That said, when boards opt for a high rule-taking structure, they are sending a clear signal to managers that they expect an agentic-type relationship. Therefore, it should not be surprising that in a high rule-taking situation the inherent inequalities between principals and agents can become exacerbated, and managers will more often incur in the traditional self-serving behaviors, such as shirking and overinvesting. Such behaviors, as predicted by the risk-aversion explanation and the free cash flow theory (Jensen, 1986), will contribute to the occurrence of ICFS.

Finally, high rule-taking can have adverse effects on the managerial motivation toward more creative projects when, in an eventual contest of subjective positions or estimates, the board would be sure to have the upper hand, even though it might not have the best information. This reduced locus of control, generally coupled with an increased demand for compliance and more detailed explanations for managerial actions, can thus indirectly incentivize the opposite behaviors, such as shirking (which has been previously associated with ICFS). In addition, if less performance deviance is the norm for the firm, and asymmetric volatility is a real phenomenon (market uptrends tend to be more gradual and downtrends tend to be sharper and steeper; Black, 1976), an eventual outlying negative NPV project may have a more dramatic effect on the CEO if they are in a high rule-taking firm. The situation can be exacerbated if the project is financed by external sources. This, again, generates an incentive to couple investments with the availability of internally generated resources. Thus, for the reasons above, it is hypothesized that:

H2: High rule-taking has a positive influence on Investment-Cash Flow Sensitivity

4.3. Empirical Design

4.3.1.
Data source, sample selection and data treatment

Our sample was collected from *ORBIS - Bureau Van Dijk*. This database possesses accounting, financial, ownership and governance data from more than 200 million companies, and a significant amount of them are of private capital. Thus, this database was especially appropriate for our objective to study the interplay of governance and other financial variables on ICFS across private and publicly traded companies.

Our sample included firms from all countries with at least 50 observations in the database. We excluded firms belonging to the financial sector and firms with negative or missing total assets and gross sales, as well as firms with negative or missing capital stock (net property, plant and equipment). Furthermore, to alleviate the effect of extreme observations, we winsorize the data at 1% in both tails. For missing values, we performed a listwise deletion, with 10,845 observations deleted due to missing values in the rule-taking variable and 53,890 deleted due to missing values in the risk-taking variable. The final sample comprises 11,784 firms from 37 countries. Because ORBIS only contains director-level data for the last fiscal year, we study a cross-sectional sample in the year of 2017.

4.3.2.
Variables measurement

Following Pawlina and Renneboog (2005), Pindado *et al*. (2011), and Kuo and Hung (2012), we gauge our dependent variable, investment (INV), as the change in net fixed assets plus depreciation & amortization expense over lagged total assets. Cash flow (CF) is measured by net income plus depreciation & amortization (Pindado *et al*., 2012). Both investment and cash flow are divided by lagged total assets, thus normalizing the sample by commonly used proxy of size. As further controls, we include the Tobin's Q, measured as the natural logarithm of market capitalization to total assets (LNQ), as an estimate of a firm's over- or under-valuation. Finally, we add a vector of industry and country dummies to control for industry and country-specific effects.

To measure risk-taking (RISK1), we utilize a similar strategy to Nakano and Nguyen (2012) and Adams *et al*. (2005). That is, risk-taking by is gauged by

calculating the firm's absolute deviation from expected performance based on return on assets (ROA). The regression model utilized follows:

$$ROA_i = \gamma_1 + \gamma_2 LNTA_i + \gamma_3 CAPEX_i + \gamma_4 DEBT_i + \phi.IND + \psi.COUNTRY + \varepsilon_i \quad (1)$$

Where ROA is return on assets; LNTA is the log of total assets; CAPEX is capital expenditures divided by sales; DEBT is the ratio of total debt to total assets; IND is a vector of industry dummies based on the Fama-French 30 industry classification; COUNTRY is a vector of country dummies; and ε is the error term.

To measure our novel construct, rule-taking, we utilized an aggregation of variables that have been consensually associated in the literature with more control over the managerial latitude of action (Hoskisson, Chirico, Zyung & Gambeta, 2017; Wangrow, Schepker & Barker, 2015; Chen *et al*., 2010; Hambrick, 2007; Finkelstein & Boyd, 1998; Hambrick & Abrahamson, 1995; Hambrick & Finkelstein, 1987). These variables are: (i) the number of board members (LNBS), representing the size of the board and calculated by the natural logarithm of the number of board members; (ii) the percentage of shares owned by all directors (DIROWN), representing the ownership of the board; (iii) the ownership of the largest shareholder (LSHR), representing the existence of blockholders and the existence of a large concentration of power in one or more shareholders; and (iv) CEO non-duality (NONDUAL), representing a situation in which the CEO does not accumulate the role of chairman of the board and therefore cannot enjoy such unity of power. Thus, our primary proxy of rule-taking (RUL1) is constituted by the summation of these four variables dichotomized at the median. That is, we create a dummy for each component that receives the value of '1' if the variable is above the median; otherwise, it receives a value of '0'. Since the variable NONDUAL is already a dummy variable, it remained unchanged. Thus, the values of RULE1 range from '0' to '4', where a final score of '0' occurs when the values of LNBS, DIROWN and LSHR are all below the median and NONDUAL equals '0'. Conversely, a final score of '4' occurs when all the former variables are above the median and NONDUAL is true.

To add robustness to our estimations, we also included alternative measures to our dependent variable and explanatory variables of interest. For our dependent variable, we include two extra measures for *almost* zero leverage firms, with a threshold of debt at 1% (AZL@1%) or at 5% (AZL@5%). For risk-taking, we calculated an alternative measure (RISK2) utilizing Tobin's Q (LNQ) instead ROA in the left-hand side of Equation (1). For rule-taking, we calculated two alternative proxies. RULE2 follows a similar strategy to RULE1, but instead of dichotomizing the three sub-components at the median, we utilized terciles for a more granulated distribution. If the variable was in the bottom tercile, it received a value of '-1'; if the variable was in the middle tercile, it received a value of '0'; and a value of '1' was attributed for variables in the upper tercile. To have a consistent interval, the dichotomous variable NONDUAL received the value of '1' if true and '-1' if not true. Finally, for RULE3, we conducted a factor analysis of the four elements of rule-taking (LNBS; DIROWN; LSHR and NONDUAL) utilizing a varimax rotation. The first factor extracted became the RULE3 variable. This factor had an Eigenvalue of 1.11 and a proportion value of 27.83%, thus representing adequately the distribution of the loadings by each component. The final scoring coefficients after the regression based on varimax rotated factors were NONDUAL = 0.48; LNBS = 0.40; DIROWN = 0.46; and LSHR = 0.55.

For the purposes of matching and to further verify the robustness of our results, we also classified the firms into sub-samples according to how high (low) they scored in risk-taking and rule-taking. Firms with a score in the upper tercile were classified into the 'high score' group whereas firms with a score in the bottom tercile were part of the 'low score' group. By repeating the procedure for our main variables of interest and their alternative proxies, we obtained five dummies representing high score on the target variables (H-RISK1, H-RISK2, H-RULE1, H-RULE2 and H-RULE3, respectively) and another five dummies representing low score on the same variables (L-RISK1, L-RISK2, L-RULE1, L-RULE2 and L-RULE3, respectively). A summary of all variables and their descriptions is found in Table A1.

4.3.3.
Empirical Model

For our base model, we depart from Fazzari *et al.*'s (1988) reduced-form investment equations, adding as controls the Tobin's Q (LNQ) and the vectors of industry (IND) and country (COUNTRY) dummies:

$$INV_i = \beta_1 + \beta_2 LNQ_i + \beta_3 CF_i + \phi.IND + \psi.COUNTRY + \varepsilon_i \quad (2)$$

Where INV is the change in net fixed assets plus depreciation and amortization expenses; LNQ is the natural logarithm of market capitalization to total assets lagged by one time period; CF is the net income plus depreciation over amortization minus change in the working capital plus capital expenditures lagged by one time period; IND is a vector of industry dummies based on the Fama-French 30 industry classification; COUNTRY is a vector of country dummies; and ε is the error term.

On our base model, we add the variables of interest (represented by χ) and their interactions with CF to analyze their effect on the sensitivity of cash flow to investment. These additional variables are also lagged by one time period in the estimations:

$$INV_i = \beta_1 + \beta_2 LNQ_i + \beta_3 CF_i + \beta_4 \chi_i + \beta_5 (\chi_i * CF_i) + \phi.IND + \psi.COUNTRY + \varepsilon_i \quad (3)$$

Additionally, following Adams, Almeida and Ferreira (2005) intuition, we investigate whether the sub-samples of firms with a high value in our variables of interest (risk-taking and rule-taking) differ from the sub-samples of firms with a low value in the same variables regarding their sensitivity of investment to cash flow. That is, we compare the betas of different categories of firms by regressing our dependent variable (INV) on cash flow (CF), controlling for Tobin's Q, for separate sub-samples. We expect that the sub-sample of firms with high values on risk-taking (upper tercile) will have a much smaller absolute coefficient (beta) regarding their cash flow when compared to the sample in the bottom tercile of risk-taking. In other words, high risk-taking firms are expected to have less

sensitivity of investment to cash flow. We expect the opposite effect for our sub-samples regarding high rule-taking (upper tercile) and low-rule-taking (bottom tercile). That is, the sub-sample of high rule-taking firms should have a greater absolute coefficient (beta) regarding their cash flow when compared to the sample in the bottom tercile of rule-taking. To carry out this and compare the different betas, we utilize Paternoster *et al.*'s (1998) recommended equation, in which the estimate of the standard deviation of the sampling distribution in this formula is unbiased:

$$Z = \frac{b_1 - b_2}{\sqrt{SEb_1^{\,2} + SEb_2^{\,2}}} \tag{4}$$

Where b_1 and b_2 represent the coefficients (betas) to be compared, and SE represents the standard errors.

4.4. Results

4.4.1. Descriptive Statistics

Table 1 shows the summary statistics for our variables, including the dependent variable (INV), the controls (LNQ, LNTA), the interaction variable cash flow (CF), our variables of interest (RISK1 and RULE1), as well as their alternative versions used for robustness (RISK2, RULE2, RULE3). INV has high positive skew; LNQ has an almost symmetric distribution; LNTA a very slight positive skew; and CF has a moderate negative skew. Regarding the weight of the tails relative to the rest of the distribution, INV and CF show high kurtosis while LNQ and LNTA show a kurtosis of slightly less than three, the value for a normal distribution.

RISK1 and RISK2, being composed of absolute values, have an expected positive skew, and their values range from zero to 6.17 and 3.62, respectively, with a standard deviation of 0.78 and 0.53, respectively. RUL1 has values between '0' and '4'. Zero occurs when all second-order elements are untrue; conversely, the value of '4' occurs when all of them are true for a given firm. The distribution shows a high incidence of the value '1', with a highly positive skew.

Similarly, RULE2 ranges from ‘-4’ to ‘4’, with the same mode of ‘1’; however, in contrast with RULE1, it gives the distribution a negative skew. Finally, RUL3, based on the factor analysis of the second-order elements of rule-taking, ranges from -5.11 to 8.11 and demonstrates a moderate positive skew and high kurtosis. Other details such as the standard deviations (S.D.), the median (p50) and the 25% and 75% percentiles (p25 and p75, respectively), as well as the number of observations (N) are also shown in Table 3:

Table 1
Summary Statistics

	Min.	p25	Mean	p50	p75	Max.	S.D.	N
INV	-0.23	-0.01	0.01	-0.00	0.02	0.32	0.07	11784
CF	-0.30	0.03	0.07	0.07	0.11	0.35	0.09	11784
RISK1	0.00	0.02	0.06	0.04	0.08	0.54	0.07	11784
RISK2	0.00	0.02	0.05	0.03	0.06	0.45	0.05	11784
RISK3	0.00	0.02	0.06	0.04	0.08	0.53	0.08	11784
RISK4	0.00	0.02	0.06	0.04	0.07	0.54	0.07	10899
LNQRES	0.00	0.22	0.60	0.47	0.84	3.78	0.51	11784
ROASD	0.00	0.02	0.04	0.03	0.05	0.31	0.04	7732
LNQSD	0.00	0.19	0.35	0.29	0.45	2.58	0.22	7732
RULE1	0.00	3.00	3.44	4.00	4.00	7.00	1.42	11119
RULE2	0.00	3.00	3.46	4.00	4.00	7.00	1.39	11119
RULE3	0.00	3.00	3.42	3.00	4.00	7.00	1.22	11119
RULE4	-3.39	-0.69	0.00	0.21	0.73	2.89	1.00	9945
RULE5	-11.79	-3.68	-0.02	0.65	3.73	8.76	4.25	9945
RULE6	-6.00	1.00	2.47	3.00	4.00	7.00	1.95	8400
LNQ	-3.06	-1.05	-0.44	-0.44	0.19	1.85	0.96	11784
LNTA	7.43	11.33	12.73	12.68	14.14	17.68	2.11	11784

The pair-wise correlation matrix in shown in Table 2. Consonant with the literature, INV is positively correlated with the controls (LNQ, LNTA) and with CF. INV also has a negative correlation with the measures of risk-taking and a positive correlation with two measures of rule-taking. This relationship is replicated for CF. Finally, the alternative measures of risk-taking are only moderately correlated with each other (0.21), while the alternative measures of rule-taking are highly correlated with each other, ranging from 0.78 to 0.86.

Table 2
Pair-wise Correlation Matrix

	1	2	3	4	5	6	7	8	9
1. INV	1.00								
2. LNQ	0.09***	1.00							
3. LNTA	0.04***	-0.07***	1.00						
4. CF	0.11***	0.29***	0.19***	1.00					
5. RISK1	-0.07***	0.23***	-0.20***	-0.11***	1.00				
6. RISK2	-0.03***	-0.04***	-0.11***	-0.11***	0.21***	1.00			
7. RULE1	0.02**	-0.09***	-0.06***	0.04***	-0.03**	0.06***	1.00		
8. RULE2	0.02*	-0.09***	-0.08***	0.03***	-0.02**	0.06***	0.90***	1.00	
9. RULE3	0.02*	-0.10***	-0.09***	0.04***	-0.02*	0.06***	0.78***	0.82***	1.00

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.05$

4.4.2.

Multivariate Analysis

We report the estimations of our base models in Table 3, without using the country and industry dummies. All models obtained F-statistics with p<0.0001,

which demonstrates that all models are statistically significant at very stringent levels. In line with previous literature, the sensitivity of investment to cash flow is positive and significant across all models, and with a greater coefficient than Tobin's Q, which is also positive and significant across all models.

Model 1 is the baseline, with only Tobin's Q and cash flow as predictors. As expected, CF is a stronger predictor of investment than Tobin's Q. In Model 2, risk-taking (RISK1) is introduced but without gauging its interaction effects with cash flow. By itself, RISK1 adds new and very significant information to the model, with its negative coefficient in line with H1. Model 3 follows a similar strategy introducing rule-taking (RULE1). Although very significant ($p<0.01$) and in the direction predicted by H2, the coefficient is very small. Model 4 combines the three previous models, showing similar results. Models 5-6 introduce RISK1 and H-RISK1 as interaction terms with CF. In line with the prediction of H1, risk-taking showed a negative coefficient, diminishing the effect of ICFS. This was true for both the continuous variable (RISK1) and the dichotomous one (H-RISK1) at very stringent significant levels ($p<0.001$). Models 7-8 introduce RULE1 and H-RULE1 as interaction terms with CF. The results show support for H2, with rule-taking showing a positive coefficient, augmenting the effect of ICFS. Like in the risk-taking models, this was true for both the continuous variable (RULE1) and the dichotomous one (H-RULE1) at stringent levels of significance ($p<0.01$ and $p<0.05$, respectively). Finally, models 9-10 combine both risk-taking and rule-taking as interaction terms with cash flow. The results kept in line with both H1 and H2. However, the significance level of H-RULE1 as an interaction variable with CF attained significance only at the 10% level.

In Table 4, we repeat the procedure adding the industry and country dummies as controls. The results are largely replicated, and all coefficients behaved in the direction predicted by our hypotheses. Our risk-taking variables showed great robustness by remaining significant at very stringent levels ($p<0.001$). Likewise, the rule-taking variables remained significant at the 5% level. However, they lost significance in the last two models, which combined both risk-taking and rule-taking as interaction terms with cash flow, with only the risk-taking variables showing significant interaction with cash flow in these models.

Table 3

Main Results of the Regression Models

	Dependent Variable = INV											
	1	2	3	4	5	6	7	8	9	10	11	12
LNQ	0.00***	0.00***	0.00***	0.00**	0.00***	0.00**	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
	[3.70]	[5.72]	[4.10]	[2.66]	[4.20]	[3.11]	[5.41]	[5.33]	[5.59]	[5.41]	[4.03]	[4.02]
CF	0.08***	0.07***	0.15***	0.17***	0.13***	0.17***	0.02	0.01	0.06***	0.05***	0.14***	0.09***
	[9.65]	[8.36]	[11.75]	[12.83]	[6.58]	[9.40]	[1.21]	[0.56]	[5.64]	[4.96]	[10.24]	[3.48]
LNTA	-0.00	-0.00*	-0.00**	-0.00+	-0.00	-0.00	-0.00*	-0.00*	-0.00*	-0.00*	-0.00*	-0.00
	[-1.63]	[-2.24]	[-2.58]	[-1.79]	[-1.04]	[-0.45]	[-2.15]	[-2.22]	[-2.19]	[-2.44]	[-2.54]	[-1.00]
TANG	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***
	[8.43]	[7.59]	[7.40]	[7.69]	[5.31]	[5.42]	[7.57]	[7.67]	[7.57]	[7.82]	[7.38]	[5.32]
ALTMANZ	-0.00***	-0.00***	-0.00*	-0.00*	-0.00*	-0.00+	-0.00***	-0.00***	-0.00***	-0.00**	-0.00*	-0.00+
	[-3.50]	[-3.47]	[-2.32]	[-2.44]	[-2.01]	[-1.94]	[-3.38]	[-3.33]	[-3.50]	[-3.13]	[-2.35]	[-1.95]
SGA	0.08***	0.08***	0.08***	0.08***	0.07***	0.08***	0.08***	0.08***	0.08***	0.08***	0.08***	0.07***
	[12.56]	[11.56]	[11.65]	[12.07]	[8.48]	[8.98]	[11.61]	[11.59]	[11.60]	[12.08]	[11.68]	[8.51]
RISK1		-0.08***	-0.07***		-0.06***		-0.09***	-0.09***	-0.09***	-0.09***	-0.07***	-0.06***
		[-7.37]	[-6.40]		[-4.75]		[-7.59]	[-7.65]	[-7.49]	[-7.76]	[-6.49]	[-4.92]
RULE1		0.00***	0.00***	0.00***	0.00***	0.00***	0.00		0.00*		0.00**	0.00**
		[4.90]	[4.99]	[4.93]	[5.18]	[5.25]	[1.35]		[2.56]		[3.04]	[2.61]
RISK1*CF			-0.55***	-0.62***							-0.54***	
			[-9.25]	[-9.96]							[-9.17]	
H-RISK1*CF					-0.08***	-0.12***						-0.08***
					[-4.38]	[-7.28]						[-4.26]
RULE1*CF							0.02***	0.02***				0.01*
							[3.33]	[5.63]				[2.04]
H-RULE1*CF									0.03*	0.05***	0.02+	
									[2.38]	[4.39]	[1.75]	
Constant	0.01**	0.02***	0.01*	0.00	0.01	-0.00	0.02***	0.02***	0.02***	0.02***	0.01**	0.01+
	[2.96]	[3.33]	[2.55]	[0.53]	[1.36]	[-0.34]	[4.03]	[4.91]	[3.75]	[5.26]	[2.87]	[1.77]
Observations	11596	10969	10969	10969	7250	7250	10969	10969	10969	11596	10969	7250
Adjusted-R2	0.05	0.06	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.06
F Statistic	86.42	65.68	66.50	73.23	40.37	44.23	59.09	63.85	58.78	67.12	60.76	36.59
Log-Likelihood	15670.37	14771.87	14813.60	14785.33	9605.11	9589.04	14778.54	14777.56	14775.06	15722.47	14815.26	9607.49

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 4

Robustness Tests for the Alternative Risk-Taking Proxies

	Dependent Variable = INV											
Risk-Taking:	RISK2	RISK3	RISK4	LNQRES	ROASD	LNQSD	H-RISK2	H-RISK3	H-RISK4	H-QRES	H-ROASD	H-QSD
	1	2	3	4	5	6	7	8	9	10	11	12
LNQ	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.01***	0.01***	0.00*	0.00***	0.01***
	[5.28]	[5.71]	[5.58]	[3.56]	[4.17]	[3.75]	[4.72]	[6.18]	[6.28]	[2.48]	[3.43]	[3.91]
CF	0.11***	0.13***	0.12***	0.11***	0.09***	0.05*	0.12***	0.13***	0.11***	0.11***	0.07***	0.07***
	[9.36]	[9.75]	[8.82]	[7.90]	[4.99]	[2.32]	[7.04]	[5.89]	[5.41]	[6.83]	[3.80]	[3.33]
LNTA	-0.00**	-0.00*	-0.00**	-0.00	-0.00***	-0.00*	-0.00	-0.00+	-0.00**	-0.00	-0.00	-0.00**
	[-3.08]	[-2.57]	[-2.78]	[-1.30]	[-3.41]	[-2.53]	[-0.26]	[-1.71]	[-2.70]	[-0.98]	[-1.44]	[-3.16]
TANG	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.01***	0.02***	0.02***	0.02***	0.02***	0.02***
	[7.46]	[7.14]	[7.01]	[8.02]	[5.92]	[6.11]	[4.59]	[5.40]	[5.63]	[5.67]	[4.25]	[5.73]
ALTMANZ	-0.00*	-0.00*	-0.00**	-0.00**	-0.00***	-0.00***	-0.00	-0.00**	-0.00*	-0.00+	-0.00**	-0.00**
	[-2.51]	[-2.31]	[-2.71]	[-3.05]	[-3.81]	[-3.30]	[-1.04]	[-2.75]	[-2.40]	[-1.83]	[-2.61]	[-2.94]
SGA	0.08***	0.07***	0.08***	0.08***	0.10***	0.10***	0.08***	0.07***	0.08***	0.09***	0.09***	0.10***
	[11.30]	[10.90]	[11.16]	[12.15]	[10.01]	[10.82]	[9.67]	[8.26]	[8.71]	[10.53]	[7.71]	[8.54]
RULE1	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
	[4.99]	[5.24]	[4.60]	[5.09]	[4.83]	[4.78]	[4.24]	[4.21]	[4.26]	[3.39]	[3.55]	[3.60]
Risk-Taking	-0.16***	-0.10***	-0.10***	-0.00	-0.13***	-0.01*	-0.13***	-0.09***	-0.10***	-0.00	-0.13***	-0.01*
	[-10.38]	[-9.47]	[-9.10]	[-1.58]	[-4.92]	[-2.29]	[-7.53]	[-7.10]	[-7.34]	[-0.94]	[-4.38]	[-2.12]
Risk-Taking*CF	-0.46***	-0.38***	-0.33***	-0.03**	-0.14	0.10*	-0.08***	-0.07***	-0.05**	-0.05**	-0.00	0.04+
	[-5.81]	[-6.50]	[-5.28]	[-3.01]	[-0.87]	[2.39]	[-4.77]	[-3.39]	[-2.67]	[-3.13]	[-0.22]	[1.91]
Constant	0.02***	0.02**	0.02***	0.00	0.02***	0.02**	0.01	0.02**	0.02***	0.01	0.02*	0.02**
	[4.11]	[3.25]	[3.64]	[1.01]	[3.76]	[2.69]	[1.46]	[2.64]	[3.37]	[1.02]	[2.16]	[3.15]
Observations	10969	10969	10217	10969	7120	7120	7241	7213	6728	7243	4673	4695
Adjusted-R2	0.07	0.07	0.07	0.06	0.06	0.06	0.08	0.08	0.08	0.06	0.06	0.06
F Statistic	68.27	66.37	62.89	57.66	46.48	42.26	51.59	46.51	45.84	37.94	32.79	29.47
Log-Likelihood	14840.91	14827.79	13923.75	14740.82	9502.53	9486.02	9652.96	9669.85	9087.66	9690.42	6324.72	6157.48

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 5

Robustness Tests for the Alternative Rule-Taking Proxies

	Dependent Variable = INV									
Rule-Taking:	RULE2	RULE3	RULE4	RULE5	RULE6	H-RULE2	H-RULE3	H-RULE4	H-RULE5	H-RULE6
	1	2	3	4	5	6	7	8	9	10
LNQ	0.00***	0.00***	0.01***	0.00***	0.01***	0.00***	0.00***	0.00***	0.00***	0.01***
	[5.48]	[5.29]	[5.59]	[5.37]	[5.68]	[5.65]	[5.37]	[3.63]	[4.06]	[5.70]
CF	0.01	0.02	0.07***	0.05+	0.05**	0.06***	0.06***	0.07***	0.07***	0.06***
	[0.59]	[1.09]	[7.63]	[1.79]	[3.15]	[5.88]	[6.22]	[6.06]	[5.66]	[4.72]
LNTA	-0.00*	-0.00*	-0.00**	-0.00**	-0.00	-0.00*	-0.00*	-0.00***	-0.00+	-0.00
	[-2.17]	[-2.48]	[-2.76]	[-2.90]	[-0.46]	[-2.27]	[-2.51]	[-3.76]	[-1.94]	[-0.47]
TANG	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.01***	0.02***
	[7.63]	[7.80]	[6.44]	[6.40]	[7.14]	[7.63]	[7.80]	[5.39]	[3.95]	[7.20]
ALTMANZ	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00**	-0.00***
	[-3.37]	[-3.37]	[-3.90]	[-3.87]	[-3.37]	[-3.50]	[-3.41]	[-3.33]	[-3.22]	[-3.41]
SGA	0.08***	0.08***	0.08***	0.08***	0.07***	0.08***	0.08***	0.09***	0.08***	0.07***
	[11.65]	[11.59]	[10.40]	[10.27]	[9.68]	[11.62]	[11.59]	[9.13]	[7.82]	[9.63]
RISK1	-0.09***	-0.09***	-0.08***	-0.08***	-0.09***	-0.08***	-0.08***	-0.07***	-0.06***	-0.09***
	[-7.58]	[-7.52]	[-6.78]	[-6.80]	[-6.68]	[-7.44]	[-7.46]	[-4.74]	[-4.58]	[-6.64]
Rule-Taking	0.00	0.00	0.00***	0.00**	0.00	0.00**	0.00+	0.00***	0.00*	0.00
	[1.45]	[1.09]	[4.23]	[2.96]	[0.04]	[3.07]	[1.87]	[4.14]	[2.48]	[0.84]
Rule-Taking*CF	0.02***	0.02**	0.01	0.01	0.01*	0.03*	0.03*	0.02	0.01	0.03*
	[3.81]	[2.64]	[1.09]	[1.03]	[2.34]	[2.25]	[2.26]	[1.36]	[0.79]	[1.98]
Constant	0.02***	0.02***	0.03***	0.02***	0.02**	0.02***	0.02***	0.03***	0.02**	0.02**
	[3.96]	[4.14]	[5.89]	[3.34]	[3.24]	[3.55]	[3.94]	[5.82]	[2.72]	[3.10]
Observations	10969	10969	9771	9771	8293	10969	10969	6453	6433	8293
Adjusted-R2	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.06
F Statistic	59.19	58.23	51.62	48.67	44.27	58.88	57.68	37.41	30.52	44.14
Log-Likelihood	14783.19	14772.98	13387.88	13378.27	10954.17	14777.13	14771.32	8818.31	8820.87	10953.14

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 6

Robustness Tests for the Family Firm Sub-Sample

	1	2	3	4	5	6	7	8	9	10
LNQ	0.00	0.00	0.00	-0.00	0.00^{+}	0.00^{+}	0.00*	0.00^{+}	0.00	0.00
	[1.39]	[0.34]	[0.66]	[-0.08]	[1.92]	[1.72]	[1.99]	[1.86]	[1.36]	[0.58]
CF	0.17***	0.19***	0.20***	0.25***	0.05	0.02	0.07***	0.06**	0.15***	0.16**
	[6.34]	[6.97]	[4.67]	[5.98]	[1.46]	[0.61]	[3.59]	[3.17]	[5.49]	[3.06]
LNTA	-0.00**	-0.00*	-0.00^{+}	-0.00	-0.00**	-0.00**	-0.00**	-0.00**	-0.00**	-0.00^{+}
	[-2.96]	[-2.48]	[-1.73]	[-1.39]	[-2.80]	[-2.86]	[-2.82]	[-2.96]	[-2.97]	[-1.73]
TANG	0.02***	0.02***	0.02*	0.02*	0.02***	0.02***	0.02***	0.02***	0.02***	0.02*
	[3.51]	[3.69]	[2.44]	[2.48]	[3.57]	[3.66]	[3.57]	[3.39]	[3.49]	[2.43]
ALTMANZ	-0.00	-0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.00
	[-0.52]	[-0.49]	[0.37]	[0.42]	[-1.00]	[-1.00]	[-1.05]	[-0.98]	[-0.60]	[0.34]
SGA	0.09***	0.10***	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***
	[6.22]	[6.49]	[4.54]	[4.75]	[6.16]	[6.21]	[6.16]	[6.39]	[6.23]	[4.54]
RISK1	-0.10***		-0.08**		-0.12***	-0.12***	-0.12***	-0.12***	-0.10***	-0.08**
	[-4.29]		[-2.72]		[-4.80]	[-4.82]	[-4.83]	[-4.92]	[-4.34]	[-2.75]
RULE1	0.00**	0.00**	0.00***	0.00***	0.00		0.00^{+}		0.00^{+}	0.00**
	[2.99]	[3.01]	[4.06]	[4.14]	[1.63]		[1.72]		[1.80]	[2.67]
RISK1 # CF	-0.64***	-0.75***							-0.63***	
	[-4.65]	[-5.09]							[-4.61]	
H-RISK1=1 # CF			-0.15***	-0.20***						-0.15***
			[-3.54]	[-5.01]						[-3.48]
RULE1 # CF					0.01	0.02**				0.01
					[1.23]	[2.72]				[0.96]
H-RULE1=1 # CF							0.05^{+}	0.06**	0.04	
							[1.71]	[2.78]	[1.50]	
Constant	0.03**	0.02^{+}	0.02	0.00	0.04***	0.04***	0.04***	0.04***	0.03**	0.02
	[2.92]	[1.68]	[1.21]	[0.27]	[3.39]	[4.20]	[3.47]	[4.46]	[3.18]	[1.40]
Observations	2693	2693	1747	1747	2693	2693	2693	2810	2693	1747
Adjusted-R2	0.08	0.07	0.08	0.07	0.07	0.07	0.07	0.07	0.08	0.08
F Statistic	18.96	20.63	12.86	14.12	17.55	18.17	17.18	18.63	17.12	11.78
Log-Likelihood	3367.98	3356.67	2155.77	2151.18	3359.14	3357.86	3359.79	3523.78	3369.09	2156.25

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 7

Robustness Tests for the Family Firm as Interaction Dummy

	1	2	3	4	5	6
LNQ	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
	[4.39]	[4.40]	[5.70]	[5.88]	[4.32]	[4.20]
CF	0.15***	0.13***	0.02	0.06***	0.14***	0.09***
	[11.74]	[6.61]	[1.13]	[5.60]	[10.18]	[3.47]
Family Dummy	0.01***	0.01**	0.00*	0.00**	0.01**	0.00
	[3.92]	[2.95]	[2.49]	[2.90]	[3.16]	[1.57]
RISK1	-0.07***	-0.06***	-0.09***	-0.08***	-0.07***	-0.06***
	[-6.31]	[-4.67]	[-7.52]	[-7.42]	[-6.39]	[-4.82]
RULE1	0.00***	0.00***	0.00	0.00**	0.00**	0.00**
	[5.22]	[5.33]	[1.49]	[2.73]	[3.21]	[2.71]
LNTA	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	[-1.49]	[-0.25]	[-1.11]	[-1.16]	[-1.47]	[-0.25]
TANG	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***
	[7.45]	[5.34]	[7.64]	[7.63]	[7.44]	[5.36]
ALTMANZ	-0.00*	-0.00*	-0.00***	-0.00***	-0.00*	-0.00*
	[-2.47]	[-2.11]	[-3.55]	[-3.68]	[-2.54]	[-2.15]
SGA	0.08***	0.07***	0.08***	0.08***	0.08***	0.07***
	[11.41]	[8.33]	[11.30]	[11.28]	[11.37]	[8.29]
RISK*CF	-0.56***				-0.53***	
	[-9.02]				[-8.62]	
RISK1*CF*Family	0.01				-0.07	
	[0.09]				[-0.69]	
H-RISK*CF		-0.08***				-0.07***
		[-4.38]				[-3.49]
H-RISK1*CF*Family		0.00				-0.06+
		[0.05]				[-1.95]
RULE1*CF			0.02**			0.01
			[3.05]			[1.18]
RULE1*CF*Family			0.01			0.02*
			[1.29]			[2.33]
H-RULE1*CF				0.02+	0.02	
				[1.70]	[1.06]	
H-RULE1* CF*Family				0.04	0.04	
				[1.58]	[1.40]	
Constant	0.01	0.00	0.01**	0.01*	0.01	0.01
	[1.13]	[0.32]	[2.74]	[2.46]	[1.54]	[0.89]
Observations	10968	7250	10968	10968	10968	7250
Adjusted-R2	0.07	0.06	0.06	0.06	0.07	0.06
F Statistic	56.16	34.10	50.22	50.00	48.25	29.22
Log-Likelihood	14821.16	9611.03	14786.79	14784.01	14824.34	9617.54

Table 8

Robustness Tests for the High Pledgeability Sub-Sample

	1	2	3	4	5	6	7	8	9	10
LNQ	0.00	0.00	0.00	0.00	0.00	0.00	0.00^{+}	0.00	0.00	0.00
	[0.96]	[1.00]	[0.48]	[0.35]	[1.61]	[1.39]	[1.69]	[1.27]	[0.92]	[0.42]
CF	0.22***	0.22***	0.19***	0.20***	0.07*	0.03	0.12***	0.09***	0.20***	0.14**
	[10.21]	[10.52]	[6.59]	[7.42]	[2.14]	[1.29]	[6.21]	[5.24]	[8.10]	[3.10]
LNTA	-0.00***	-0.00***	-0.00**	-0.00**	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00**
	[-4.66]	[-4.69]	[-2.79]	[-2.72]	[-4.55]	[-4.58]	[-4.60]	[-4.79]	[-4.59]	[-2.74]
TANG	-0.05***	-0.05***	-0.05***	-0.05***	-0.05***	-0.05***	-0.05***	-0.04***	-0.05***	-0.05***
	[-7.29]	[-7.28]	[-6.37]	[-6.35]	[-7.26]	[-7.27]	[-7.21]	[-7.07]	[-7.34]	[-6.42]
ALTMANZ	-0.00***	-0.00***	-0.00**	-0.00**	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00**
	[-3.38]	[-3.38]	[-3.16]	[-3.09]	[-4.08]	[-4.03]	[-4.14]	[-3.66]	[-3.38]	[-3.12]
SGA	0.12***	0.12***	0.10***	0.10***	0.12***	0.12***	0.12***	0.12***	0.12***	0.10***
	[10.46]	[10.46]	[7.40]	[7.47]	[10.47]	[10.45]	[10.44]	[10.76]	[10.50]	[7.47]
RISK1	0.00		-0.02		-0.07**	-0.07**	-0.07**	-0.06**	0.00	-0.02
	[0.07]		[-0.71]		[-2.83]	[-2.79]	[-2.83]	[-2.71]	[0.07]	[-0.72]
RULE1	0.00***	0.00***	0.00***	0.00***	0.00^{+}		0.00**		0.00**	0.00*
	[5.02]	[5.02]	[4.69]	[4.67]	[1.65]		[2.97]		[2.91]	[2.17]
RISK1*CF	-0.88***	-0.87***							-0.88***	
	[-5.50]	[-6.30]							[-5.54]	
H-RISK1*CF			-0.08**	-0.10***						-0.08**
			[-2.75]	[-3.80]						[-2.78]
RULE1*CF					0.02*	0.03***				0.01
					[2.46]	[5.33]				[1.56]
H-RULE1*CF							0.04	0.06***	0.04	
							[1.46]	[3.58]	[1.52]	
Constant	0.08***	0.08***	0.08***	0.07***	0.09***	0.10***	0.09***	0.09***	0.08***	0.08***
	[8.67]	[8.81]	[6.64]	[6.51]	[9.73]	[11.05]	[9.50]	[11.27]	[8.80]	[6.83]
Observations	5441	5441	3473	3473	5441	5441	5441	5779	5441	3473
Adjusted-R2	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.06
F Statistic	38.74	43.35	21.28	23.92	35.45	38.15	35.28	37.50	35.07	19.27
Log-Likelihood	6519.50	6519.50	4070.19	4069.88	6507.06	6505.68	6505.04	6960.87	6520.69	4071.35

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 9

Robustness Tests with Pledgeability as Interaction Dummy

	1	2	3	4	5	6
LNQ	0.00**	0.00**	0.00***	0.00***	0.00**	0.00**
	[3.03]	[3.08]	[4.13]	[4.40]	[2.97]	[2.94]
CF	0.17***	0.15***	0.04**	0.07***	0.15***	0.11***
	[13.33]	[8.33]	[2.80]	[7.24]	[11.39]	[4.72]
H-TANG Dummy	0.04***	0.05***	0.04***	0.04***	0.04***	0.04***
	[20.50]	[16.42]	[16.68]	[18.44]	[18.93]	[14.55]
LNTA	-0.00***	-0.00*	-0.00***	-0.00***	-0.00***	-0.00*
	[-3.86]	[-2.11]	[-3.50]	[-3.45]	[-3.76]	[-2.10]
TANG	-0.04***	-0.05***	-0.04***	-0.04***	-0.04***	-0.05***
	[-10.23]	[-9.08]	[-10.10]	[-10.12]	[-10.36]	[-9.09]
ALTMANZ	-0.00*	-0.00*	-0.00**	-0.00**	-0.00*	-0.00+
	[-2.37]	[-2.04]	[-3.00]	[-3.20]	[-2.20]	[-1.94]
SGA	0.09***	0.08***	0.09***	0.09***	0.09***	0.08***
	[12.75]	[9.45]	[12.80]	[12.78]	[12.87]	[9.51]
RISK1	-0.05***	-0.04**	-0.07***	-0.07***	-0.05***	-0.04***
	[-4.75]	[-3.25]	[-6.35]	[-6.16]	[-4.57]	[-3.53]
RULE1	0.00***	0.00***	0.00	0.00	0.00	0.00
	[3.60]	[3.68]	[0.34]	[1.16]	[1.51]	[1.52]
RISK1*CF	-0.57***				-0.47***	
	[-9.80]				[-8.21]	
RISK1*CF*H-TANG	0.03				-0.23*	
	[0.32]				[-2.09]	
H-RISK*CF		-0.11***				-0.07***
		[-6.14]				[-4.09]
H-RISK1*CF*H-TANG		0.05*				-0.01
		[2.54]				[-0.54]
RULE1*CF			0.00			0.00
			[0.87]			[0.17]
RULE1*CF*H-TANG			0.02***			0.02**
			[5.18]			[2.91]
H-RULE1*CF				-0.01	-0.02	
				[-0.87]	[-1.19]	
H-RULE1*CF*H-TANG				0.09***	0.09***	
				[5.05]	[4.45]	
Constant	0.03***	0.03***	0.04***	0.04***	0.03***	0.03***
	[5.87]	[4.26]	[7.66]	[7.32]	[6.41]	[4.82]
Observations	10969	7250	10969	10969	10969	7250
Adjusted-R2	0.12	0.12	0.12	0.12	0.12	0.12
F Statistic	102.20	66.54	95.89	95.43	87.70	56.81
Log-Likelihood	15129.81	9836.36	15108.95	15103.41	15143.52	9842.81

Table 10

Robustness Tests for the Small Firms Sub-Sample

	1	2	3	4	5	6	7	8	9	10
LNQ	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	[5.07]	[3.99]	[4.37]	[3.77]	[5.77]	[5.75]	[5.91]	[5.65]	[5.05]	[4.28]
CF	0.14***	0.15***	0.15***	0.18***	0.02	0.02	0.05***	0.05***	0.14***	0.13***
	[8.16]	[8.65]	[5.14]	[6.49]	[0.85]	[1.08]	[4.00]	[3.96]	[7.51]	[3.48]
TANG	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
	[0.82]	[1.14]	[-0.07]	[0.07]	[0.90]	[0.90]	[0.91]	[0.96]	[0.81]	[-0.06]
ALTMANZ	-0.00**	-0.00**	-0.00*	-0.00*	-0.00***	-0.00***	-0.00***	-0.00**	-0.00**	-0.00*
	[-2.88]	[-2.88]	[-2.26]	[-2.17]	[-3.62]	[-3.60]	[-3.68]	[-3.09]	[-2.88]	[-2.24]
SGA	0.06***	0.07***	0.06***	0.06***	0.06***	0.06***	0.06***	0.06***	0.06***	0.06***
	[6.56]	[6.96]	[4.91]	[5.21]	[6.66]	[6.66]	[6.66]	[6.95]	[6.57]	[4.92]
RISK1	-0.07***		-0.05**		-0.07***	-0.07***	-0.07***	-0.07***	-0.07***	-0.05***
	[-5.21]		[-3.21]		[-5.45]	[-5.42]	[-5.36]	[-5.57]	[-5.21]	[-3.30]
RULE1	0.00	0.00	0.00	0.00	-0.00		-0.00		-0.00	0.00
	[0.13]	[0.26]	[0.67]	[0.80]	[-0.60]		[-0.23]		[-0.01]	[0.31]
RISK1*CF	-0.50***	-0.52***							-0.50***	
	[-6.77]	[-6.77]							[-6.79]	
H-RISK1*CF			-0.12***	-0.15***						-0.12***
			[-4.26]	[-5.50]						[-4.23]
RULE1*CF					0.01+	0.01+				0.01
					[1.90]	[1.83]				[1.00]
H-RULE1*CF							0.02	0.01	0.01	
							[1.01]	[0.78]	[0.42]	
Constant	0.01	0.00	-0.01	-0.02+	0.02	0.01	0.02	0.02	0.01	-0.01
	[0.44]	[0.14]	[-1.32]	[-1.79]	[0.86]	[0.75]	[0.82]	[0.78]	[0.47]	[-1.21]
Observations	5519	5519	3785	3785	5519	5519	5519	5798	5519	3785
Adjusted-R2	0.09	0.09	0.09	0.08	0.09	0.09	0.09	0.09	0.09	0.09
F Statistic	9.34	8.50	5.96	5.80	7.90	8.01	7.90	7.77	9.22	5.91
Log-Likelihood	7123.86	7107.90	4822.13	4816.17	7103.92	7103.73	7102.20	7529.44	7123.95	4822.75
LNQ	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	[5.07]	[3.99]	[4.37]	[3.77]	[5.77]	[5.75]	[5.91]	[5.65]	[5.05]	[4.28]

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 11

Robustness Tests with Small Firm Size as Interaction Dummy

	1	2	3	4	5	6
LNQ	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	[6.34]	[5.41]	[7.12]	[7.38]	[6.10]	[5.25]
CF	0.15***	0.13***	0.02	0.06***	0.13***	0.10***
	[11.19]	[6.58]	[1.41]	[5.34]	[9.72]	[3.72]
SMALL Dummy	0.00	0.00	0.00	0.00	0.00	-0.00
	[0.39]	[0.28]	[1.24]	[1.07]	[1.18]	[-0.07]
TANG	0.02***	0.01***	0.02***	0.02***	0.02***	0.01***
	[5.73]	[3.66]	[5.89]	[5.96]	[5.72]	[3.69]
ALTMANZ	-0.00**	-0.00**	-0.00***	-0.00***	-0.00**	-0.00**
	[-2.98]	[-2.71]	[-3.88]	[-4.03]	[-3.03]	[-2.64]
SGA	0.08***	0.07***	0.08***	0.08***	0.08***	0.07***
	[10.72]	[8.05]	[10.86]	[10.87]	[10.83]	[8.05]
RISK1	-0.05***	-0.05***	-0.07***	-0.06***	-0.05***	-0.05***
	[-4.44]	[-3.54]	[-5.73]	[-5.60]	[-4.36]	[-3.69]
RULE1	0.00	0.00+	-0.00	-0.00	0.00	0.00
	[1.20]	[1.74]	[-0.53]	[-0.12]	[0.14]	[0.82]
RISK1*CF	-0.47***				-0.54***	
	[-4.94]				[-5.60]	
RISK1*CF*SMALL	-0.10				0.01	
	[-1.07]				[0.15]	
H-RISK*CF		-0.04*				-0.04+
		[-2.10]				[-1.75]
H-RISK1*CF*SMALL		-0.06***				-0.08**
		[-3.75]				[-3.16]
RULE1*CF			0.02***			0.01
			[4.22]			[1.42]
RULE1*CF*SMALL			-0.01*			0.00
			[-2.45]			[0.61]
H-RULE1*CF				0.07***	0.06**	
				[4.16]	[3.26]	
H-RULE1* CF*SMALL				-0.05**	-0.04*	
				[-2.82]	[-2.07]	
Constant	-0.00	-0.01	0.01	0.01	0.00	-0.00
	[-0.03]	[-0.43]	[0.64]	[0.57]	[0.08]	[-0.27]
Observations	10969	7250	10969	10969	10969	7250
Adjusted-R2	0.12	0.10	0.11	0.11	0.12	0.10
F Statistic	16.54	10.27	15.79	15.72	16.49	10.15
Log-Likelihood	15137.75	9818.61	15105.40	15104.17	15142.99	9821.35

Table 12

Robustness Tests for the Non-Dividend Paying Firms Sub-Sample

	1	2	3	4	5	6	7	8	9	10
LNQ	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	[6.27]	[5.48]	[5.62]	[5.07]	[7.41]	[7.42]	[7.58]	[7.73]	[6.19]	[5.46]
CF	0.16***	0.17***	0.14***	0.16***	0.02	0.02	0.06***	0.05***	0.14***	0.10***
	[11.15]	[11.83]	[6.35]	[8.25]	[1.38]	[1.50]	[5.14]	[5.02]	[9.75]	[3.81]
LNTA	-0.00*	-0.00+	-0.00	-0.00	-0.00+	-0.00+	-0.00+	-0.00+	-0.00*	-0.00
	[-2.23]	[-1.72]	[-0.86]	[-0.52]	[-1.74]	[-1.75]	[-1.75]	[-1.90]	[-2.24]	[-0.87]
TANG	0.02***	0.02***	0.01***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.01***
	[5.79]	[6.14]	[3.68]	[3.85]	[5.98]	[5.99]	[5.99]	[6.11]	[5.80]	[3.71]
ALTMANZ	-0.00***	-0.00***	-0.00**	-0.00**	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00**
	[-3.36]	[-3.55]	[-2.91]	[-2.95]	[-4.29]	[-4.29]	[-4.41]	[-4.04]	[-3.39]	[-2.85]
SGA	0.08***	0.08***	0.07***	0.07***	0.08***	0.08***	0.08***	0.08***	0.08***	0.07***
	[10.37]	[10.69]	[7.77]	[8.09]	[10.43]	[10.43]	[10.43]	[10.86]	[10.43]	[7.80]
RISK1	-0.06***		-0.05***		-0.07***	-0.07***	-0.07***	-0.07***	-0.06***	-0.05***
	[-4.79]		[-3.45]		[-5.81]	[-5.81]	[-5.73]	[-5.92]	[-4.88]	[-3.59]
RULE1	0.00	0.00	0.00+	0.00*	-0.00		0.00		0.00	0.00
	[1.38]	[1.38]	[1.95]	[2.01]	[-0.02]		[0.41]		[0.67]	[1.17]
RISK1*CF	-0.57***	-0.61***							-0.56***	
	[-8.95]	[-9.39]							[-8.90]	
H-RISK1* CF			-0.09***	-0.12***						-0.09***
			[-4.53]	[-6.50]						[-4.46]
RULE1* CF					0.01**	0.01**				0.01
					[2.84]	[3.14]				[1.63]
H-RULE1* CF							0.03*	0.03*	0.02+	
							[2.28]	[2.34]	[1.71]	
Constant	0.01	0.01	-0.00	-0.01	0.02	0.02	0.02	0.02	0.02	0.00
	[0.97]	[0.40]	[-0.02]	[-0.40]	[1.41]	[1.44]	[1.34]	[1.54]	[1.11]	[0.09]
Observations	9979	9979	6644	6644	9979	9979	9979	10487	9979	6644
Adjusted-R2	0.12	0.11	0.10	0.10	0.11	0.11	0.11	0.11	0.12	0.10
F Statistic	15.58	15.67	9.58	9.63	14.64	14.82	14.58	14.57	15.51	9.52
Log-Likelihood	13506.28	13489.99	8835.30	8826.70	13469.95	13469.95	13467.98	14256.30	13507.91	8836.86

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 13

Robustness Tests with Dividend Paying as Interaction Dummy

	1	2	3	4	5	6
LNQ	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	[6.12]	[5.60]	[7.29]	[7.49]	[6.01]	[5.39]
CF	0.16***	0.13***	0.03	0.06***	0.14***	0.09***
	[11.63]	[6.58]	[1.52]	[5.55]	[10.05]	[3.66]
DIV Dummy	-0.00	-0.00+	-0.00	-0.00	-0.00+	-0.01*
	[-1.00]	[-1.76]	[-1.63]	[-1.31]	[-1.71]	[-2.05]
LNTA	-0.00**	-0.00	-0.00*	-0.00*	-0.00**	-0.00
	[-2.64]	[-0.93]	[-2.19]	[-2.23]	[-2.65]	[-0.93]
TANG	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***
	[6.26]	[4.09]	[6.43]	[6.48]	[6.28]	[4.11]
ALTMANZ	-0.00**	-0.00**	-0.00***	-0.00***	-0.00**	-0.00**
	[-3.24]	[-2.84]	[-4.19]	[-4.32]	[-3.28]	[-2.77]
SGA	0.08***	0.07***	0.08***	0.08***	0.08***	0.07***
	[10.98]	[8.16]	[11.02]	[11.02]	[11.04]	[8.20]
RISK1	-0.05***	-0.05***	-0.07***	-0.07***	-0.06***	-0.05***
	[-4.72]	[-3.51]	[-5.89]	[-5.79]	[-4.80]	[-3.68]
RULE1	0.00	0.00+	-0.00	0.00	0.00	0.00
	[1.36]	[1.82]	[-0.34]	[0.13]	[0.39]	[0.77]
RISK1*CF	-0.57***				-0.55***	
	[-9.20]				[-9.02]	
RISK1*CF*DIV	0.33*				0.29*	
	[2.48]				[2.26]	
H-RISK*CF		-0.09***				-0.09***
		[-4.60]				[-4.37]
H-RISK1*CF*DIV		0.07**				0.07**
		[3.07]				[2.74]
RULE1*CF			0.01**			0.01+
			[3.01]			[1.95]
RULE1*CF*DIV			0.01*			0.01
			[2.38]			[1.12]
H-RULE1*CF				0.03*	0.03+	
				[2.36]	[1.93]	
H-RULE1* CF*DIV				0.07*	0.05+	
				[2.52]	[1.76]	
Constant	0.01	-0.00	0.02	0.02	0.02	0.00
	[1.02]	[-0.08]	[1.54]	[1.48]	[1.21]	[0.08]
Observations	10969	7250	10969	10969	10969	7250
Adjusted-R2	0.12	0.10	0.11	0.11	0.12	0.10
F Statistic	16.29	9.89	15.63	15.51	16.31	9.91
Log-Likelihood	15143.43	9814.12	15106.35	15104.43	15147.11	9817.14

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 14

Robustness Tests for the English Legal System Sub-Sample

	1	2	3	4	5	6	7	8	9	10
LNQ	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	[6.06]	[5.25]	[5.20]	[4.61]	[6.83]	[6.84]	[6.97]	[6.97]	[5.97]	[4.97]
CF	0.14***	0.15***	0.11***	0.14***	-0.02	-0.01	0.03*	0.03*	0.11***	0.05+
	[8.21]	[8.80]	[4.22]	[5.94]	[-0.82]	[-0.84]	[2.17]	[2.13]	[6.53]	[1.65]
LNTA	-0.00**	-0.00*	-0.00	-0.00	-0.00*	-0.00*	-0.00*	-0.00*	-0.00**	-0.00
	[-2.85]	[-2.18]	[-1.28]	[-0.82]	[-2.23]	[-2.24]	[-2.30]	[-2.30]	[-2.85]	[-1.27]
TANG	0.01***	0.02***	0.01**	0.01**	0.02***	0.02***	0.02***	0.02***	0.02***	0.01**
	[3.84]	[4.21]	[2.70]	[2.88]	[4.10]	[4.10]	[4.09]	[4.09]	[3.92]	[2.81]
ALTMANZ	-0.00**	-0.00**	-0.00+	-0.00+	-0.00**	-0.00**	-0.00***	-0.00***	-0.00**	-0.00+
	[-2.84]	[-2.98]	[-1.94]	[-1.94]	[-3.17]	[-3.17]	[-3.35]	[-3.35]	[-2.88]	[-1.80]
SGA	0.08***	0.08***	0.07***	0.07***	0.08***	0.08***	0.08***	0.08***	0.08***	0.07***
	[8.34]	[8.62]	[6.18]	[6.50]	[8.26]	[8.27]	[8.28]	[8.30]	[8.34]	[6.17]
RISK1	-0.06***		-0.05***		-0.07***	-0.07***	-0.07***	-0.07***	-0.07***	-0.06***
	[-4.80]		[-3.56]		[-5.37]	[-5.37]	[-5.32]	[-5.32]	[-4.98]	[-3.79]
RULE1	0.00+	0.00+	0.00+	0.00+	-0.00		0.00		0.00	0.00
	[1.70]	[1.73]	[1.66]	[1.72]	[-0.09]		[0.33]		[0.52]	[0.59]
RISK1*CF	-0.50***	-0.53***							-0.47***	
	[-7.13]	[-7.32]							[-6.94]	
H-RISK1*CF			-0.07**	-0.11***						-0.07**
			[-3.19]	[-4.91]						[-3.05]
RULE1*CF					0.02***	0.02***				0.02**
					[4.11]	[4.50]				[2.73]
H-RULE1*CF							0.07***	0.07***	0.05**	
							[3.81]	[4.16]	[3.24]	
Constant	0.03**	0.02*	0.02*	0.01	0.04***	0.04***	0.04***	0.04***	0.03***	0.03*
	[3.29]	[2.01]	[2.04]	[1.04]	[3.93]	[4.23]	[3.82]	[4.26]	[3.69]	[2.40]
Observations	6025	6025	4074	4074	6025	6025	6025	6025	6025	4074
Adjusted-R2	0.10	0.09	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.08
F Statistic	10.71	10.78	6.97	7.03	10.14	10.31	10.11	10.29	10.61	6.90
Log-Likelihood	8020.23	8005.37	5332.98	5324.79	8005.56	8005.56	8004.13	8004.08	8025.72	5337.00

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 15

Robustness Tests for the Non-English Legal System Sub-Sample

	1	2	3	4	5	6	7	8	9	10
LNQ	0.00*	0.00*	0.00*	0.00*	0.00**	0.00**	0.00**	0.00***	0.00*	0.00*
	[2.17]	[2.08]	[2.23]	[2.06]	[2.98]	[3.00]	[2.94]	[3.37]	[2.21]	[2.28]
CF	0.19***	0.20***	0.17***	0.19***	0.13***	0.13***	0.12***	0.11***	0.20***	0.20***
	[8.20]	[8.89]	[5.09]	[6.43]	[3.97]	[4.46]	[6.19]	[6.20]	[7.50]	[3.63]
LNTA	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	[-1.29]	[-1.26]	[-0.31]	[-0.26]	[-1.14]	[-1.14]	[-1.14]	[-1.59]	[-1.28]	[-0.30]
TANG	0.02***	0.02***	0.02***	0.02***	0.03***	0.03***	0.03***	0.02***	0.02***	0.02***
	[5.25]	[5.26]	[3.60]	[3.58]	[5.69]	[5.70]	[5.65]	[5.80]	[5.27]	[3.64]
ALTMANZ	-0.00	-0.00	-0.00*	-0.00*	-0.00**	-0.00**	-0.00**	-0.00*	-0.00	-0.00*
	[-1.60]	[-1.63]	[-2.20]	[-2.35]	[-2.64]	[-2.64]	[-2.63]	[-2.14]	[-1.58]	[-2.18]
SGA	0.08***	0.08***	0.07***	0.08***	0.08***	0.08***	0.08***	0.08***	0.08***	0.07***
	[7.33]	[7.37]	[5.36]	[5.52]	[7.16]	[7.17]	[7.19]	[8.11]	[7.30]	[5.32]
RISK1	-0.02		-0.04		-0.07**	-0.07**	-0.07**	-0.07***	-0.02	-0.04
	[-0.78]		[-1.31]		[-2.99]	[-2.99]	[-3.00]	[-3.30]	[-0.76]	[-1.26]
RULE1	-0.00	-0.00	0.00	0.00	-0.00		-0.00		-0.00	0.00
	[-0.30]	[-0.29]	[0.03]	[0.04]	[-0.00]		[-0.15]		[-0.00]	[0.35]
RISK1*CF	-0.79***	-0.86***							-0.79***	
	[-4.94]	[-6.07]							[-4.94]	
H-RISK1*CF			-0.08*	-0.11***						-0.08*
			[-2.40]	[-4.04]						[-2.40]
RULE1*CF					-0.01	-0.01				-0.01
					[-0.76]	[-0.89]				[-0.66]
H-RULE1*CF							-0.01	-0.02	-0.01	
							[-0.66]	[-1.24]	[-0.65]	
Constant	0.00	0.00	-0.01	-0.01	0.01	0.01	0.01	0.01	0.00	-0.01
	[0.28]	[0.18]	[-0.25]	[-0.40]	[0.52]	[0.55]	[0.56]	[0.82]	[0.19]	[-0.34]
Observations	4944	4944	3176	3176	4944	4944	4944	5571	4944	3176
Adjusted-R2	0.15	0.15	0.14	0.13	0.14	0.14	0.14	0.14	0.15	0.14
F Statistic	12.63	12.81	7.50	7.60	12.11	12.30	11.98	12.22	12.47	7.43
Log-Likelihood	7189.05	7188.47	4527.70	4525.97	7172.20	7172.20	7172.08	8160.26	7189.31	4527.98

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

4.4.3.
Matched samples

The nature of our variables of interest (i.e., investment, cash flow, risk-taking, and rule-taking) draws our attention to possible confounding factors and selection bias in our previous empirical design. To mitigate these concerns and to help us infer causality from our estimations, we present a new set of robustness tests with matched samples. Our aim with this procedure is to match firms simultaneously by size and industry. The identification strategy consisted in matching the subsample of firms with "high" risk-taking (upper tercile) with firms with "low" risk-taking (lower tercile)—and we repeated the same procedure for rule-taking, as well as the alternative proxies used previously in the robustness models (RISK2; RULE2; RULE3). We then utilized propensity score matching to match one firm in each group and in each industry based on the natural logarithm of total assets, a usual proxy for firm size. In our specifications, we allowed for replacement and the utilization of the 3 closest neighbors. We then re-run our base models using only the matched companies. These new estimations are presented in Table 9.

The results showed that RISK1 remained with a highly significant negative coefficient in its interaction with CF. Thus, the effects of RISK1 have shown outstanding robustness across our models, lending strong support for H1. However, RISK2, our robustness variable for risk-taking did not meet the 5% significance level, even though the coefficient is in the predicted direction. The results were also in line with H2, with our main proxy for rule-taking showing a significant positive coefficient in the interaction with CF. The alternative proxy RULE2 was also in line with our hypothesis but met only the 10% threshold of significance. Our last robustness measure for rule-taking (RULE3) was not significant. Overall, even in this highly stringent model, the results also continued to lend support for H2.

Table 16

Regression Model with Propensity Score Matching

Explanatory Var.	RISK1	RISK2	RISK3	RISK4	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	1	2	3	4	5	6	7	8	9	10
LNQ	0.00^{+}	0.00	0.00*	0.00**	0.00***	0.00***	0.00***	0.00**	0.00**	0.01***
	[1.93]	[1.46]	[2.49]	[2.94]	[4.44]	[4.36]	[3.86]	[2.95]	[3.20]	[5.51]
CF	0.17***	0.14***	0.19***	0.16***	0.02	0.01	0.00	0.08***	0.04^{+}	0.04*
	[9.47]	[8.51]	[10.16]	[7.83]	[0.97]	[0.49]	[0.13]	[6.45]	[1.79]	[2.48]
LNTA	-0.00	-0.00	-0.00	-0.00**	-0.00**	-0.00**	-0.00**	-0.00**	-0.00	-0.00
	[-0.79]	[-0.26]	[-1.35]	[-2.58]	[-3.08]	[-2.67]	[-2.95]	[-2.67]	[-0.94]	[-0.25]
TANG	0.02***	0.02***	0.01**	0.02***	0.02***	0.02***	0.02***	0.02***	0.01***	0.02***
	[4.71]	[4.51]	[3.25]	[4.84]	[6.27]	[6.41]	[7.22]	[4.13]	[3.46]	[4.98]
ALTMANZ	-0.00^{+}	-0.00	-0.00**	-0.00**	-0.00*	-0.00**	-0.00***	-0.00^{+}	-0.00^{+}	-0.00**
	[-1.91]	[-0.97]	[-2.90]	[-2.74]	[-2.31]	[-3.01]	[-3.40]	[-1.67]	[-1.82]	[-3.06]
SGA	0.08***	0.10***	0.08***	0.09***	0.08***	0.08***	0.09***	0.09***	0.08***	0.08***
	[8.94]	[10.46]	[8.73]	[8.81]	[10.38]	[9.50]	[10.41]	[7.60]	[6.49]	[8.88]
RISK1					-0.08***	-0.09***	-0.09***	-0.07***	-0.07***	-0.08***
					[-6.10]	[-6.19]	[-6.20]	[-4.58]	[-4.28]	[-5.01]
RULE1	0.00***	0.00***	0.00***	0.00***						
	[5.09]	[3.85]	[4.58]	[4.08]						
Risk-Taking*CF	-0.66***	-0.55***	-0.53***	-0.40***						
	[-7.92]	[-4.84]	[-6.45]	[-4.49]						
Rule-Taking*CF					0.02***	0.02***	0.02***	0.02***	0.00	0.01*
					[4.01]	[4.73]	[4.02]	[3.29]	[0.76]	[2.12]
Constant	-0.00	-0.00	0.00	0.01^{+}	0.03***	0.03***	0.03***	0.03***	0.02**	0.02**
	[-0.25]	[-0.63]	[0.50]	[1.72]	[5.35]	[4.98]	[4.87]	[4.25]	[2.84]	[3.03]
Observations	6227	6137	5781	5325	7738	7770	7788	4752	4641	5866
F Statistic	40.71	43.64	42.55	36.51	45.79	43.51	47.28	25.69	21.27	33.81
Adjusted-R2	0.06	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.06
Log-Likelihood	8159.74	8144.13	7687.36	7134.53	10696.55	10650.50	10486.65	6721.41	6606.37	7852.81

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Table 17

Regression Model with Propensity Score Matching with all the controls

Explanatory Var.	RISK1	RISK2	RISK3	RISK4	RULE1	RULE2	RULE3	RULE4	RULE5	RULE6
	1	2	3	4	5	6	7	8	9	10
LNQ	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	[4.49]	[4.69]	[5.95]	[5.55]	[6.38]	[6.59]	[5.99]	[6.50]	[6.59]	[5.96]
CF	0.15***	0.11***	0.15***	0.13***	0.05*	0.03	0.01	0.06***	0.08**	0.05**
	[7.93]	[6.35]	[7.91]	[5.95]	[2.56]	[1.60]	[0.23]	[4.72]	[2.84]	[2.95]
LNTA	-0.00	-0.00	-0.00*	-0.00**	-0.00*	-0.00*	-0.00*	-0.00**	-0.00	-0.00
	[-1.04]	[-1.08]	[-2.31]	[-3.07]	[-2.54]	[-2.15]	[-2.57]	[-2.71]	[-1.03]	[-1.27]
TANG	0.02***	0.01***	0.01**	0.02***	0.01***	0.02***	0.02***	0.02***	0.01**	0.02***
	[3.88]	[3.45]	[3.06]	[4.88]	[4.18]	[4.49]	[5.62]	[3.57]	[3.19]	[4.35]
ALTMANZ	-0.00*	-0.00	-0.00**	-0.00*	-0.00**	-0.00***	-0.00***	-0.00**	-0.00*	-0.00***
	[-2.26]	[-1.22]	[-2.85]	[-2.18]	[-3.20]	[-3.69]	[-4.13]	[-2.72]	[-2.48]	[-3.36]
SGA	0.08***	0.09***	0.07***	0.08***	0.08***	0.08***	0.09***	0.09***	0.09***	0.08***
	[7.99]	[9.18]	[7.38]	[8.00]	[9.58]	[9.01]	[10.04]	[7.50]	[7.00]	[8.17]
RISK1	-0.06***	-0.15***	-0.09***	-0.09***	-0.06***	-0.07***	-0.07***	-0.05**	-0.05**	-0.07***
	[-4.60]	[-7.74]	[-7.25]	[-5.97]	[-4.53]	[-4.72]	[-4.86]	[-3.20]	[-3.04]	[-3.96]
RULE1	0.00*	0.00	0.00	0.00	0.00	-0.00+	-0.00+	0.00	-0.00	-0.00
	[2.08]	[1.19]	[1.00]	[1.36]	[0.46]	[-1.94]	[-1.81]	[0.15]	[-0.36]	[-0.11]
Risk-Taking*CF	-0.55***	-0.28*	-0.41***	-0.29**						
	[-6.72]	[-2.41]	[-5.27]	[-3.24]						
Rule-Taking*CF					0.01	0.01+	0.02**	-0.00	-0.01	0.01
					[1.02]	[1.89]	[2.74]	[-0.12]	[-1.24]	[1.26]
Constant	-0.01	0.01	0.02	0.01	0.02	0.03+	0.02	0.05***	0.08*	0.01
	[-0.37]	[0.54]	[1.32]	[0.51]	[1.26]	[1.82]	[1.29]	[3.65]	[2.24]	[0.53]
Observations	6227	6137	5781	5325	7738	7770	7788	4752	4641	5866
F Statistic	9.44	10.53	10.68	8.97	11.64	12.07	12.30	8.79	.	10.31
Adjusted-R2	0.11	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.11
Log-Likelihood	8371.84	8425.71	7939.90	7327.98	10953.29	10914.71	10745.41	6912.48	6809.01	8052.01

t-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

4.4.4.
Interaction Plots

In Figures 1-2, we illustrate our results by showing the interaction plots, permitting a graphic comparison regarding the behavior of ICFS for different sub-samples of firms. To build the plots, we used the robust regression in Model 10. In Figure 1, the blue dots represent firms with low risk-taking (L-RISK1) and the red dots, firms with high risk-taking (H-RISK1). The whiskers represent the 95% confidence interval. Consistent with our hypothesis, the H-RISK1 sub-sample is much less affected by ICFS, the graph shows that its true line is practically insensitive to an increase in CF (heteroskedasticity is observed, though). Conversely, the sub-sample of low risk-taking firms demonstrate clear sensitivity of investment to the value of cash flows. This result demonstrates a clear difference between the sensitivities of the firm with high and low levels of risk-taking, reinforcing the claim of H1.

In Figure 2, we observe an inversion in the positions of the high and low sub-samples, as expected according to H2. The red dots, representing firms with high rule-taking (H-RULE1), demonstrate more ICFS than the blue dots, representing firms with low rule-taking (L-RULE1). Their differences are not so contrasting as in the risk-taking case, with some overlap between the confidence intervals of H-RULE1 and L-RULE1. However, the confidence intervals of one group never overlap with the means of the other group, indicating that their true means significantly different. In sum, the clearly higher sensitivity of investment to CF in high rule-taking sub-sample—in comparison to the low rule-taking sample—also reinforces the claim made in H2.

Figure 1

Interaction Plot for Investment Versus Cash Flow for High Risk-taking and Low Risk-taking Sub-samples

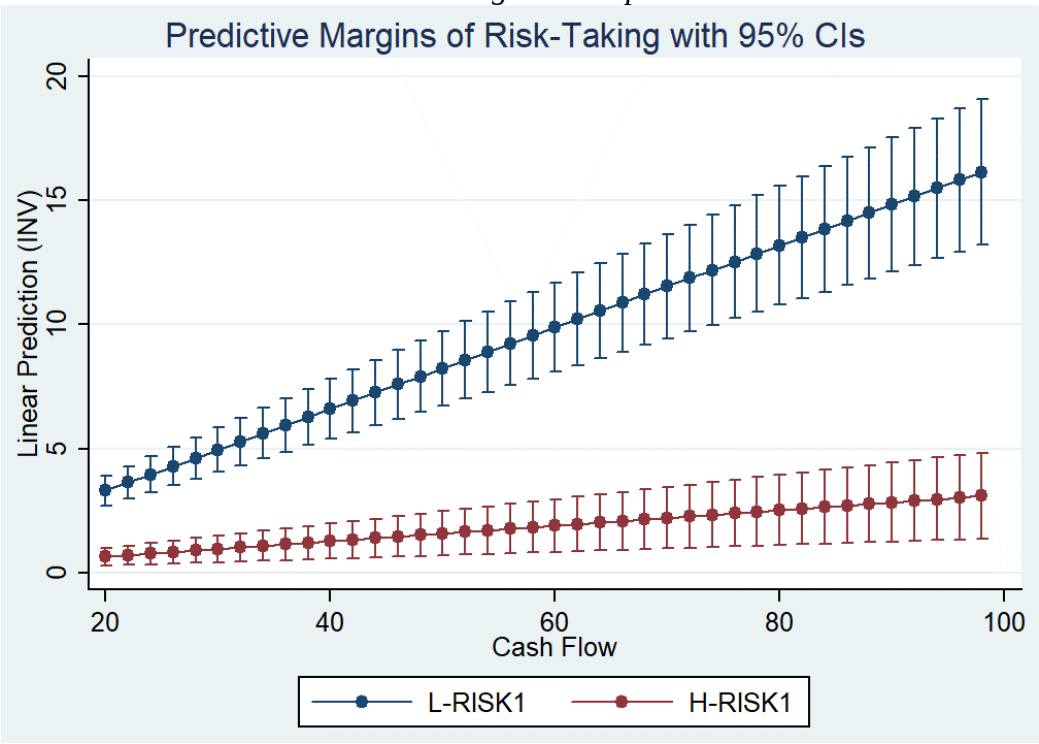
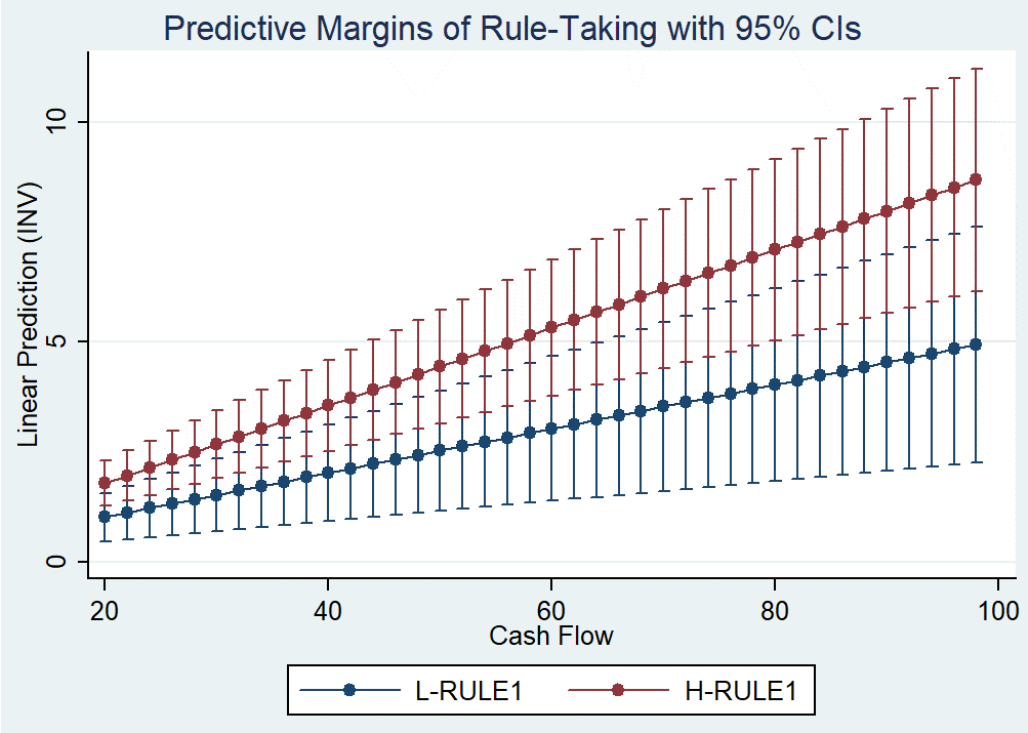


Figure 2

Interaction Plot for Investment Versus Cash Flow for High Rule-taking and Low Rule-taking Sub-samples



4.4.5.
Beta comparison among firms with high and low risk-taking and rule-taking

In Table 5, we show the results of regressing INV on the different sub-samples of firms, categorizing them as either high or low regarding their score for risk-taking and rule-taking. Following Paternoster *et al*. (1998), we utilized Equation (4) to gauge the significance in the difference between the CF betas of the high and low sub-samples. The difference was significant at the 5% level between three pairs: H-RISK1 and L-RISK1; H-RULE1 and L-RULE1, and H-RULE3 and L-RULE3. For the other two pairs, however, the differences in the betas were not significant. Overall, these results corroborate the observations in Figures 1 and 2 regarding a difference in the behavior of ICFS for the different sub-samples. In Table 10, we once again compare the betas of the low and high sub-samples, following a similar procedure in which we obtained the results showed in Table 7. However, for this new model we utilize only observations that have undergone the matching process. Consonant with H1, firms in the category of high risk-taking demonstrated a mitigation in the effect of ICFS in comparison with the firms with low levels of risk-taking (see difference between Models 1 and 2). The result, however, was not replicated with our robustness proxy for risk-taking (RISK2). Consonant with H2, firms in the category of high managerial rule-taking demonstrated exacerbated ICFS in comparison with the low rule-taking firms. This result was robust across all rule-taking proxies.

Table 18

Comparison of the Cash Flow Betas Between Low and High Sub-samples

Panel A. Comparison between Low and High Risk-taking sub-samples						
	(1)	(2)		(3)	(4)	
	L-RISK1	H-RISK1	Diff.	L-RISK2	H-RISK2	Diff
LNQ	0.01***	0.01***		0.02***	0.00***	
	[5.83]	[6.60]		[8.66]	[3.56]	
CF	0.18***	0.03**	0.15***	0.08***	0.06***	0.02
	[9.86]	[2.61]	[7.32]	[4.52]	[5.16]	[0.92]
Constant	0.03**	0.01		0.03***	0.02*	
	[3.01]	[1.22]		[3.81]	[2.05]	
Observations	5692	4684		5491	4878	
Adjusted-R2	0.10	0.04		0.08	0.04	
Log-Likelihood	7664.00	4960.12		6812.49	5614.53	
Industry dummies	Yes	Yes		Yes	Yes	
Country dummies	Yes	Yes		Yes	Yes	
Errors	Robust	Robust		Robust	Robust	

Panel B. Comparison between Low and High Rule-taking sub-samples									
	(5)	(6)		(7)	(8)		(9)	(10)	
	L-RULE1	H-RULE1	Diff.	L-RULE2	H-RULE2	Diff.	L-RULE3	H-RULE3	Diff.
LNQ	0.01***	0.00**		0.01***	0.01***		0.01***	0.00**	
	[6.48]	[2.61]		[7.12]	[4.38]		[6.23]	[2.91]	
CF	0.05**	0.10***	0.05**	0.04**	0.08***	0.04*	0.05***	0.10***	0.05*
	[3.01]	[6.71]	[2.51]	[2.82]	[6.13]	[1.88]	[3.46]	[6.16]	[2.04]
Constant	0.02*	0.02+		0.02*	0.01		0.02*	0.04*	
	[2.56]	[1.67]		[2.56]	[1.57]		[2.05]	[2.51]	
Observations	3655	3833		4386	5192		4314	4344	
Adjusted-R2	0.05	0.06		0.05	0.06		0.05	0.07	
Log-Likelihood	4475.40	4535.47		5206.60	6164.41		5329.39	5235.48	
Industry dummies	Yes	Yes		Yes	Yes		Yes	Yes	
Country dummies	Yes	Yes		Yes	Yes		Yes	Yes	
Errors	Robust	Robust		Robust	Robust		Robust	Robust	

t or z-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Table 19

Post-Matching Comparison of the Cash Flow Betas Between Low and High Sub-samples

Panel A. Comparison between Low and High Risk-taking sub-samples

	(1) L-RISK1	(2) H-RISK1	Diff.	(3) L-RISK2	(4) H-RISK2	Diff
LNQ	0.01***	0.01***		0.02***	0.00***	
	[3.82]	[6.54]		[7.05]	[3.57]	
CF	0.12***	0.03*	0.09***	0.05+	0.06***	0.01
	[4.74]	[2.50]	[3.43]	[1.86]	[5.16]	[0.44]
Constant	0.03+	0.01		0.04**	0.02*	
	[1.94]	[1.10]		[2.94]	[1.99]	
Observations	4383	4604		4680	4837	
Adjusted-R2	0.08	0.04		0.08	0.04	
Log-Likelihood	5372.86	4866.84		5628.91	5570.18	
Industry dummies	Yes	Yes		Yes	Yes	
Country dummies	Yes	Yes		Yes	Yes	
Errors	Robust	Robust		Robust	Robust	

Panel B. Comparison between Low and High Rule-taking sub-samples

	(5) L-RULE1	(6) H-RULE1	Diff.	(7) L-RULE2	(8) H-RULE2	Diff.	(9) L-RULE3	(10) H-RULE3	Diff.
LNQ	0.01***	0.00**		0.01***	0.01***		0.01***	0.00**	
	[5.32]	[2.58]		[6.06]	[4.33]		[5.60]	[2.81]	
CF	0.06**	0.10***	0.04*	0.04+	0.08***	0.04*	0.06**	0.10***	0.04+
	[2.98]	[6.69]	[1.71]	[1.95]	[6.06]	[1.73]	[2.99]	[6.04]	[1.30]
Constant	0.03**	0.02+		0.02+	0.01		0.02+	0.04*	
	[2.87]	[1.68]		[1.95]	[1.57]		[1.94]	[2.51]	
Observations	3130	3815		3912	5161		3676	4306	
Adjusted-R2	0.07	0.06		0.06	0.06		0.08	0.07	
Log-Likelihood	3698.79	4510.64		4424.03	6121.57		4339.17	5180.67	
Industry dummies	Yes	Yes		Yes	Yes		Yes	Yes	
Country dummies	Yes	Yes		Yes	Yes		Yes	Yes	
Errors	Robust	Robust		Robust	Robust		Robust	Robust	

t or z-statistics in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10

4.5.
Discussion and Conclusion

In this paper, we examine whether and how corporate risk-taking and managerial rule-taking affect a firm's ICFS. The bulk of prior research that sought to explain ICFS via the so-called "managerial literature strands" (Myers, 1984) have focused on either the risk-aversion hypothesis (Fama, 1980) or the free cash flow theory (Jensen, 1986). By integrating concepts from the entrepreneurship and creativity literature strands into the discussion, we postulate and find that there are other important elements at play that can either mitigate (risk-taking) or exacerbate (rule-taking) ICFS.

Our results regarding the impact of risk-taking are very robust, showing that the introduction of this variable has significant effects on ICFS across different models tested. That is firms with higher risk-taking tend to have lower ICFS. The literature shows two non-mutually exclusive channels through which risk-taking can influence investment behavior.

The first channel is through the link between risk-taking and financial restrictions. A firm with a higher level of risk-taking can become more financially constrained if their risk-taking is accompanied by a premium for external financing. Thus, greater risk-taking leads to greater costs of external sources of finance, which in turn condition investments to the availability of internally generated cash flows (Myers & Majluf, 1984). Our results do not support this channel; instead, it appears that managerial alertness or "environmental scanning" (Sauner- Leroy, 2004) explanations can more suitably explain the results.

Managerial alertness is based on the works of entrepreneurship theorist Israel Kirzner (1973). In his theory, because some players in the market are able to perceive profit opportunities—to which other players have been ignorant—they are able to enjoy supernormal profits. Very importantly, Kirzner theorizes that the communication of these opportunities occurs *ex-post*, via the price system. That is, the rest of the market only becomes aware of the entrepreneurial opportunity when the alert player executes their plan and successfully sells (buys) at prices at prices that are higher (lower) than the market. Although this detail may be easily overlooked, it is of major importance when the alert person is unable to carry out their entrepreneurial business by themselves; that is, when they either need

external financing or they are managers of established firms chiefly owned by other people. In these situations, the only way to carry out the plans that they have been alerted to is by enjoying a great deal of discretion or by convincing other powerful parties that this is the best course of action. Both possibilities entail inherent problems. First, more discretion brings increased risk of moral hazard, and more importantly for the arguments in this paper, the convincing of powerful parties is constrained an intrinsic "communication penalty". That is, the more creative an idea, the more difficult it is for other parties to appreciate its true value. Thus, many innovations suffer an impasse because of the inherent difficulty in the communication of value ex-ante, before the private and subject estimates that the manager has been alerted to can be converted in the purchasing or selling of goods and services with a price that is in fact better than the current estimates of the market.

Alertness is the base of two types of risk-taking investment behaviors: principled investing and signaling investing. Signaling investing occurs when the CEO wants the to climb the ladder in the job-market and to reach a better position, the CEO is incentivized to take more risks in order to signal to the market their superior ability. This kind of investing has been associated with increased risk-taking in previous literature. For instance, the convex payoffs of winning such tournaments are thought to induce CEOs toward more risk-taking so that they can either increase their probability to win the tournament or "catch up with" the leading firms (Kini and Williams, 2012; Hvide, 2002; Goel and Thakor, 2008; Chen, Hughson, and Stoughton 2011; Coles et al. 2017).. Complementarily, when these incentives are removed, a decline in investments, including research and development expenditures, capital investments and acquisitions are observed (Cohen, Dey, & Lys, 2013).

Principled investing, on the other hand, is based on strategic investments, consonant with the firm's best interests in the long term. Consonant with this channel and risk-taking, previous research has found a triple association among more ambiguity in the information environment, more risk-taking by the firm and more investment in research and development (Nguyen, Phan, & Sun, 2018; Lin, Liu, & Manso, 2016). This finding lends empirical support to arguments regarding the connection between risk-taking and "principled" investing, as well as prior discussion on the role of creativity and innovativeness in environments of

uncertainty and competitiveness (García-Granero, Llopis, Fernández-Mesa & Alegre, 2015; Latham & Braun, 2009; Makri & Scandura, 2010; Baumol, 1996). In addition, it provides an interesting complement to the free cash-flow argument (Jensen, 1986). While the free cash-flow argument posits that a misbehaving manager can take advantage of internal funds and overspend them on self-serving, but unprofitable projects, our results indicate that with greater the level of risk-taking, the manager tends to invest more independently of cash flows. We interpret this result as evidence of investing based on managerial alertness and on the "environmental scanning" (Sauner- Leroy, 2004) of opportunities, both of which depend on the managerial capacity to collect and interpret information, acting with discretion on complex and ambiguous environments—all of which should be independent from internally generated cash flows.

Regarding the impact of managerial rule-taking on ICFS, our results show that, in line with previous literature, governance variables matter for the explanation of the sometimes "puzzling" financing behavior of firms. Unlike previous efforts, though, our paper utilizes a novel construct, rule-taking, which seeks to reflect in a more comprehensive manner the general outlook of the governance mechanisms in a firm and the degree to which a manager is ruled, controlled, monitored, and liable to intervention or to have their discretionary power constrained. The enactment of rule-taking institutions by a firm is motivated by the possibility of managers abusing their power for self-serving purposes, thus generating a loss of value for the firm. However, because the firm can be expected to be competing in a quickly changing, complex, ambiguous and often-uncertain environment, excessive managerial rule-taking may in fact reduce the capability of managers exercise their discretion, take calculated risks, and eventually carry out projects that are both novel and valuable (the managerial creativity issue).

We also hypothesized that managerial rule-taking induces conservatism and exacerbates the agency conflict, creating extra incentives for the manager to couple investments with the availability of internally generated resources. Our findings provide support for this hypothesis while pointing away from explanations based on the agency theory. This is especially relevant because a firm with a high level of rule-taking should suffer a lesser penalty in the communication of projects to powerful parties and thus should have an easier

relationship with providers of external finance, which in turn should contribute to a lower ICFS (Hoshi, Kashyap, & Scharfstein, 1991). Our findings point away from this explanation, demonstrating that a higher level of rule-taking in fact exacerbates ICFS.

Another argument based on the tenets of AT is that more governance should mitigate the CEO's ability to overinvest, especially in the presence of abundant internal funds (see also Pawlina & Renneboog, 2005). Again, our findings suggest otherwise. It is the firms with more governance mechanisms—spilling over to higher levels of rule-taking—that demonstrate an aggravated ICFS. Thus, the extra governance elements entailed in our construct of rule-taking do not seem to mitigate ICFS; instead, it aggravates the phenomenon.

Taken together, our results point out to the importance of variables that exist at interface of the literatures on corporate governance, managerial discretion, entrepreneurship, and creativity and its communication to help explain long-standing puzzles of financial behavior. This is an especially relevant contribution, as previous scholars have underscored the limited evidence on the impact of firm-level corporate governance variables on ICFS (Francis *et al*., 2012). Moreover, our findings offer an interesting complement to previous works that have challenged the predictions of AT in explaining firm behavior. For instance, it was found that the removal of external controls on managerial behavior, instead of exacerbating agency losses, led managers to invest more in long-term projects, especially those that are potentially more difficult to value (Le, Nguyen, & Sila, 2020; Lin, Liu, & Manso, 2016; Tian and Wang, 2014). It should be noted that these investments are value maximizing, therefore in line with the best interests of the principal. These investments are, however, disenfranchised because they involve more ambiguity, complexity and uncertainty, which exacerbates the wedge of information between insiders and outsiders (creditors, investors, outside monitors), making these investments less easily comprehensible by them (Myers & Majluf, 1984). Likewise, Pindado *et al*. (2011) found that contrary to traditional CG mechanisms predicted by AT, alternative CG measures such as family management are related to a decrease in investment–cash flow sensitivities. They suggest that these non AT based mechanisms might be better at harnessing the knowledge that managers and the (friendly) boards accumulate about the business itself and the industry in which the company operates (Pindado *et al*., 2011, p.

1391). This would ultimately lead to more efficient—or, in our terms—more principled investing

By focusing on internal governance mechanisms that lead a firm to adopt a high (low) managerial rule-taking stance, we contribute to the understanding that over-governance may in fact drift the firm managers away from principled investment behaviors that otherwise could generate long-term and strategic value to the firm. The paper then offers an alternative approach in a literature strand that is traditionally dominated by the AT perspective. In other words, we underscore the possibility of corporate governance being involved in investing behavior in a perspective other than that predicted by AT, by fomenting managerial alertness and gauging the level of rule-taking so over-governance does not become a hazard to the autonomy necessary to pursue alertness-driven growth opportunities. We, thus, go beyond seeing the manager either as a reluctant investor, who needs to be pushed away from inherent risk aversion, or as self-serving investor, who needs to be monitored not to invest in expropriate projects. We also consider this paper a step toward a more comprehensive view that better acknowledges the manager as a strategic player—and not a passive recipient of governance mechanisms enacted by other powerful parties. Equally importantly, we highlight that principle investing must be driven by managerial alertness, and this alertness can be jeopardized by excessive rule-taking.

In sum, our research contributes to extend the literature on the role of organizational configurations in the phenomenon of ICFS. It adds a new layer to the discussion of the effects of the wedge of information between managers and those who are interested in the profitability of the firm but are not close to its operation (e.g. shareholders) on firm behavior (see also Whited, 1992; Ascioglu, 2008; Attig *et al*., 2012), especially when the fear of moral hazard derived from this wedge between insiders and outsiders leads the firm to adopt a governance configuration of managerial rule-taking. Finally, this paper demonstrates that the articulation of traditional finance problems with theories on entrepreneurship and creativity may lead to interesting and useful insights that can inform research and policy in the field. We encourage more theoretical advances in the direction of joining different research strands to investigate surprising phenomena, as well as further refinement and exploration of the novel construct of rule-taking in future studies. We believe that interdisciplinary conversations of the type proposed in the

paper may help illuminate long-standing issues in the fields of finance and governance and can empower researchers to tackle complex and difficult questions in a more comprehensive and integrative way.

4.6.

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4.7.
Appendix (Paper 3)

Table A1
Variable Description

Panel A. Dependent variables and Controls		
	Description	Source
INV	Δ Net Property, Plant & Equipment / Lagged Total Assets	Orbis
CF	Net Profit – Total Depreciation Amortization and Depletion / Lagged Total Assets	Orbis
LNQ	Natural logarithm of Market Capitalization / Total Assets	Orbis
ROA	Return on Assets	Orbis
LNTA	Natural logarithm of total assets	Orbis
CAPEX	Capital Expenditures / Gross Sales	Orbis
DEBT	Total Debt / Total Assets	Orbis
TANG	Fixed Assets / Total Assets	
ALTMANZ	Altman's Z score = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5, where X1 = working capital / total assets; X2 = retained earnings / total assets; X3 = EBIT / total assets. X4 = market value of equity / total liabilities; X5 = Gross sales / total assets	Orbis
SGA	Gross Sales – Gross Sales in previous year / Gross Sales in previous year	Orbis
IND	Vector of industry dummies based on the Fama-French 30 industry classification	Orbis
COUNTRY	Vector of country dummies	Orbis
Panel B. Governance-related variables		
	Description	Source
LNBS	Natural logarithm of the number of board members	Orbis
DIROWN	Percentage of shares owned by all directors,	Orbis
LSHR	Ownership of the largest shareholder	Orbis
NONDUAL	Dummy that equals '1' if the CEO does not accumulate the role of Chairperson of the Board of Directors	Orbis
Panel C. Proxies for the Risk-Taking and Rule-Taking Constructs		
	Description	Based on
RISK1	Absolute value of the residuals from the regressing ROA on LNTA, CAPEX, DEBT and IND and COUNTRY dummies.	Nakano & Nguyen, 2012; Adams *et al*., 2005
RISK2	Absolute value of the residuals from the regressing ROA on LNTA, CAPEX, DEBT and COUNTRY	

	dummies per industry.	
RISK3	The difference between the firm expected ROA and the expected ROA of its industry.	
RISK4	The difference between the firm expected ROA and the expected ROA of its industry and country.	
LNQRES	Absolute value of the residuals from the regressing LNQ on LNTA, CAPEX, DEBT and IND and COUNTRY dummies.	
ROASD	Standard Deviation of ROA in the last 9 years.	
LNQSD	Standard Deviation of LNQ in the last 9 years.	
RULE1	The summation of LNBS, DIROWN, LSHR converted to dummies that equal '1' if the value of that variable is above the median and '0' if the value is below the median plus NONDUAL	Developed for this study
RULE2	The same as RULE1 but with the median calculated by legal system.	Developed for this study
RULE3	The same as RULE1 but with the median calculated by country.	Developed for this study
RULE4	The first factor extracted from the factor analysis of the same variables that composed RULE1 utilizing a varimax rotation..	Developed for this study
RULE5	The latent variable from the confirmatory factor analysis utilizing the same variables that composed RULE1 as observed variables.	Developed for this study
RULE6	The summation of LNBS, DIROWN, LSHR converted to dummies that equal '1' if the value of that variable is in the upper tercile; '0' if the value is the middle tercile; and '-1' if the value is in the bottom tercile plus NONDUAL where the dummy takes a value of '1' if true and a value of '-1' if not true.	Developed for this study
H-RISK*	Dummy that equals '1' if the value of RISK1 is in the upper tercile.	Developed for this study
H-RULE*	Dummy that equals '1' if the value of RULE1 is in the upper tercile.	Developed for this study
L-RISK*	Dummy that equals '1' if the value of RISK1 is in the bottom tercile.	Developed for this study
L-RULE*	Dummy that equals '1' if the value of RULE1 is in the bottom tercile.	Developed for this study

Table A2

Observations by Country

Country	N	Percentage	Country	N	Percentage
Australia	322	2.73	Mexico	42	0.36
Bangladesh	35	0.30	New Zealand	55	0.47
Belgium	70	0.59	Nigeria	42	0.36
Bermuda	282	2.39	Norway	66	0.56
Brazil	107	0.91	Oman	35	0.30
Canada	231	1.96	Pakistan	158	1.34
Cayman Isl.	316	2.68	Philippines	109	0.92
Chile	72	0.61	Poland	80	0.68
China	445	3.78	Russia	77	0.65
Cyprus	33	0.28	Saudi Arabia	87	0.74
Denmark	56	0.48	Singapore	221	1.88
Egypt	82	0.70	South Africa	143	1.21
Finland	53	0.45	South Korea	461	3.91
France	299	2.54	Spain	60	0.51
Germany	83	0.70	Sri Lanka	116	0.98
Greece	86	0.73	Sweden	164	1.39
Hong Kong	107	0.91	Switzerland	113	0.96
India	1,339	11.36	Taiwan	831	7.05
Indonesia	195	1.65	Thailand	334	2.83
Iran	60	0.51	Turkey	130	1.10
Israel	177	1.50	U.K.	453	3.84
Italy	113	0.96	U.S.A.	1,451	12.31
Japan	1,096	9.30	U.A.E.	39	0.33
Jordan	46	0.39	Vietnam	286	2.43
Kwait	64	0.54			
Malaysia	462	3.92	Total	11,784	100.00

5
General Discussion and Conclusions

Each of the three papers in this dissertation adds a layer to the central theme regarding how CG structures and managerial action are related to important capital structure and investment behaviors. Thus, together these papers constitute a package that contributes to research on corporate finance and corporate governance in the following ways: (i) clarifying the limitations of current managerial approaches, especially the agency theory, in dealing with the firm behaviors at the interplay of CG structures and managerial decision-making and forwarding the debate on the positive and negative effects of trying to curb moral hazard by underscoring the possibility of the "misgovernance hazard"; (ii) providing novel ways to analyze these firm behaviors though a theoretical lens informed by the research strands on entrepreneurship and creativity, particularly by investigating the role of the constructs of managerial rule-taking and corporate risk-taking, which are derived from our integrative approach and can serve a nexus to investigate important relationships between CG systems, firm characteristics, and firm outcomes; and (iii) understanding whether, and how, the constructs of managerial rule-taking and corporate risk-taking, can affect the occurrence of two traditional financial puzzles, zero-leverage and investment-cash flow sensitivity.

Below I discuss how the dissertation contributes to each theme, starting with a discussion on the results of the empirical papers and then proceeding to implications to research and practice. After that, I conclude the dissertation with suggestions for relevant themes that are worthy of further exploration in future research.

5.1.
The effects of Rule-taking and Risk-taking on capital structure and investment behavior

In the first paper, I analyzed the effects of managerial rule-taking and firm risk-taking on the puzzle of zero leverage, which stems from the stylized fact that many firms carry substantially less debt than expected and a significant number of firms displays an extreme version of this behavior, carrying no debt at all. Rule-taking was hypothesized to be negatively related to ZL because the projects and strategies that the rule-taking manager can pursue will tend to be those that are easier to communicate—i.e., with smaller information transaction costs—and thus easier to be supported by shareholders and other powerful parties. As pointed out, this situation can be much less conducive for actions that deviate from the consensus of the market, such as the abhorrent behavior of zero leverage. The findings are then consonant with the theories that divergent behavior require some pre-conditions to occur (Csikszentmihalyi, 2014, 1999; Kozbelt, Beghetto, & Runco, 2010), and may be rarer when agreement from powerful parties is required, communication is not frictionless (Greene, 1984), and the principals have good reason not to give the benefit of doubt to the creative agent (Jensen, 1986).

The other construct of interest, risk-taking, was hypothesized to be positively related to ZL. The rationale is also based on the idea that risk estimates based on subjective perceptions and on knowledge that is not easy communicated or transferred (Makowski & Ostroy, 2001; Kirzner, 1997). This creates a wedge between the quality of information of insiders and outsiders and, more importantly for the phenomenon observed, between the costs of internal e external financing. Consonant with previous literature, risk-taking firms may follow a zero-leverage strategy to maintain its financial flexibility and take advantage of growth opportunities (Bessler *et al*., 2013; Dang, 2013; Strebulaev & Yang; 2013; Huang, Li & Gao, 2017; Caban, 2018).

In the second paper, the puzzle investigated was investment-cash flow sensitivity (ICFS), which can be traced back to the seminal paper by Fazzari, Hubbard and Petersen (1988) when the authors challenged the traditional assumption that a firm's financial structure is irrelevant to investment; i.e., that external funds provide a perfect substitute for internal capital (cf. Modigliani &

Miller, 1958). Fazzari and colleagues argue that because providers of external finance, due to markets frictions, agency problems and asymmetric information, face restrictions—or are unable—to assess the quality of a firm's investment opportunities, they will demand a premium on their financing. As a result, the cost of new debt and equity may differ substantially from the opportunity cost of internal finance generated through cash flow and retained earnings. Under these circumstances, a firm's investment and financing decisions may become interdependent (Fazzari, Hubbard and Petersen; 1988).

In this scenario, high rule-taking was hypothesized to have a positive effect on IFCS because it would exacerbate the differences—and possibly the divergences—between principals and agents. In addition, high rule-taking would be particularly conducive to the occurrence of the misgovernance hazards, in which powerful parties obstruct important channels of innovation in the firm. Our results did not completely confirm that rule-taking exaggerates IFCS, but although it does not support a positive coefficient, it does support that rule-taking is associated with the status-quo, which in case in the occurrence of ICFS. In other words, it is likely that, as measured in our paper, the true effect of rule-taking may be neutral or slightly positive, but it is possible to assert with great confidence that it is not negative.

Contrary to rule-taking, risk-taking was hypothesized to have a negative effect on ICFS and the results were significant and robust in supporting this hypothesis. The rationale was that risk-taking was associated with the behavior of a CEO who wants to perform above and beyond the market and will seek growth prospects that are not readily available and that may require a significant incubation period or the acquisition of unique knowledge before the actual investment prospect can become clear. This would be true for either the CEO investing with the firm's long-term growth strategy in mind or the CEO incentivized to take more risks in order to signal to the market their superior ability. In both situations, the CEO is driven by their alertness and is expected to invest based on the perceived value of an opportunity and its perceived maturation, and not on the situation of the firm's cash flows, which would then mitigate ICFS. The findings are then consonant with the entrepreneurship literature that predicts alertness-based investments (Kirzner, 2009; Baumol, 1996) and with the literature on managerial career concerns and industry tournament

incentives and their associations with risk-taking (Chevalier & Ellison, 1999; Hvide, 2002; Kini & Williams, 2012; Goel & Thakor, 2008; Coles *et al*., 2017).

From these two papers, it was demonstrated that the proxies utilized for both risk-taking and rule-taking could help explain two famous financial puzzles above and beyond other traditional variables. The effects of risk-taking were remarkably significant and robust across models in both studies. The effects of rule-taking, however, were less pronounced and less robust, but still significant in some models. Taken together, these results should grant justified interest in these constructs in future studies. Future research could help clarify and disentangle the types of investment behavior that may be behind risk-taking. For instance, in Paper 3, I explore that both "principled investing" and "signalling investing" could underlie risk-taking. Examining the effects of each type of risk-taking behavior may shed new light on the results. Additionally, the proxies utilized for rule-taking need to be further examined, with other samples of firms spanning different time periods. Different assumptions regarding the components of rule-taking should also be tested, as well as the utilization of other sets of elements to compound alternative proxies of rule-taking. Moreover, the construct of rule-taking can be expanded to encompass factors above firm level; that is, pressures from country-level and international level rules, regulations and even cultural expectations that can exert similar pressures onto a manager. Relatedly, rule-taking can be expanded downward to deal with leadership aspects in general, especially team leadership. Some connections between rule-taking, team member creativity and the misgovernance hazard could be interesting to assess at the team level.

5.2.
Coda: going beyond agency theory and toward a more integrative approach of corporate governance

Since the seminal works of Marshall (1890), passing through Berle and Means (1932) and then Jensen and Meckling (1976), it has been assumed that managerial behavior can be actively controlled by a board that is endowed with "wide general knowledge and sound judgment" (Marshall, 1890, p. 241). This job was somewhat easier when the manager acted more like Clark's (1902) "manager-coordinator", centered on the oversight of the ongoing efficiency of the firm. In

that case, most of the board's job was to "make sure that the managers of the company are doing their work thoroughly" (Marshall, 1890, p. 241). However, given the increasing volatility, uncertainty, complexity and ambiguity of the business environment, the managers are increasingly expected to take an "entrepreneurial" stance and seek novel projects that go beyond what the competition is doing in the market.

This work then problematizes the assumption that monitoring and control by boards generate a positive and effective interference with management in order to increase the value of the investors' claims (cf. Tirole, 2010, p. 27). Monitoring, especially of the active type, presumes the wisdom outlined by Marshal (1890). However, the board is not expected to dedicate its full-time to the company and they need information, whose provision is heavily dependent on the CEO, to make decisions. Moreover, even active monitoring often refers to look backward; that is, to collect information about managerial past actions and intervene in case those actions were understood to be value decreasing. Conversely, the core of the managerial job is forward-looking; that is, to determine the firm's goals and objectives for the future and implement corresponding courses of action.

Aware of this imbroglio, this work brings theories from very different literary traditions in an attempt toward a more comprehensive perspective of firm behavior. In especial, I focused on bringing together three different literature strands: the traditional finance, the "managerial" and the entrepreneurship strands, culminating in the development of the rule-taking construct and the advancement of a new perspective for risk-taking.

5.2.1.
From Moral Hazard to Misgovernance Hazard and the Innovation Impasse

In this dissertation, I highlight the innovation impasse that can be created, driven by the "misgovernance hazard" that occurs when important channels of innovation are obstructed by powerful parties. If moral hazard refers to a misbehavior of the manager by using their power for self-serving means, expropriating value from the firm; misgovernance hazard is also a misbehavior—this time by the board—by using their power to over-interfere in the firm despite their disadvantaged position regarding insider knowledge and information on the

firm's range of prospects. Like moral hazard, misgovernance hazard also subtracts value from the firm by either disallowing or imposing extra costs on positive net present value projects, especially when they happen to be more creative (non-typical).

I also demonstrate that the problem of misgovernance hazard is intimately linked with the paradoxical nature of the communication of creativity, which ultimately makes it more "excusable" than moral hazard because it is built on a natural "communication penalty". As discussed, for an idea to be deemed as creative, it must "score high" in three parameters: (i) utility, the idea must work perfectly; (ii) unlikelihood, its probably should not be very high; and (iii) surprisingness, there should be no prior knowledge that the idea will work (Simonton, 2013). Although the definition of creativity outlined by Simonton is probably independent of Kirzner's idea of entrepreneurial alertness, their shared characteristics are remarkable. Simonton talks about a creative idea as being unlikely to appear to anyone and being often regarding as "surprising". It is as close as it gets to a reinterpretation of the Kirznerian entrepreneur being "alerted" of ideas that "which has hitherto not been suspected of existing at all" (Kirzner, 2009, p. 151) and were "lurking around the corner", invisible to most, but waiting for someone to unveil them. It follows from the reasoning above that although an idea (a financial project) must ultimately have a high utility, it is unlikely that many people will be able to foresee this final utility beforehand. Therefore, the most creative ideas are those that work but also that are highly surprising for everyone, except for the ideator themselves. Consequently, the process of financing projects entails an inherent paradox: the most creative ideas are also those that are more difficult to communicate. Finally, if the market cannot understand well the determinants of a financial project, this communication problem will raise the project's uncertainty level and its risk in the eyes of the market, thus the providers of finance will require a greater premium to support this creative—but to them unclear—project.

More interestingly, and critical for the occurrence of financial "anomalies" analyzed in the empirical papers in the dissertation, is that a manager pursuing a highly creative project will suffer from this innovation impasse no matter the source of finance they choose. If they opt for external financing, the market will place a premium for financing a project whose determinants are unclear to them.

Likewise, if the manager is in a high-rule-taking environment, with a presumption of mistrust and expectation of detailed and thorough monitoring and control, managers may suffer from higher communication penalties when justifying the use of internal capital. As strategic players, they may be unmotivated to pursue highly creative projects if they will embed greater communication penalty, require more energy to convince the board that such project is in fact as valuable as the manager envisions, and have a greater chance of being not only a positive but also a negative outlier, inviting then even more scrutiny into managerial decision-making.

5.2.2.
CG Measures as the Interplay of "Positive" and "Negative" Actions

Given the problems raised in this dissertation, it becomes clear that CG measures that only deal with monitoring and incentive alignment cannot appreciate the full spectrum of the complex interplay between managers, capitalists and the market. Therefore, CG actions should be expanded to include measures that entail the possibility of an alliance between managers and capitalists in the common goal of beating the competition and thus allow supernormal economic profits and other benefits to both parties that would be impossible without such cooperation.

Under this approach, it is important to note, principals and agents are not together because there is a presumption of pro-social behavior by the managers (cf. Davis *et al*., 1997). Managers and capitalists are in fact in a "bounded alliance", with a mix of trust and suspicion that can vary cross-sectionally and longitudinally. Very importantly, because this relationship is so precious for the manager (Hermalin & Weisbach, 2017; Holmstrom, 1999), under some circumstances even a highly self-serving person will behave indistinctively from a pro-organization steward. And because this relationship is also so precious to the capitalist (Schackle, 1970), under some circumstances even a highly rational and utility-maximizing capitalist will tolerate some degree of misbehavior or mismanagement by their agents (the transaction costs of taking action will be higher than the benefits of doing so).

It follows from this reasoning that monitoring and incentive alignment are not the only strategies that should be carried out by boards. They also need to

know when to intervene, when to step out, and when to act as counsels and encouragers of managers (although the latter resembles the CG structures proposed by the stewardship theory (Davis *et al*., 1997), we highlight that boards will do so because they estimate that, at the margin, this action will yield better benefits for shareholders and not because of a presumption of trust.

It is possible then to propose a simplified framework for possible CG measures, composed of two "paths" of governance actions that aim to affect managerial behavior, but which stem from the same objective (maximize firm value) and flow toward the same desirable outcome: guaranteeing the pursuit of high-quality projects. These actions are based on the idea that to maximize firm value, two requirements must be in place: the firm must grow by fostering alertness to opportunities and minimize the possibility of misgovernance hazards, thus CG systems should entail "positive actions", which refer to the provision of discretion for the manager and that will lead to growth and the accrual of supernormal economic profits, and "negative actions", which refer to the monitoring and controlling of managerial actions whose aim is to mitigate the losses caused by agency conflicts. Finally, it is important to note that the intensity and saliency of these actions are not static and should vary to respond to new endogenous or exogenous information.

5.3.
Topics For Future Research

Below, I list some topics that can inform the problems explored in this dissertation, but, given the limitations of size and scope, they were not fully examined in the three papers that compose the dissertation

Asset specificity of managerial talent. The board is faced with a problem that greatly reduces their bargaining power with managers: there is a tiny pool of candidates for the top executive position. One of the drivers of this problem is asset specificity; that is, when a "unique" type of component is required for a transaction to occur (Williamson, 2002; 1979). The implementation of the strategy of the firm can be considered a transaction that requires a very specific type of asset: a "fit" manager. The determinants of the manager's specificity are various. One of the most important elements traditionally considered is industry knowledge. Although the principles of corporate strategy can be considered to

cross-industry boundaries, real business wisdom and practice shows that an overwhelming majority of firms are captained by managers considered industry experts. Naturally, industry expertise is not enough. Top managers are also known to have gained administrative expertise in lower managerial roles. Finally, some behavioral attributes and specific talents are also part of the variables considered to raise a person to the position of a firm's top manager. Since capitalists and the board are risk averse, and given that the potential negative outcomes of a "unfit" leader may equal a tremendous financial loss to them, boards will tend to be very conservative regarding their choice of managers, which will lead to a very limited pool of "suitable" candidates. In addition, because most firms in the same industry will probably seek a similar manager profile, the pool of candidates may also end up being extremely non diverse. Ironically, it will lead to a situation of weakening the power of the capitalist in relation to the managers. If a manager knows that he or she is very difficult of substitute or that the substitutes are very similar to them in behavior, the manager will have more incentives to behave in a more careless way. Especially if the industry is mono or oligopolistic and if the manager knows the most—if not all—other potential "suitable" candidates of the pool. Naturally, an obvious solution to this problem for the capitalist would be to enlarge the pool of possible candidates. In fact, it appears to be the strategy behind some trainee and executive training programs.

Co-evolution of managers and firms. Another way to analyze the problem of the asset specificity of managers is via the dynamic capabilities perspective (Teece, Pisano & Shuen; 1997). The dynamic capabilities perspective extends the resource-based view argument (Barney, 1986; Dierickx & Cool, 1989; Penrose, 1959) by addressing how valuable, rare, difficult to imitate and imperfectly substitutable resources can be developed (not just bought) and how the current stock of valuable resources can be refreshed in changing environments (Ambrosini & Bowman, 2009). In the dynamic capabilities perspective, the physical assets, human resources and the intellectual property of a company, having developed together over time, are more valuable in combination than separately, and give a firm a sustainable competitive advantage. Because the firm faces great uncertainty, important actors have placed different "bets" in the past as to what will prove to be the most effective way of doing things. Naturally, it is expected that these actors, with their limited foresight, will not be able to arrive at

value-maximizing solutions. Because these choices may lead to path-dependent investments, correction of past mistakes may not necessarily be economic at the relevant margin (Jacobides & Winter, 2005), thus firms will end up with an accumulation of idiosyncratic inefficiencies. In this scenario, a top manager with knowledge about how to make the firm work with all its idiosyncrasies is believed to be more valuable than a manager that has greater intelligence and more epistemic and technical expertise—but lacks the vital idiosyncratic knowledge about the functioning of a given firm, sector or industry. That is another point that leads to closer binding of some kinds of firms with some types of managers.

Managerial career concerns. Another important element is how boards address the career concerns of managers. The literature on career concerns deal with the incentives that managers may have to perform well, regardless of internal monitoring mechanisms. Fama (1980) was also seminal in this approach by stating that if there is a competitive market for managerial talent in place, the managers will want to appear more able so that they will receive greater compensation. Hermalin and Weisbach (2017), however, disagree. Although career concerns generate incentives for the executive, they are not optimal in general. That is, shareholders can indeed improve their situation by enacting CG mechanisms such as the provision of financial incentives. What the career concerns literature strand demonstrates is that the market does exert pressure on the manager to perform well. If this is connected to the idea that the hallmark of performing well in the market is to be able arrive at perceptions that are "better than the market" and choose projects that capture "unforeseen opportunities of advantageous purchases" (Mises 1952; Keynes, 1936), we arrive at a link between career concerns and the mutuality between managers and capitalists to beat the market.

Board friendliness. While AT emphasizes the monitoring aspect of the board, the "theory of friendly boards" (Adams & Ferreira, 2007) seeks to put equal stress on the advisory role of the board and presents an interesting dilemma to the agent: should they disclose information to receive better advice from the board or should them withheld information so that monitoring becomes lees intensive? In this context, Adams and Ferreira (2007) argue that because a highly independent board is a tougher monitor, the top manager may be reluctant to share information with it. Thus, in situations whereby the sharing of information

between the CEO and the board is vital, management-friendly boards can be optimal. Relatedly, Davis et. al (1997) argues that in certain situations managerial autonomy should be deliberately extended and control should be gauged to not become counterproductive because it undermines the managerial motivation to pursue difficult, complex projects that are, however, in line with the best interests of the shareholders.

5.4.
Dissertation Conclusion

The firm is the powerhouse of modern economy, with joint-stock companies being responsible for the bulk of the modern-day living standards. In this scenario, the most prevalent CG structure for these companies is that of fractional managerial ownership, with monitoring and bonding activities to curb managerial misdeeds, as outlined by Jensen and Meckling (1976). The dissertation departed from this fact; however, it changed the focus from the costs of agency relationship to a more comprehensive perspective that includes not only the risk of moral hazard but also of misgovernance hazard; that is, because of sub-optimal CG measures, the firm can disenfranchise creative projects that would otherwise benefit the firm as a whole. Based on these ideas, the construct of managerial rule-taking was developed and tested along two famous financial "puzzles", with some significant results. The same theoretical background allowed for re-visiting the construct of risk-taking and test it along the same puzzles, with remarkably robust results. This dissertation then contributes to describe important factors regarding board and managerial behavior that have been underexplored in mainstream research on corporate governance, especially agency theory. It also demonstrates that constructs derived from the interplay of the literature on managerial discretion, entrepreneurship and creativity above and beyond other traditional variables. Furthermore, it addresses many calls in the economics, finance and management research literature for more integration between the different strands. Finally, it opens new avenues of research that can stem from further exploration of the concepts (e.g. the misgovernance hazard, communication penalty and innovation impasse) and constructs advanced in this dissertation.

5.5.

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