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TESIS DOCTORAL / DOCTORAL DISSERTATION

LA ASUNCIÓN DE RIESGOS Y LOS TRES PILARES INSTITUCIONALES / RISK-TAKING AND THE THREE INSTITUTIONAL PILLARS

SUMEET MALIK

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ABSTRACT

This dissertation systematically looks at the interaction of risk-taking market actors with the three institutional pillars – regulative, normative, and socio-cognitive (Scott, 2013). Since institutions can define both market and non-market outcomes, each chapter of the thesis asks a question related to an institutional pillar. The first chapter asks how investors interpret and react to entrepreneurial orientation rhetoric in strictly regulated contexts. The second chapter asks, can business leaders act opportunistically at the cost of other stakeholders in their response to regulations? The final chapter asks, how can creative entrepreneurs balance the paradox of conforming to institutional pressures and offering novelty?

The thesis contributes to management literature in several ways. First, it explains how investors perceive entrepreneurial orientation (EO) rhetoric in a highly regulated environment. Second, it provides evidence of CEOs exploiting the attention of markets to act opportunistically against stakeholders to preserve their personal wealth. Finally, it attempts to unravel the paradox of novelty and conformity for creative entrepreneurs driven by Schumpeterian rents.

RESUMEN

Esta tesis examina sistemáticamente la interacción de los agentes del mercado que asumen riesgos con los tres pilares institucionales: el regulador, el normativo y el socio-cognitivo (Scott, 2013). Dado que las instituciones pueden definir resultados tanto de mercado como de no mercado, cada capítulo de la tesis plantea una pregunta relacionada con un pilar institucional. El primer capítulo se pregunta ¿cómo los inversores interpretan y reaccionan a la retórica de la orientación empresarial en contextos estrictamente regulados? El segundo capítulo se pregunta: ¿pueden los líderes empresariales actuar de forma oportunista a costa de otras partes interesadas en su respuesta a la normativa? El último capítulo se pregunta ¿cómo pueden los empresarios creativos equilibrar la paradoja de ajustarse a las presiones institucionales y ofrecer novedad?

La tesis contribuye a la literatura de gestión de varias maneras. En primer lugar, explica cómo los inversores perciben la retórica de la orientación empresarial (OE) en un entorno altamente regulado. En segundo lugar, aporta pruebas de que los consejeros delegados aprovechan la atención de los mercados para actuar de forma oportunista contra las partes interesadas para preservar su riqueza personal. Por último, intenta desentrañar la paradoja de la novedad y la conformidad de los empresarios creativos impulsados por las rentas Schumpeterianas.

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INTRODUCTION

Although focusing on the interaction of organizations with institutions, broadly two streams of research have developed in institutional theory. The new institutional economics (NIE) focuses on formal elements of institutions such as regulations and statutes with its widespread assumption of economic rationality (North, 1990; Williamson, 2000). Neo-institutional theory (NIT) focuses on the informal norms of institutions such as norms and beliefs with its pervasive assumption that economic action is embedded in social structures (Granovetter, 1985).

As can be understood because of the polarity of assumptions, the two streams of research have remained mostly independent. Scott (1995) synthesized the diverse ideas about institutions into three pillars – regulative systems, normative systems, and cultural-cognitive systems – as vital ingredients of institutions. The three pillars form a continuum moving “from the conscious to the unconscious, from the legally enforced to the taken for granted” (Hoffman, 1997: 36). As summarized in Table 1, the inclusive model helped identify some of the underlying assumptions, logic, and indicators of the three pillars.

Insert Table 1 about here

The regulative pillar stresses the explicitly regulatory processes: rule-setting, monitoring, and sanctioning activities. Economists and political scientists see institutions resting primarily on the regulative pillar. For them, institutions are “rules of the game in a society or more formally... the humanly devised constraints that

shape human interactions" (North, 1990: 3). "Force, fear, and expedience are central ingredients of the regulatory pillar…powerful actors may sometimes impose their will on others, based on the use or threat of sanctions. Or they may provide inducements to secure compliance….The most common case, however, involves the use of authority, in which coercive power is legitimated by a normative framework that both supports and constrains the exercise of power" (Scott, 2001: 53).

The normative pillar emphasizes on rules that "introduce a prescriptive, evaluative and obligatory dimension into social life. Normative systems include both values and norms. Values are conceptions of the preferred or the desirable, together with the construction of standards to which existing structures or behavior can be compared and assessed. Norms specify how things should be done: they define legitimate means to pursue valued ends" (Scott, 2001: 54-55). Many sociologists and organization theorists embrace the normative conception of institutions and see institutions having moral roots (Stinchcombe, 1997).

The cultural-cognitive elements of institutions – "the shared conceptions that constitute the nature of social reality and the frames through which meaning is made" (Scott, 2001: 55) – help human existence. "In the cognitive paradigm, what a creature does is, in large part, a function of the creature´s internal representation of its environment" (D´Andrade 1984:88). Symbols – words, signs, and gestures – shape the meanings that market players attribute to objects and activities. Cultural categories are treated as "cognitive containers in which social interests are defined and classified, argued, negotiated, and fought out" (Douglas, 1982: 12). Rather than stressing on normative obligations, cultural-cognitive institutionalists stress on

the “power of templates for particular types of actors and scripts for actions” (Scott, 2001: 58) (Berger & Luckmann, 1966; Dimaggio & Powell, 1983).

As Institutions both facilitate and constrain market activity, it can have a significant impact on the growth and survival of entrepreneurial or risk-taking players. Since powerful incumbents can influence the rules of the game, it can make the entry for new players significantly more difficult (Ahuja & Yayavaram, 2011). Further, entrepreneurs face “liabilities of newness” until they learn how to be better social actors (Stinchcombe, 1965). One antidote to liabilities of newness is legitimacy – a favorable evaluation by potential stakeholders that entrepreneurs can gain by following the social norms (Suchman, 1995). Earlier versions of institutional theory mainly observed the institutional pressures constrain entrepreneurs. However, recent works have emphasized the strategic processes that organizations can employ to respond to institutional pressures (Oliver, 1991; Aldrich & Fiol, 1994).

This dissertation presents three empirical studies to understand better the interactions between risk-taking market players and institutions. The first study focuses on regulative institutions. In a highly regulated environment, investors may discount firms with entrepreneurial orientation (EO) rhetoric since it constitutes a soft signal rather than evidence of substantive commitment. The solution, it argues, is EO rhetoric sustained over time, which produces more reliable information for investors—in contrast to occasional increases in EO rhetoric, which invite skeptical scrutiny. Further, the firms can mitigate investor concerns by making substantive commitments in market entry and their social responsibilities (CSR).

The second study focuses on normative institutions. It explores the opportunistic behavior of CEOs to protect their personal wealth when initiating faulty product recalls. Stock options have been widely used to incentivize CEOs to take risks. However, relatively little is known about their effects on other stakeholder groups. It argues that CEOs are cognizant of attention variations by external monitors (periods of low and peak awareness concerning the firm). Thus, CEOs can preserve their option wealth by initiating product recalls to exploit periods of low monitoring attention or delaying product recalls during periods of heightened monitoring attention. As a result, option incentives may lead to CEO opportunistic behaviors that compromise external monitoring effectiveness. Further, it hypothesizes that CEOs' long-term orientation mitigates these opportunistic behaviors.

The third chapter is devoted to the cultural-cognitive institutions. Optimal distinctiveness (OD) theory suggests that producers need to balance between conforming to categorical norms (to gain legitimacy) and being distinctive from other producers (to gain innovation rents). This paradox is salient to entrepreneurs who are driven by novelty but also suffer from liabilities of newness. The problem is further compounded in cultural industries in which novelty plays a crucial role. It suggests a way for creative entrepreneurs to balance this paradox and position their products by testing the assumptions of a homogeneous audience, crisp boundaries of the categories, and high-status benefits.

As a whole, this dissertation contributes to our understanding of the interactions between risk-taking market players and the institutions that can both enable and constrain market outcomes. Due to different (sometimes polar)

assumptions, various streams of literature studying interactions of market players with institutions have primarily remained independent. One victim of this paucity of cross-boundary conversation has been the progress of institutional research itself (Scott, 1995). Thus, scientists studying the institutional context need to collaborate across their disciplines to bring in fresh ideas, methods, and theories to test some of their field's weakly held assumptions (Aldrich & Fiol, 1994; Malik & Rathee, 2018). By doing so, it furthers research development on this important topic and opens new avenues for future research.

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Table 1

Three Pillars of Institutions

	Pillar		
	Regulative	*Normative*	*Cultural-Cognitive*
Basis of compliance	Expedience	Social obligation	Taken-for-grantedness Shared understanding
Basis of order	Regulative rules	Binding expectations	Constitutive schema
Mechanisms	Coercive	Normative	Mimetic
Logic	Instrumentality	Appropriateness	Orthodoxy
Indicators	Rules Laws Sanctions	Certification Accreditation	Common beliefs Shared logics of action
Basis of legitimacy	Legally sanctioned	Morally governed	Comprehensible Recognizable Culturally supported

INTRODUCCIÓN

Aunque se centra en la interacción de las organizaciones con las instituciones, en la teoría institucional se han desarrollado a grandes rasgos dos corrientes de investigación. La nueva economía institucional (NIE) se centra en los elementos formales de las instituciones, como los reglamentos y los estatutos, con su supuesto generalizado de racionalidad económica (North, 1990; Williamson, 2000). La teoría neo institucional (NIT) se centra en las normas informales de las instituciones, como las normas y las creencias, con su suposición generalizada de que la acción económica está integrada en las estructuras sociales (Granovetter, 1985).

Como puede entenderse, debido a la polaridad de los supuestos, las dos corrientes de investigación han permanecido en su mayoría independientes. Scott (1995) sintetizó las diversas ideas sobre las instituciones en tres pilares: sistemas reguladores, sistemas normativos y sistemas culturales-cognitivos, - como ingredientes vitales de las instituciones. Los tres pilares forman un continuo que va "de lo consciente a lo inconsciente, de lo legalmente impuesto a lo dado por sentado" (Hoffman, 1997: 36). Como se resume en el Cuadro 1, el modelo inclusivo ayudó a identificar algunos de los supuestos, la lógica y los indicadores subyacentes de los tres pilares.

Insertar Cuadro 1 sobre aquí

El pilar reglamentario estreses explícitamente en los procesos regulatorios: actividades de establecimiento de normas, supervisión y sanción. Los economistas y politólogos consideran que las instituciones se apoyan principalmente en el pilar regulador. Para ellos, las instituciones son "las reglas del juego en una sociedad o, más

formalmente... las restricciones concebidas por el hombre que dan forma a las interacciones humanas" (North, 1990: 3). "La fuerza, el miedo y la conveniencia son ingredientes centrales del pilar regulador... los actores poderosos pueden a veces imponer su voluntad a otros, basándose en el uso o la amenaza de sanciones o pueden ofrecer incentivos para asegurar su cumplimiento..... El caso más común, sin embargo, implica el uso de la autoridad, en el que el poder coercitivo está legitimado por un marco normativo que apoya y restringe el ejercicio del poder" (Scott, 2001: 53).

El pilar normativo estreses en las reglas – que "introducen una dimensión prescriptiva, evaluativa y obligatoria en la vida social. Los sistemas normativos incluyen tanto valores como normas. Los valores son concepciones de lo preferido o lo deseable, junto con la construcción de estándares con los que se pueden comparar y evaluar las estructuras o comportamientos existentes. Las normas especifican cómo deben hacerse las cosas: definen los medios legítimos para perseguir los fines valorados" (Scott, 2001: 54-55). Muchos sociólogos y teóricos de la organización adoptan la concepción normativa de las instituciones y consideran que éstas tienen raíces morales (Stinchcombe, 1997).

Los elementos culturales-cognitivos de las instituciones - "las concepciones compartidas que constituyen la naturaleza de la realidad social y los marcos a través de los cuales se hace el significado" (Scott, 2001: 55)- ayudan a la existencia humana. "En el paradigma cognitivo, lo que hace una criatura es, en gran parte, una función de la representación interna que tiene la criatura de su entorno" (D'Andrade, 1984:88). Los símbolos -palabras, signos y gestiones- conforman los significados que los agentes del mercado atribuyen a los objetos y las actividades. Las categorías culturales se tratan

como "contenedores cognitivos en los que se definen y clasifican los intereses sociales, se argumentan, se negocian y se combaten" (Douglas, 1982: 12). De estresar - en las obligaciones normativas, los institucionalistas culturales-cognitivos estresa en el "poder de las plantillas para determinados tipos de actores y guiones para las acciones" (Scott, 2001: 58) (Berger & Luckmann, 1966; Dimaggio & Powell, 1983)

Dado que las instituciones facilitan y restringen la actividad del mercado, pueden tener un impacto significativo en el crecimiento y la supervivencia de los actores emprendedores o que asumen riesgos. Dado que los poderosos titulares pueden influir en las reglas del juego, puede dificultar considerablemente la entrada de nuevos actores (Ahuja & Yayavaram, 2011). Además, los emprendedores se enfrentan a las "responsabilidades de la novedad" hasta que aprenden a ser mejores actores sociales (Stinchcombe, 1965). Un antídoto contra las responsabilidades de la novedad es la legitimidad: una evaluación favorable por parte de los posibles interesados que los empresarios pueden obtener siguiendo las normas sociales (Suchman, 1995). Las primeras versiones de la teoría institucional observaban principalmente las presiones institucionales que limitan a los empresarios. Sin embargo, los trabajos recientes han estresado en los procesos estratégicos que las organizaciones pueden emplear para responder a las presiones institucionales (Oliver, 1991; Aldrich & Fiol, 1994).

Esta tesis presenta tres estudios empíricos para comprender mejor las interacciones entre los agentes del mercado que asumen riesgos y las instituciones. El primer estudio se centra en las instituciones reguladoras. En un entorno altamente regulado, los inversores pueden descartar a las empresas con retórica de orientación empresarial (OE), ya que constituye una señal suave más que una prueba de

compromiso sustantivo. La solución, argumenta, es la retórica de la OE sostenida en el tiempo, que produce una información más fiable para los inversores, en contraste con los aumentos ocasionales de la retórica de la OE, que invitan a un escrutinio escéptico. Además, las empresas pueden mitigar las preocupaciones de los inversores asumiendo compromisos sustantivos en la entrada al mercado y en sus responsabilidades sociales (RSC).

El segundo estudio se centra en las instituciones normativas. Explora el comportamiento oportunista de los consejeros delegados para proteger su patrimonio personal al iniciar la retirada de productos defectuosos. Las opciones sobre acciones se han utilizado ampliamente para incentivar a los directores generales a asumir riesgos. Sin embargo, se sabe relativamente poco sobre sus efectos en otros grupos de interés. Se argumenta que los consejeros delegados son conscientes de las variaciones de atención por parte de los monitores externos (períodos de baja y de máxima atención a las empresas). Así, los directores generales pueden preservar su riqueza de opciones iniciando la retirada de productos para aprovechar los períodos de baja atención de los supervisores o retrasando la retirada de productos durante los períodos de mayor atención de los supervisores. En consecuencia, los incentivos de las opciones pueden llevar a los directores generales a adoptar comportamientos oportunistas que comprometan la eficacia de la supervisión externa. Además, se plantea la hipótesis de que la orientación a largo plazo de los consejeros delegados mitiga estos comportamientos oportunistas.

El tercer capítulo está dedicado a las instituciones culturales-cognitivas. La teoría del carácter distintivo óptimo (OD) sugiere que los productores necesitan

equilibrar entre ajustarse a las normas categóricas (para ganar legitimidad) y ser distintivos de otros productores (para ganar rentas de innovación). Esta paradoja es evidente para los empresarios que se sienten impulsados por la novedad, pero que también sufren las consecuencias de la novedad. El problema se agrava aún más en las industrias culturales, en las que la novedad desempeña un papel crucial. Se sugiere una forma de que los empresarios creativos equilibren esta paradoja y posicionen sus productos poniendo a prueba los supuestos de un público homogéneo, los límites nítidos de las categorías y los beneficios de alto estatus.

En conjunto, esta tesis contribuye a nuestra comprensión de las interacciones entre los actores del mercado que asumen riesgos y las instituciones que pueden tanto permitir como restringir los resultados del mercado. Debido a los diferentes supuestos (a veces polares), las diversas corrientes de literatura que estudian las interacciones de los agentes del mercado con las instituciones han permanecido principalmente independientes. Una de las víctimas de esta escasez de conversaciones transfronterizas ha sido el progreso de la propia investigación institucional (Scott, 1995). Por lo tanto, los científicos que estudian el contexto institucional necesitan colaborar entre sus disciplinas para aportar ideas, métodos y teorías frescas que pongan a prueba algunos de los supuestos poco sólidos de su campo (Aldrich & Fiol, 1994; Malik & Rathee, 2018). Al hacerlo, se fomenta el desarrollo de la investigación sobre este importante tema y se abren nuevas vías para futuras investigaciones.

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Williamson OE. (2000). The new institutional economics: taking stock, looking ahead. *Journal of Economic Literature* 38(3): 595–613.

Cuadro 1

Los tres pilares de las instituciones

	Pilar		
	Regulativo	*Normativo*	*Cultural-Cognitivo*
Base del cumplimiento	Expediencia	Obligación social	Asumido como algo natural Entendimiento compartido
Base de la orden	Normas reguladoras	Expectativas vinculantes	Esquema constitutivo
Mecanismos	Coercitivo	Normativo	Mimético
Lógica	Instrumentalidad	Adecuación	Ortodoxia
Indicadores	Reglas Leyes Sanciones	Certificación Acreditación	Creencias comunes Lógicas de acción compartidas
Base de legitimidad	Legalmente sancionado	Moralmente gobernado	Comprensible Reconocible Apoyado culturalmente

CHAPTER 1: WHEN ENTREPRENEURIAL RHETORIC MEETS STRICT REGULATIONS: IMPLICATIONS FOR THE VALUATION OF HEALTH SCIENCE FIRMS

ABSTRACT

Research summary: Health science firms have long product development horizons and need regulatory approval for market entry. In communicating with investors, they may use entrepreneurial orientation (EO) rhetoric to emphasize their strategic and behavioral commitment to product innovation and market entry. However, because EO rhetoric constitutes a soft-information signal rather than evidence of substantive commitment, investors may suspect firm insiders using such rhetoric of impression management. The solution, we argue, is EO rhetoric sustained *over time*, which produces more reliable information for investors—in contrast to occasional increases in EO rhetoric, which invite skeptical scrutiny. Nevertheless, investors' potential concerns regarding changes in EO rhetoric can be mitigated by concurrent hard-information signals that carry signaling costs or penalty costs for false signaling.

Managerial summary: Entrepreneurial orientation (EO) rhetoric can reduce information asymmetry between managers and investors. In strictly regulated contexts such as health science industries, using such rhetoric may be challenging. For firms embracing entrepreneurial strategies and behaviors, maintaining EO rhetoric over time is critical to overcoming skepticism that it is merely "cheap talk." For investors, this study also suggests that health science firms maintaining higher EO rhetoric over time deserve higher valuations, given the variety of benefits an EO can have for health science firms. If a health science firm aims to ramp up its EO rhetoric, managers should be aware that investors may interpret the increase as impression management and should confront this interpretation head-on—for instance, by simultaneously increasing entry commitment or corporate social responsibility.

Keywords: entrepreneurial rhetoric, strict regulations, health science firms, entry commitment, corporate social responsibility

INTRODUCTION

There is growing consensus that “efficient” regulations provide economic freedom and ensure a level playing field for all companies seeking innovation and growth (Bradley and Klein, 2016; McMullen, Bagby, and Palich, 2008; Scott, 2013). Ideally, regulations correct market failures so that firms find it rewarding to enter new markets with innovative offerings that can ultimately improve overall economic growth and prosperity (Acs *et al.*, 2016; Bradley and Klein, 2016; Sobel, 2008). However, in reality, stringent regulations erect barriers to entry that may unintentionally increase firms’ motivations for political rent-seeking over product innovation in competition with new entrants (Bessen, 2016; Djankov, McLiesh, and Ramalho, 2006; Gutiérrez and Philippon, 2017; Klapper, Laeven, and Rajan, 2006).

Research examining regulation and entrepreneurship has mainly focused on the entry behaviors and outcomes of new ventures. However, all firms, incumbents included, may actively seek and exploit opportunities to enter new product markets. Such firms are said to have an entrepreneurial orientation (EO), which reflects the extent to which their strategies and behaviors embrace and enable product innovation, market entry, and risk-taking (Covin and Slevin, 1988; 1989). Since the seminal work of Miller (1983), EO has become one of the most important concepts in entrepreneurship research (Covin and Lumpkin, 2011; Miller, 2011; Wales, Covin, and Monsen, 2020). The EO literature has traditionally examined EO as manifest in a firm’s product innovation and market entry (i.e., launching a product to a market), and how these actions influence its financial performance (Lumpkin and Dess, 1996).

Recent EO scholarship has incorporated rhetoric—the discretionary use of language to convey the firm's innovativeness, proactiveness, and risk-taking to outsiders (Watson *et al.*, 2019)—with an increasing emphasis on whether investors value such rhetoric (Engelen, Neumann, and Schmidt, 2016; Short *et al.*, 2010). Although these studies have demonstrated that investors do pay attention to EO language in published communications, little is known about how they interpret and react to EO rhetoric when it is used by firms operating in strictly regulated industries, including pharmaceuticals and medical devices, military and national defense, air and aerospace travel, nuclear energy, and some petroleum sectors. There is a common belief that innovation and entrepreneurship are important drivers for economic and social development, indeed that most businesses and industries must innovate or die (Christensen, 1997). However, it is often costly and difficult to obtain regulatory approval when implementing entrepreneurial strategies (Guo, Tang, and Su, 2014; Wang, Thornhill, and De Castro, 2017), so in strictly regulated industries investors may interpret EO rhetoric with greater caution.

This study examines how investors interpret and react to EO rhetoric used by health science firms operating in the United States, where regulations stringently enforced by the U.S. Food and Drug Administration (FDA) constrain already lengthy and costly innovation processes. Health science firms' success depends on their long-term commitment to product innovation and solution development (Gittelman, 2016; Mohs and Greig, 2017). However, medical product development has long horizons (e.g., more than 10 years) (Mohs and Greig, 2017) involving various phases of clinical studies of

human and animal subjects (Gittelman, 2016), which are necessary to obtain the FDA's approval for market entry (Briggeman, Roberts, and Gulfo, 2016).

Investors face a dilemma in interpreting and reacting to such firms' EO rhetoric. On the one hand, the rhetoric may provide useful information about the firm's strategies and behaviors to embrace and enable product innovation and market entry; on the other hand, the rhetoric could simply be "cheap talk" (Farrell and Rabin, 1996)—impression management by firm insiders bent on advancing their own short-term interests. In order to solve this dilemma, we argue that sustaining EO rhetoric *over time* in published communications such as annual reports and CEO shareholder letters makes it possible for investors to identify and penalize false signaling (Kaya, 2009; Manelli, 1996). Health science firms that are willing to bear the consequence are likely to evoke stronger investor confidence. That is, a between-firm difference in average EO rhetoric over time should improve investor valuation of the firm.

In contrast, an occasional increase in EO rhetoric—that is, a within-firm difference—could be interpreted as self-interested impression management aimed at securing bonuses, options, and promotion by directing the market's attention to (away from) positive (negative) information related to potential new products that will increase financial performance (Merkl-Davies and Brennan, 2007). As a result, investors will lower the valuation of health science firms that inflate their EO rhetoric. Drawing on signaling theory (Bergh *et al.*, 2014; Connelly *et al.*, 2011), we posit that the extent to which they adjust their valuation depends on whether the firm has sent other, hard-information signals that involve greater R&D investment (e.g., irreversible investments

in seeking FDA approval) or higher penalty costs for false signaling (e.g., losses of reputation and trustworthiness).

This study contributes to entrepreneurship and regulation research in three ways. First, we answer Miller's (2011) call for industry-specific EO research by focusing on the distinctive characteristics of health science firms with long product development horizons due to strict multistage regulations. Second, we decompose the signaling mechanism of EO rhetoric into the effects of *average EO rhetoric* and *change in EO rhetoric* over time, thus distinguishing between-firm and within-firm differences as recommended by Certo, Withers, and Semadeni (2017). Finally, we show how soft- and hard-information signals can jointly affect investor reactions, an influence that is particularly important in regulated industries with high information asymmetry between firm insiders and outsiders.

THEORY AND HYPOTHESES

Signaling Theory

Firm insiders (e.g., top managers and board directors) possess more private information than outsiders (e.g., potential investors) about strategies and behaviors that can determine the firm's potential (Cohen and Dean, 2005; Connelly *et al.*, 2011). To increase market efficiency, it is necessary but costly to reduce this "information asymmetry" (Stiglitz, 2000). Signaling theory (Spence, 1973; 2002) reveals mechanisms that can mitigate it by explicating how outsiders "search for clues about a firm, interpret those clues, and are guided by their interpretations when formulating their own actions" (Bergh *et al.*, 2014: 1335).

Generally speaking, an effective signal contains hard information, that is, information that cannot be sent without costly and irreversible commitment (Bergh *et al.*, 2014; Connelly *et al.*, 2011; Williamson, 1983). For example, patent applications serve as a quality signal for new ventures because developing patentable technologies requires knowledge and resources, and new ventures do not possess alternative ways to demonstrate their value to outsiders because they lack historical data about operations and performance (Hoenen *et al.*, 2014; Hsu and Ziedonis, 2013). Put differently, a credible signal needs to be more difficult and costly for a lower-quality firm to imitate (Bergh *et al.*, 2014; Connelly *et al.*, 2011). While recent developments in signaling theory suggest that soft information provided by firm insiders (narratives, statements, and expressions in communication materials) can also serve as a signal (Gutiérrez *et al.*, 2020), outsiders often construe soft information as manipulation by insiders seeking their own interests at the cost of outsiders (Abrahamson and Park, 1994; Merkl-Davies and Brennan, 2007). It is also possible that firm insiders purposely send misleading information to confuse outsiders such as competitors (Ofek and Turut, 2013). Therefore, soft information can even increase information asymmetry between firm insiders and outsiders.

EO Rhetoric

As one of the most important concepts in the entrepreneurship literature (Rauch *et al.*, 2009; Soares and Perin, 2020), EO has been conceived in two ways: as a unidimensional and a multidimensional construct (for a more systematic discussion, see Covin and Lumpkin, 2011). As originally conceived by Miller (1983) and developed by Covin and Slevin (1988, 1989), the unidimensional conceptualization posits that an

entrepreneurial firm manifests innovativeness, proactivity, and risk-taking concurrently (Covin and Lumpkin, 2011). The multidimensional conceptualization of EO adds autonomy and competitive aggressiveness, and posits that these five dimensions can "vary independently" to influence how a firm launches a new product in a market (Lumpkin and Dess, 1996: 152). In essence, the unidimensional EO focuses on "what is *common* among entrepreneurial firms," while the multidimensional EO emphasizes "how entrepreneurial firms can be *different*" (italics original) (Covin and Wales, 2019: 4). As Covin and Lumpkin (2011: 863) note, "researchers will be well served by acknowledging the distinctiveness of these two conceptualizations and by explicitly recognizing and defending the particular conceptualization being employed in their research." We examine how investors interpret a health science firm's EO rhetoric as a unitary signal, rather than how they compare different dimensions of that signal, and therefore treat EO as a unidimensional construct.

Whereas survey-based EO research captures entrepreneurial attitudes *and* behaviors (Covin and Slevin, 1988; 1989), studies of EO rhetoric focus on top managers' *expressions* of those attitudes and their *statements* about those behaviors (McKenny *et al.*, 2018; Watson *et al.*, 2019). These expressions constitute "the strategic use of words in organizational narratives" (Watson *et al.*, 2019: 752) and do not necessarily mean that the firm has made substantive commitment to innovative, proactive, and risk-taking decisions and behaviors. Building upon content analysis of firm communications (McKenny *et al.*, 2018; Short *et al.*, 2010), researchers have started to explore how outsiders interpret and react to firms' EO rhetoric (Short,

Zachary, and Ketchen Jr, 2018; Watson *et al.*, 2019), especially how that rhetoric affects a firm's valuation (Engelen *et al.*, 2016; McKenny *et al.*, 2018; Short *et al.*, 2010).

Firm value is generally defined from the perspective of investors owning the firm's assets and residual value (Wang and Thornhill, 2010). For example, in financial interactions, firm value is essentially the price at which potential investors are willing to buy the company and current investors are willing to sell it. In this situation, the firm's market value is collectively determined by potential and current investors, and can be higher or lower than the book value of its assets. Whereas book value captures the asset replacement costs if the firm is rebuilt, market value can be thought of as its expected future returns to investors. The ratio of market value to book value, which serves as the foundation for calculating different forms of Tobin's Q, reflects investors' perception of the firm's value. The higher the ratio of market to book value, the higher the valuation that investors have for the firm (Chung and Pruitt, 1994). As a result, Tobin's Q has been increasingly used to examine the effect of EO rhetoric on firm valuation (Engelen *et al.*, 2016; McKenny *et al.*, 2018; Short *et al.*, 2010).

Given the soft-information character of EO rhetoric, can investors use health science firms' EO rhetoric to facilitate their valuation of these firms? To answer this question, we posit that investors will pay attention to health science firms' EO rhetoric *over time* and derive implicit information for their valuation. Firms communicate with outsiders through periodic documents and materials (e.g., annual reports and CEO shareholder letters). Such repeated signaling creates an opportunity for false signals to be detected and penalized (Kaya, 2009; Manelli, 1996), thereby creating an assurance

that a repeated signal is credible. In other words, one can get more reliable information by looking at EO rhetoric over time rather than merely at a cross-sectional data point.

Average EO Rhetoric Over Time and Health Science Firm Valuation

We first argue that *average EO rhetoric over time*, or the extent to which firms differ in their average EO rhetoric during an observation window, helps investors identify health science firms with substantive commitment to product innovation and market entry, and increases their confidence in the firms.

As we note above, the development horizons of health science products are lengthy (Gittelman, 2016; Mohs and Greig, 2017), partly because the strict regulations of the U.S. FDA can reduce success rates and increase the time needed to reach each of the milestones in product development (Hay *et al.*, 2014). Consequently, health science firms must sustain their strategies and behaviors to embrace and enable product innovation and market entry over long periods of time, and it is reasonable to believe that such firms will demonstrate a high level of EO rhetoric over time.

This sustained EO rhetoric, in turn, lengthens the time window during which investors can verify the reliability and credibility of the signal (Connelly *et al.*, 2011). Pure impression management to manipulate outsiders has a high likelihood of being discovered over time (Connelly *et al.*, 2011; Merkl-Davies and Brennan, 2007), as investors will eventually notice the discrepancy between what the firm says and does. In contrast, investors are more likely to consider consistent EO rhetoric over time that matches objective criteria as a credible signal and value the firm accordingly. Therefore,

> *Hypothesis 1: Average EO rhetoric over time has a positive relationship with health science firm valuation, so that health science firms with higher average EO rhetoric over time have higher valuations.*

Change in EO Rhetoric and Health Science Firm Valuation

If investors favor health science firms that maintain a high average level of EO rhetoric over time, how might they interpret and react to a sudden increase in that rhetoric? We argue that investors are likely to interpret such an increase as indicating that the firm is overestimating the potential of its opportunities and underestimating its risks (Kreiser *et al.*, 2020). First, notable increases in EO rhetoric may indicate overconfidence on the part of top managers (Engelen, Neumann, and Schwens, 2015). An occasional increase in strategic and behavioral inclinations toward product innovation and entry opportunities does not always foreshadow returns, given the uncertainty and high failure rates associated with the lengthy product development process (Hay *et al.*, 2014).

Second, investors are well aware that firm insiders may intentionally manipulate information in the firm's communications with outsiders to present a more favorable image. For example, firms may use more positive language in their communications before selling new equity (Lang and Lundholm, 2000). This manipulation benefits top managers and current owners at the expense of potential investors (Merkl-Davies and Brennan, 2007). Innovation is key to addressing both endemic and sudden public health problems (Gittelman, 2016), so it stands to reason that an EO in health science firms can be socially desirable. However, investors must discern whether the top management is emphasizing EO rhetoric as an impression management tool to further short-term self-interests rather than long-term commitment to the development of more innovative products that can solve health problems.

Third, a sudden increase in EO rhetoric may also be perceived as an attempt to draw attention away from potential adverse events (Abrahamson and Park, 1994; Merkl-

Davies and Brennan, 2007). One of the most critical negative events for health science firms is product failure, which can pose great risks to patients and society, and significantly affect top managers' personal wealth (Wowak, Mannor, and Wowak, 2015). Since product failures are inevitable at some point given human fallibility and bounded rationality (Reason, 1990; 2016), investors may suspect that an increase in EO rhetoric is being used to distract them from some negative aspect of the business.

Finally, an increase in EO rhetoric may be interpreted as an attempt to mislead competitors rather than reflecting the firm's real decisions about product innovation and market entry. For example, the firm may use a vaporware strategy, announcing plans to pursue a new product opportunity when it does not believe in the product's potential and has no real intention to develop it (Ofek and Turut, 2013).

Taken together, an occasional increase in EO rhetoric allows a multitude of possible interpretations, thereby increasing the perceived uncertainty of returns from investing in the firm. Investors have long been found to lower their valuation of firms with higher perceived uncertainty (Miller and Reilly, 1987). Therefore,

> *Hypothesis 2: After accounting for average EO rhetoric over time, change in EO rhetoric has a negative relationship with health science firm valuation, so that as health science firms increase their EO rhetoric, their valuations decrease.*

Signaling Complementarity of Entry Commitment

Investors valuing a health science firm are unlikely to rely on a single signal but tend to derive important implications from the combination and configuration of different signals (Wang *et al.*, 2019). Therefore, complementary hard-information signals, which involve signaling costs (e.g., irreversible investments) or penalty costs (e.g., reputation losses), should temper investors' speculation toward changes in EO rhetoric. One kind

of signaling cost is entry commitment, the extent to which firms have committed irreversible investments (Williamson, 1983) toward product-market entry (Surdu, Mellahi, and Glaister, 2019).

Entry commitment, while not theorized sufficiently in the entrepreneurship literature, has profound implications for research on EO rhetoric. As Lumpkin and Dess (1996: 136) have clarified, “new entry explains *what* entrepreneurship consists of, and entrepreneurial orientation describes *how* new entry is undertaken” (italic original). Traditional EO studies have included both managerial attitudes toward *and* firm behaviors of new entry within the conceptualization and measurement of EO as a whole (Covin and Slevin, 1989; Miller, 1983). Focusing on EO rhetoric (Allison, McKenny, and Short, 2013; Watson *et al.*, 2019), however, scholars have begun to disentangle managerial attitudes or style from the organizational resources committed to new entries (Wales *et al.*, 2020). Such resource commitment may also be conceived as a signal that complements EO rhetoric.

Since a change in EO rhetoric does not necessarily imply corresponding substantive resource commitment, investors’ doubts will be mitigated if the firm has made irreversible investments towards product-market entry, using assets that cannot be redeployed (Balakrishnan & Fox, 1993; Williamson, 1983). In essence, entry commitment offers critical, complementary behavioral evidence to investors about the firm’s change in EO rhetoric. Given that obtaining regulatory approval for medical products is an increasingly costly process (Hoang & Rothaermel, 2010), commitment to that process signals that an increase in EO rhetoric reflects the firm’s real strategy and

behavior to foster product innovation and market entries (Covin & Wales, 2019), rather than being an artifact of impression management. Therefore,

> *Hypothesis 3: Entry commitment moderates the relationship between change in EO rhetoric and health science firm valuation, so that this relationship is less negative for firms with concurrent change in entry commitment.*

Signaling Complementarity of Corporate Social Responsibility

To differentiate among health science firms regarding their use of hard-information signals that involve substantial penalty costs, we examine the contingent effect of corporate social responsibility (CSR), which refers to "the firm's consideration of, and response to, issues beyond the narrow economic, technical, and legal requirements of the firm" (Davis, 1973: 312). Although researchers have extensively studied the relationship between CSR and firm financial performance, the signaling function of CSR has recently gained scholarly attention (Flammer, 2018; Su *et al.*, 2016). Firms with a high level of CSR support local communities, donate to charities, engage with advocacy groups, provide equal employment and promotion opportunities for employees, place women and minority members on boards, and so on. These activities help a firm establish a reputation as a good corporate citizen and as being trustworthy (i.e., not behaving opportunistically) (Flammer, 2018).

A positive reputation and trustworthiness can be considered valuable assets that enable an organization to achieve competitive advantages and realize insurance-type benefits (Flammer, 2018; Su *et al.*, 2016). The more the firm has invested in CSR, the more valuable its reputation and trustworthiness will be (Vanhamme and Grobben, 2009). Although CSR instills trust in a variety of stakeholders, that trust can be lost easily through as few as two adverse events (e.g., disputes and scandals) (Shiu and

Yang, 2017). False signaling by top management to further self-interests, hide negative news, or mislead stakeholders, if being discovered, can be important negative events and thus damage the firm's reputation and trustworthiness.

For a signal to be credible, a high-quality signaler often needs to bear higher penalty costs for false signaling than a low-quality signaler (Bergh *et al.*, 2014). Losses in reputation and trustworthiness (Bergh *et al.*, 2014; Certo, Daily, and Dalton, 2001) can cost a health science firm its legitimacy (O'Riordan and Fairbrass, 2014; Wang *et al.*, 2019). Because firms with a high level of CSR tend to have a more valuable reputation and trustworthiness than those with a low level of CSR (Flammer, 2018; Vanhamme and Grobben, 2009), the former have more to lose through false signaling—they would pay a higher penalty cost. Knowing this, investors are likely to place credit in an increase in EO rhetoric by a health science firm that concurrently emphasizes CSR. Therefore,

> *Hypothesis 4: CSR moderates the relationship between change in EO rhetoric and health science firm valuation, so that this relationship is less negative among firms with concurrent change in CSR.*

METHODS

Sample

We used the Compustat North America annual fundamental database to calculate Tobin's Q, our dependent variable capturing these firms' valuation, and the related control variables. From the Compustat database, we identified all the firm-year observations in the health science industries defined by three-digit standard industrial classification (SIC) codes 283 (drugs) and 384 (surgical, medical, and dental instruments and supplies). Although their primary SIC codes were not 283 or 384, some other companies had conducted clinical studies, suggesting that their products were

also subject to regulation by the U.S. FDA (U.S. FDA, 2016). We included these firms, which we identified by their clinical research records from the U.S. National Library of Medicine (www.clinicaltrials.org).

CEOs' shareholder letters reflect their values and strategic directions for their firms (Gamache *et al.*, 2015). We used the CEO shareholder letters of the sampled firms to measure EO rhetoric (McKenny *et al.*, 2018; Short *et al.*, 2010), in line with upper-echelons theory (Hambrick, 2007). The Sarbanes-Oxley Act, enacted on July 30, 2002 (Zhang, 2007), gradually enhanced the accuracy of statements in these letters, which are normally attached to firms' annual reports, so we included CEO shareholder letters from 2004 onward. We collected these letters from www.morningstar.com, www.annualreports.com, and the official websites of the sampled firms, and found that a significant number of our sampled firms had stopped providing CEO shareholder letters through these websites since 2013. We thus collected letters for the years 2004–2012.

To measure CSR, we drew data from KLD's universe C sample (Ioannou and Serafeim, 2015; Perrault and Quinn, 2018; Short *et al.*, 2016), which includes the original 400 social index firms and the 1,000 largest U.S. companies (MSCI ESG Research Inc., 2013). To avoid the liabilities of smallness, we excluded firms with fewer than 100 employees. EO is influenced by resource availability (Anderson and Eshima, 2013; Rauch *et al.*, 2009), and small firms may lack the resources to commit to CSR (Wang and Bansal, 2012). By matching firms across the data sources, we obtained a final sample of 212 firms with 926 firm-year observations over 2004–2012 (both inclusive). Out of the 212 firms, 114 firms primarily produced drugs, and 98 primarily produced medical devices.

Measures

Firm valuation. We measured firm valuation using *Tobin's Q* (Chung and Pruitt, 1994):

$$Tobin's\ Q = (MVE + PS + DEBT)/TA. \quad (1)$$

In Equation (1), *MVE* is the product of the firm's average stock price and the number of outstanding common shares, *PS* is the liquidation value of its outstanding preferred stocks, *DEBT* is the value of its long-term debt plus its short-term liabilities net of short-term assets, and *TA* is the book value of its total assets. Signaling theory assumes information asymmetry between participants in a market transaction (Spence, 1973; 2002), and Tobin's Q is determined by the transaction between current and potential investors at a certain stock price. In order to mitigate the influence of extremely high and low valuations of some firms, we winsorized Tobin's Q by specifying 1% of observations in each tail (i.e., scores lower than the 1st percentile or higher than the 99th percentile were replaced by the next scores counting inwards from these extremes) (Gnanadesikan and Kettenring, 1972).

EO rhetoric. Short et al. (2010) developed a measure of EO rhetoric by searching a firm's official documents for keywords related to EO dimensions, on the assumption that the appearance of these keywords reflects the top managers' attention to particular strategies (Abrahamson and Hambrick, 1997; Sapir, 1944; Whorf, 1956). Building on Short and colleagues' dictionary of keywords, McKenny *et al.* (2018) added other keywords that may be used by technology firms to demonstrate their EO. We adopted this new dictionary of keywords because our sampled firms mainly operate in industries defined by SIC codes 283 and 384, which are widely considered high-tech industries (Wang *et al.*, 2017). We used CAT Scanner, a specialty tool designed to capture

keywords for content analysis (McKenny, 2018), to measure the appearance of high-tech EO keywords included in the CEOs' shareholder letters of the sampled firms. As we note above, we adopt the unidimensional conceptualization of EO because we examine how investors interpret a health science firm's EO rhetoric as a unitary signal rather than how they compare different dimensions of that signal. Therefore, we measured EO rhetoric by summing the instances of EO keywords related to innovativeness, proactiveness, and risk-taking. In order to mitigate the influence of extremely high and low uses of EO keywords in these letters, we winsorized EO rhetoric by specifying 1% of observations in each tail (Gnanadesikan and Kettenring, 1972).

Entry commitment. By definition, entry commitment captures a firm's investments and actions that serve as behavioral evidence of irreversible resource commitment toward innovation and new product-market entry and therefore provide a more concrete, hard information signal to investors. We measured entry commitment using these firms' submissions for new drugs and applications for premarket approval of new medical devices, collected from the official website of the U.S. FDA. For drugs, we included all applications classified as "original submissions" by the U.S. FDA. For medical devices, we included all premarket approval applications required for new devices (Johnson, 2016). Both original submissions for new drugs and applications for premarket approval of new devices indicate that the firm has conducted rounds of preclinical research and clinical studies, which require investments in developing labs, enrolling patient participants, and collaborating with organizations with the needed knowledge and expertise (Deeds, Decarolis, and Coombs, 1997; Gittelman, 2016). In general, these investments are irreversible and the assets cannot be redeployed (Balakrishnan and

Fox, 1993; Williamson, 1983). Therefore, they serve as a hard-information signal of entry commitment (Bergh *et al.*, 2014; Connelly *et al.*, 2011).

For each sampled firm, we counted the number of original submissions for new drugs and applications for premarket approval of medical devices over a three-year window.[1] On average, the 212 firms during a three-year window had 0.42 original submissions for drugs and 0.09 premarket approval applications for medical devices. Because a firm may enter both new drug and new device markets and the two procedures often differ in cost, we calculated a standardized score of entry commitment by using the following equation:

$$EC = N/(SD_N) + M/(SD_M) \quad (2)$$

In Equation (2), *EC* is the firm's entry commitment, *N* is the number of three-year accumulated original submissions for new drugs, SD_N is the standard deviation of *N* in the sample, *M* is the number of three-year accumulated applications for premarket approval of medical devices, and SD_M is the standard deviation of *M* in the sample.

CSR. We measured CSR by using the seven social assessments from the KLD database: community, diversity, employee treatment, environment, products, corporate governance, and human rights (Short *et al.*, 2016). The KLD database has assessed strengths and concerns in each of these areas (Perrault and Quinn, 2018). The use of the KLD database to measure CSR has been evolving, with increasing acknowledgment that it is problematic to aggregate all the items (Parks and Cardinal, 2018) and that researchers need to distinguish between CSR and corporate social irresponsibility (CSiR) (Fu, Tang, and Chen, 2019; Strike, Gao, and Bansal, 2006). The KLD strengths

[1] In robustness checks, we used other time windows such as five years and obtained qualitatively identical results.

and concerns in the seven areas are not necessarily opposite, and firms may be responsible in some areas and irresponsible in some other areas simultaneously (Clark and Crawford, 2012; Entine, 2003; Oikonomou, Brooks, and Pavelin, 2014; Strike *et al.*, 2006). For these reasons, we used KLD strengths to measure a firm's CSR (Fu *et al.*, 2019; Strike *et al.*, 2006), and controlled for the effect of CSiR using KLD concerns.

A potential problem with the KLD data is that different items were adopted in different years. Following Short *et al.* (2016), we standardized a firm's strength in each of the seven areas by dividing its number of strengths by the total number of items being assessed in the given area and given year. For example, if firm A has two strengths in employee treatment and the KLD evaluators assessed six items of employee treatment in the given year, the firm's standardized strength in employee treatment would be 0.33. We then summed the standardized strengths in all the seven areas to measure the firm's CSR (Short *et al.*, 2016). The larger the summed score, the more the firm demonstrates its commitment to social responsibility.

Control variables. Although our sampled firms were all strictly regulated, they still differ in the regulatory exposure of their primary products. For example, compared with pharmaceutical firms, medical device companies in general face fewer strict regulations. The U.S. FDA categorizes medical devices into three classes (general controls, general controls and special controls, and general controls and premarket approval) (Zuckerman, Brown, and Nissen, 2011). For most medical devices, only registration was needed before launching (i.e., there was no need to obtain premarket approval). In contrast, drug companies need to conduct a variety of stricter clinical studies (Gittelman, 2016), take longer development time (Mohs and Greig, 2017), and have a higher rate of

failure to obtain FDA approval (Hay *et al.*, 2014). To control for the effect of this difference, we used RegData 3.1 to measure these firms' *regulatory stringency*, as other researchers have suggested (Audretsch, Belitski, and Desai, 2019; Bailey and Thomas, 2017). RegData 3.1 captures the stringency, by industry, of the Code of Federal Registrations (Bradley and Klein, 2016; Goldschlag and Tabarrok, 2018), which compiles all federal regulations in the United States. Each industry in RegData 3.1 has a restriction score; the larger the score is, the more stringent the regulations in that industry. We measured regulatory stringency at the 3-digit NAICS industry level. The regulatory stringency score is a continuous variable that changes over time, and thus can capture refined differences in these firms' regulatory restrictions over the observation period.

An EO consumes resources (Wiklund and Shepherd, 2003; 2005). Because larger firms often have more resources, we controlled for *firm size* by using the firm's total assets (in thousand U.S. dollars, log-transformed). The possession of slack resources is also related to innovativeness (Nohria and Gulati, 1996), a key EO dimension (Rauch et al., 2009). We thus controlled for the effect of *financial slack*, measured by the ratio of cash to current liabilities (Bourgeois, 1981). As discussed above, we measured a firm's EO rhetoric by counting the instances of EO keywords in a CEO shareholder letter. However, the longer the CEO shareholder letter, the more likely that such keywords would appear. We thus controlled for *letter length* measured by the number of total sentences in a letter. In order to mitigate the influence of firms that have extremely long or short CEO shareholder letters, we winsorized letter length by specifying 1% of observations in each tail (Gnanadesikan and Kettenring, 1972).

A firm's valuation may move in tandem with its financial performance (Blanchard, Rhee, and Summers, 1993). Thus, we controlled for financial performance by including *return on assets* (i.e., the ratio of earnings before tax and interest to total assets) in our regression models. A firm's R&D investments have been widely considered an important factor that can reflect the firm's specific assets (Wang and Thornhill, 2010), which can ultimately influence the firm's valuation. Therefore, we also controlled for the effect of *R&D ratio*, measured by R&D investment divided by the firm's total revenue. Because some firms did not generate a large amount of revenue but still invested significant capital in R&D, R&D ratio is skewed to the right. To mitigate this issue, we assigned a value of 1 to R&D ratio for observations that had higher R&D investments than total revenue.

Firms with an EO may borrow heavily (i.e., risk-taking) (Lumpkin and Dess, 1996; Miller, 1983). For this reason, we controlled for *debt ratio*, measured by dividing the firm's long-term debt by its total assets. Firms may be socially responsible and socially irresponsible at the same time (Fu *et al.*, 2019; Strike *et al.*, 2006). Therefore, we also controlled for *CSiR* using KLD "concerns" in the areas of community, diversity, employee treatment, environment, products, corporate governance, human rights, and involvement in stigmatized businesses (i.e., alcohol, tobacco, gambling, weapons, and nuclear energy) (Hillman and Keim, 2001; Waddock and Graves, 1997). Again, we standardized a firm's items of concern within an area by dividing the total number of concern items by the total number of items evaluated by KLD (Short *et al.*, 2016), and then measured CSiR by summing all the standardized concern scores. Finally, to

control for the temporal differences over 2004–2012, we included eight binary variables in our regression models (i.e., year-fixed effects).

Analysis

By focusing on the effect of average EO rhetoric over time on firm valuation, Hypothesis 1 investigates a between-firm relationship. In contrast, Hypothesis 2 examines the effect of change in EO rhetoric over time on firm valuation and essentially focuses on a within-firm relationship. Although the between-effects and the fixed-effects models for panel data can test the two hypotheses separately, each has its own limitations. The fixed-effects models have an advantage in controlling for the effects of unobserved factors at the firm level but cannot estimate the effect of any variable that does not change over time (Certo *et al.*, 2017).

To overcome the limitations of the between-effects and the fixed-effects models, researchers propose that the hybrid approach is a better alternative for disentangling the between- and within-firm relationships of a predictor and an outcome variable (Certo *et al.*, 2017; Schunck, 2013). More specifically, the hybrid approach can combine the advantages of both effects by splitting the predictor into two variables: a firm-mean variable that captures the between-firm relationship and a firm-mean deviation variable that captures the within-firm relationship in the random-effects models (Certo *et al.*, 2017; Schunck, 2013). Furthermore, the hybrid approach enables testing for equivalence of the between- and within-firm relationships (Schunck, 2013), thus offering extra evidence for Hypotheses 1 and 2.

We adopted the hybrid approach by following the procedure recommended by Schunck (2013). We first calculated the firm-mean and firm-mean deviation scores of EO rhetoric, entry commitment, and CSR. In order to test the moderation effects of entry

commitment and CSR (Hypotheses 3 and 4), we obtained the interaction (product) terms of EO rhetoric and entry commitment and of EO rhetoric and CSR. For both interaction terms, we then calculated their firm-mean and firm-mean deviation scores. As explained by Schunck (2013), in order to obtain the correct estimates of an interaction effect using the hybrid approach, both firm-mean and firm-mean deviation scores of the interaction term need to be included in the random-effects models. Because the firm-mean deviation score of the interaction term reflects the change in both the predictor and the moderator (Schunck, 2013), we used the estimates of the deviation scores of the interaction terms between EO rhetoric and entry commitment and between EO and CSR as evidence for Hypotheses 3 and 4, with the firm-mean scores of the interaction terms controlled in the random-effects models (Schunck, 2013).

Our empirical model can be described as follows:

$$Tobin's\ Q_{i(t+1)} = \beta_0 + \beta_{1i}\, EO\ rhetoric\_mean_i + \beta_{2it}(EO\ rhetoric\_deviation_{it}, entry\ commitment\_deviation_{it}, CSR\_deviation_{it}) + \beta_{1i}(control\ variables_{it}) + u_i + \epsilon_{it}\ . \quad (3)$$

In equation (3), the one-year lag between the predictors and Tobin's Q helps reduce concerns about reverse causality.

RESULTS

Table 1 reports the descriptive statistics and bivariate correlations of all variables except the eight year dummies. The mean value of EO rhetoric was 30.251, indicating that within a CEO's shareholder letter, keywords signaling EO (McKenny *et al.*, 2018) would appear 30.251 times. Model 1 in Table 2 is the base model that includes all the

control variables, the firm-mean and firm-mean deviation scores of entry commitment, and the firm-mean and firm-mean deviation scores of CSR. Model 2 adds the firm-mean and firm-mean deviation scores of EO rhetoric. The regression coefficient of EO rhetoric's firm-mean score was positive and significant ($b = 0.016$, $p < 0.05$), thus demonstrating the presence of the between-firm relationship. On average, for health science firms with one standard deviation higher in the appearance of EO keywords in the CEO shareholder letters (i.e., 14.669 times) over the observation period, their valuation measured by Tobin's Q_{t+1} is likely to be higher by about 23.470% (i.e., 1.6% × 14.669). Therefore, Hypothesis 1 is supported.

Insert Tables 1 and 2 about here

The regression coefficient of EO rhetoric's firm-mean deviation score was negative and significant ($b = – 0.009$, $p < 0.05$), thus demonstrating the presence of the within-firm relationship. On average, for health science firms that had increased their EO keyword appearance on the CEO shareholder letter by one standard deviation (i.e., 11.014 times), their valuation measured by Tobin's Q would decrease by 9.913% (0.9% × 11.014). Therefore, Hypothesis 2 is supported. Following Schunck (2013: 69), we also tested the equality of the estimates of the between-and within-firm relationships. We found that the chi-squared test for equality is 12.51 ($p < 0.001$), providing evidence that average EO rhetoric and change in EO rhetoric have different effects on the valuation of these health science firms.

In Model 3, we added both the firm-mean and firm-mean deviation scores of the interaction term between EO rhetoric and entry commitment. After we accounted for the firm-mean of the interaction term, its firm-mean deviation score produced a positive and

significant coefficient with Tobin's Q_{t+1} ($b = 0.006$, $p < 0.01$), supporting Hypothesis 3. In Model 4, we added both the firm-mean and firm-mean deviation scores of the interaction term between EO rhetoric and CSR. After we controlled for the effect of the firm-mean of the interaction term, its firm-mean deviation score produced a positive and significant coefficient with Tobin's Q_{t+1} ($b = 0.005$, $p < 0.05$), supporting Hypothesis 4. We also included the firm-mean and firm-mean deviation scores of both interaction terms in Model 5, and they produced results similar to those reported in Models 3 and 4.

We plotted the marginal effects of change in EO rhetoric on Tobin's Q_{t+1} across different levels of entry commitment and CSR, using estimates obtained from the fixed-effect model with both interaction terms.[2] As Figure 1 illustrates, the estimated marginal effects of change in EO rhetoric on Tobin's Q_{t+1} were significant when the measure of entry commitment was lower than 0.68. As Figure 2 illustrates, the estimated marginal effects of change in EO rhetoric on Tobin's Q_{t+1} were significant when CSR was lower than 1.17. Overall, these visual illustrations suggest that the negative effect of change in EO rhetoric on firm valuation is mitigated for firms with concurrent increases in entry commitment or CSR.

Insert Figures 1–2 about here

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[2] Using Stata 15, it is impossible to use the "margins" command after the random-effects models as we needed to include the firm-mean and firm-mean deviation scores of the interaction terms between EO rhetoric and entry commitment and between EO rhetoric and CSR (for detailed explanations, see Schunck, 2013: 71-74). However, because our Hypotheses 3 and 4 focus on within-firm relationships, the "margins' command after the fixed-effects models provide the correct postestimation.

DISCUSSION

These findings suggest that, over our observation window, investors bestow higher valuations on health science firms that maintain higher average EO rhetoric over time. An occasional increase in that rhetoric, however, prompts investor skepticism and lowers health science firms' valuations. We also find that concurrent changes in entry commitment and CSR help mitigate investors' skepticism. By joining scholarly conversations on health science firms that are increasingly important because of the rising health issues around the world, this study contributes to entrepreneurship and regulation research in several ways.

Theoretical Implications

First, we contribute to the EO literature by focusing on health science firms that face strict regulation by the U.S. FDA. As Miller (2011: 881) has recommended, researchers should "study EO within a carefully defined industry context" to better elucidate the particular challenges and opportunities associated with EO. We answer this call by incorporating the industry-specific characteristics of health science firms within EO research to reveal nuanced mechanisms that engender new insights into the context. Health science firms are characterized by long horizons of product development due to the discovery-driven nature of health science products and the strict regulations enacted by the FDA (Gittelman, 2016; Mohs and Greig, 2017). Therefore, health science firms are likely to benefit from an EO; without innovative, proactive, and risk-taking decisions and behaviors, they cannot develop novel products and enter promising markets.

However, strict FDA regulations place more emphasis on the safety of the public. Briggeman *et al.* (2016: 3) have even claimed that "In a sense, the FDA has restated its

mission from *promoting* health to *protecting* health, from permitting new products that can advance health to demanding certainty that products will not cause any harm" (italics original). Increases in regulatory restrictions can lead to higher compliance costs for new market entries (Chambers, McLaughlin, and Richards, 2018). Therefore, health science firms seem to face a dilemma. On the one hand, their EO is critical for them to pursue successful product innovation and market entry. On the other hand, strict regulations by the FDA make it difficult for them to realize economic returns from their EO, even if their innovative products are better, safer, and healthier than the existing ones (Lindblom, 2018). By considering this dilemma, our study suggests that in certain industries, such as health science, EO's contributions to firm performance and valuation can be rather different from those identified in the extant research.

Second, we contribute to the emerging stream of research on the signaling function of EO rhetoric by offering a novel and nuanced distinction between average and change in EO rhetoric over time. Given the information asymmetry between firm insiders and outsiders, potential investors may not be confident in a health science firm without observing strong indicators that the firm can achieve successful product innovation and market entries. Researchers have started to consider EO rhetoric as a signal (Allison *et al.*, 2013; Watson *et al.*, 2019) that may reduce information asymmetry between the firm and potential investors. Drawing upon the theory of repeated signaling (Kaya, 2009; Manelli, 1996), we argue that average EO rhetoric and change in EO rhetoric over time play different roles in affecting information asymmetry between firm insiders and outsiders.

We find that sustained EO rhetoric over time is perceived well, while an

occasional increase in EO rhetoric is met with investors' skepticism. Sustained EO rhetoric over time in a regulated environment gives investors the confidence that the firm has a grip on complex regulations and can earn regulation rents (Bessen, 2016). Complex regulations are likely to make regulators dependent on industry expertise (Alvarez, Young, and Woolley, 2015), thus giving investors' confidence that firms with EO rhetoric sustained over time would be more influential in extracting regulation rents than their industry rivals. However, investors may perceive an occasional increase in EO rhetoric as managerial overconfidence and impression management, since they know the many regulatory "hoops" that the firms have to jump through before launching their products in the markets (Gittelman, 2016).

Our findings that average EO rhetoric and change in EO rhetoric over time exhibit opposite effects on firm valuation support Certo *et al.* (2017), who point out that the between-firm and within-firm variances of an organizational factor can have profound and different theoretical implications that are largely neglected in the management literature. This may explain the inconsistent findings of past studies examining EO rhetoric. Some researchers have reported a positive relationship between EO rhetoric and firm valuation (Engelen *et al.*, 2016; Liu *et al.*, 2019; Moss, Neubaum, and Meyskens, 2015), while others have shown a negative relationship (Mousa, Wales, and Harper, 2015; Short *et al.*, 2010). In the industry we examine, strict FDA regulation and the consequent long product development horizons make it likely that false signals will be discovered and penalized. Therefore, firms with sustained EO rhetoric give confidence to investors that they will be able to extract higher economic rents, while those with occasional changes in EO rhetoric generate ambiguity and doubt

among investors.

We also acknowledge that interpreting the difference of the between- and within-firm effects of a variable may not be straightforward (Certo *et al.*, 2017; Schunck, 2013), given that average EO rhetoric over time may be correlated with firm- or CEO-specific unobserved variables (e.g., social capital) that enable the firm or CEO to benefit from an EO (Stam and Elfring, 2008). Another possible explanation for the difference is that the within-firm effect may depend on the between-firm effect (Certo *et al.*, 2017; Schunck, 2013), so that the negative effect of change in EO rhetoric on firm valuation is weaker for health science firms with a higher level of average EO rhetoric over time. We tested this speculation and found that the interaction term of the firm-mean and firm-mean deviation scores of EO rhetoric produced a positive regression coefficient with firm valuation ($b = 0.0004$, $p = 0.111$). Although this coefficient is not strongly significant, its positive sign is consistent with this explanation.

Third, we contribute to signaling theory by illustrating how soft-information and hard-information signals can jointly affect the reactions of outsiders. More specifically, we illustrate that hard-information signals (entry commitment and CSR) can increase the credibility of soft-information signals (EO rhetoric within CEO shareholder letters). While widely assumed in the EO literature (Lumpkin and Dess, 1996), entry commitment has not been empirically studied. As Wales *et al.* (2020) posit, a firm's communicated EO is more closely aligned to its management style and positioning than its actual new entry, thereby creating an opportunity to examine the gap between EO rhetoric and firm valuation. Such a gap is likely to be mitigated for firms that have already made strong entry commitment, thus providing additional support for our finding

that behavioral evidence in the form of increased entry commitment can enhance the relationship between change in EO rhetoric and health science firm valuation.

As other researchers have noted (Flammer, 2018; Su *et al.*, 2016), the signaling function of CSR deserves further research attention and effort. The more socially responsible practices a firm has engaged in, the more valuable its reputation and trustworthiness will be (Vanhamme and Grobben, 2009). Therefore, firms with a higher level of CSR are less likely to send false signals, given that losses of reputation and trustworthiness due to false signaling can cause higher penalty costs for them. As a result, investors are more likely to be confident in firms with concurrent increases in EO rhetoric and CSR signaling. By introducing this nuanced mechanism, this study also offers novel evidence that firms benefit from being socially responsible and entrepreneurial at the same time.

Managerial Implications

When considering EO rhetoric as a potential quality signal, investors should examine whether a health science firm has maintained a higher level of EO rhetoric than its peers *over time* and whether its EO rhetoric has changed recently. Average EO rhetoric over time constitutes a more credible signal; it helps identify health science firms with more substantive strategic and behavioral inclinations toward product innovation, entry opportunities, and business-related risks. Our findings imply that health science firms maintaining higher EO rhetoric over time deserve higher valuations, given the myriad of benefits that an EO can have for health science firms. A change in EO rhetoric, however, invites scrutiny because it may be serving a myriad of short-term

purposes, such as impression management, hiding negative news, and misleading competitors.

For health science firm managers, how to communicate their firms' EO to investors is a significant challenge. The market will penalize false signaling, and investors are cautious regarding changes in EO rhetoric. Consistency is critical to overcoming skepticism that such rhetoric is merely "cheap talk." If a health science firm aims to ramp up its EO rhetoric, it should be aware that investors may misinterpret the increase and confront this misinterpretation head-on with concurrent increases in entry commitment and/or CSR.

Limitations and Future Research

Researchers have argued and found evidence that strict regulations may help incumbent firms extract economic rents by erecting barriers to new entrants (Bessen, 2016; Gutiérrez and Philippon, 2017). We find that regulatory stringency produces a positive regression coefficient with Tobin's Q_{t+1} (Model 1), but this coefficient becomes insignificant when average EO rhetoric and changes in EO rhetoric are included in the regression models (Models 2–5). This positive coefficient seems to support the idea that increased barriers due to strict regulations can give incumbents a competitive advantage to earn economic rents. However, if these incumbents demonstrate a strong inclination to enter new product markets using EO rhetoric, investors may lower their valuations because of the potential risks (e.g., uncertainties in long product development horizons, difficulties in obtaining approvals from the FDA, and/or potential penalties due to product failures). It is important and promising to further disentangle the relationships among regulation, innovation, and firm value in future research.

We have conceptualized EO rhetoric as a unitary signal of strategies and behaviors to enable entrepreneurship, rather than comparing the signaling effects of individual EO dimensions or different configurations of EO dimensions. Researchers have paid increasing attention to various combinations of EO dimensions (Lomberg *et al.*, 2017; McKenny *et al.*, 2018). It may be fruitful to study the temporal characteristics of such configurations from a signaling perspective. Furthermore, investors differ in their investment horizons: some are long-term oriented, while others focus on a series of short-term gains (Bushee, 1998). Given the long-term product development horizons of health science firms, it is likely that the majority of their investors are long-term oriented. However, it is promising to examine how time orientation affects investors' interpretation of and reaction to health science firms' average EO rhetoric and change in EO rhetoric over time.

We have focused on health science firms in the United States, so our data lack variance at the industry level (Misangyi *et al.*, 2006; Peterson, Arregle, and Martin, 2012) and we cannot examine whether and how industry-level differences in regulation may shape the effect of EO rhetoric on firm valuation. But other industries (e.g., military products and national defense, air and aerospace travels, and the petroleum and nuclear energy sectors) also face industry-specific regulations that could expose further nuance in the relationships between entrepreneurship and firm valuation. Finally, we have relied on the KLD database to measure our sampled firms' CSR, and thus our results may not be generalizable to firms that had not been included in the KLD sample. It is important to further develop and test our hypotheses in other empirical contexts, such as firms from more industries that vary in regulatory stringency, with alternative

CSR data sources and measures, and/or from other countries that differ in institutional and cultural environments that can affect EO (Semrau, Ambos, and Kraus, 2016).

Conclusion

Being entrepreneurial and innovative is critical for health science firms, given that their success ultimately depends on product innovation and market entry despite the presence of strict regulations that may stifle their entrepreneurial efforts and processes. By drawing on signaling theory, we argue that EO rhetoric over time contains important information for investors to consider when valuating health science firms. We observe that investors value health science firms with a higher level of average EO rhetoric over time but tend to be skeptical of firms exhibiting occasional increases in EO rhetoric in published communications. Moreover, we find that concurrent increases in entry commitment and CSR can mitigate investor skepticism.

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TABLES AND FIGURES

Table 1

Descriptive Statistics and Bivariate Correlations

	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12
1. Tobin's Q_{t+1}	2.172	1.544	0.259	11.500												
2. EOR (firm-mean)	30.251	14.669	4.000	71.200	0.100											
3. EOR (firm-mean deviation)	0.000	11.014	–41.889	44.800	–0.054	0.000										
4. EC	0.265	1.171	0.000	14.683	–0.100	0.059	–0.033									
5. CSR	0.632	1.021	0.000	5.383	–0.095	0.334	–0.036	0.165								
6. Regulatory stringency	6.308	5.287	0.000	11.209	0.209	0.285	–0.001	0.021	0.153							
7. Firm size	6.976	1.956	2.892	12.269	–0.262	0.308	–0.005	0.223	0.688	0.027						
8. Financial slack	3.899	3.025	0.487	21.952	0.130	–0.093	0.007	–0.102	–0.296	0.128	–0.431					
9. Return on assets	0.020	0.253	–3.187	1.647	–0.211	0.010	–0.011	0.088	0.235	–0.186	0.440	–0.243				
10. R&D ratio	0.271	0.343	0.000	1.000	0.288	0.162	0.019	–0.083	–0.214	0.424	–0.382	0.407	–0.708			
11. Debt ratio	0.170	0.210	0.000	1.705	–0.064	0.111	–0.022	0.027	0.005	0.174	0.114	–0.074	–0.159	0.214		
12. Letter length	67.605	37.392	9.000	205.000	–0.069	0.508	0.336	0.060	0.311	0.010	0.420	–0.258	0.248	–0.245	–0.042	
13. CSiR	0.944	0.854	0.000	6.000	–0.126	0.142	0.009	0.167	0.392	0.008	0.391	–0.182	0.129	–0.143	0.028	0.196

Note: EOR = entrepreneurial orientation rhetoric; EC = entry commitment; CS(i)R = corporate social (ir)responsibility; Correlations with absolute value larger than 0.057, 0.070, and 0.088 were significant at $p < 0.10$, $p < 0.05$, and $p < 0.01$ respectively (two-tailed tests).

Table 2

Regressions on Tobin's Q_{t+1}

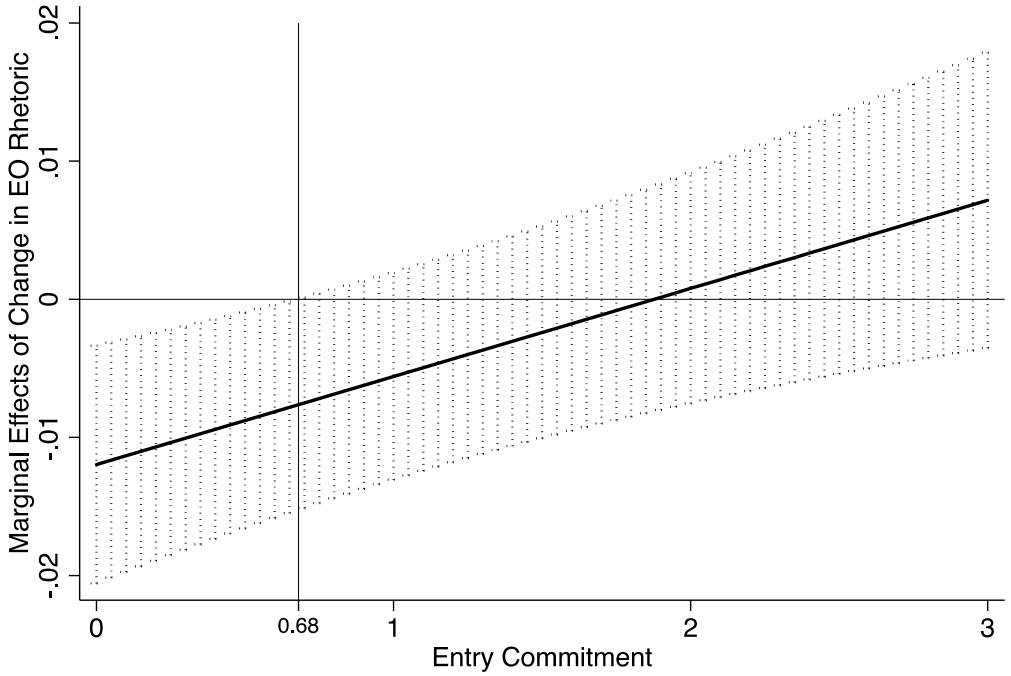
	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	4.140 (0.442)***	3.847 (0.439)***	3.854 (0.446)***	3.802 (0.442)***	3.815 (0.447)***
Regulatory stringency	0.039 (0.019)*	0.029 (0.018)	0.029 (0.019)	0.029 (0.018)	0.028 (0.019)
Firm size	–0.297 (0.063)***	–0.327 (0.063)***	–0.328 (0.063)***	–0.330 (0.063)***	–0.333 (0.064)***
Financial slack	–0.058 (0.025)*	–0.056 (0.025)*	–0.055 (0.025)*	–0.055 (0.025)*	–0.055 (0.025)*
Return on assets	0.091 (0.488)	0.077 (0.478)	0.070 (0.473)	0.079 (0.471)	0.072 (0.465)
R&D ratio	0.719 (0.361)*	0.683 (0.372)†	0.685 (0.371)†	0.701 (0.372)†	0.702 (0.372)†
Debt ratio	–0.777 (0.290)**	–0.821 (0.286)**	–0.823 (0.286)**	–0.850 (0.286)**	–0.853 (0.287)**
Letter length	–0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
CSiR	0.036 (0.065)	0.034 (0.064)	0.031 (0.064)	0.041 (0.063)	0.037 (0.063)
EC (firm-mean)	–0.123 (0.064)†	–0.119 (0.066)†	–0.106 (0.239)	–0.122 (0.064)†	–0.151 (0.242)
EC (firm-mean deviation)	0.034 (0.048)	0.023 (0.049)	–0.068 (0.033)*	0.041 (0.047)	–0.055 (0.028)*
CSR (firm-mean)	0.324 (0.113)**	0.259 (0.112)*	0.266 (0.112)*	0.418 (0.203)*	0.430 (0.212)*
CSR (firm-mean deviation)	–0.334 (0.101)***	–0.345 (0.105)**	–0.328 (0.108)**	–0.513 (0.128)***	–0.501 (0.131)***
EOR (firm-mean)		0.016 (0.007)*	0.016 (0.007)*	0.018 (0.008)*	0.018 (0.008)*
EOR (firm-mean deviation)		–0.009 (0.004)*	–0.009 (0.004)*	–0.014 (0.005)**	–0.014 (0.005)**
EOR×EC (firm-mean)			–0.000 (0.007)		0.001 (0.007)
EOR×EC (firm-mean deviation)			0.006 (0.002)**		0.006 (0.002)**
EOR×CSR (firm-mean)				–0.004 (0.004)	–0.004 (0.004)
EOR×CSR (firm-mean deviation)				0.005 (0.002)*	0.005 (0.002)**
R2 within	0.141	0.152	0.156	0.161	0.165
between	0.183	0.205	0.205	0.206	0.206
overall	0.190	0.201	0.202	0.205	0.207

Notes:

1) EOR = entrepreneurial orientation rhetoric; EC = entry commitment; CS(i)R = corporate social (ir)responsibility;
2) The firm-mean and firm-mean deviation scores of a variable captures its between-firm and within-firm effects, respectively;
3) Eight year dummies were included in all the models;
4) Unstandardized coefficients (standard errors), † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed tests).

Figure 1

Marginal Effects of Change in EO Rhetoric on Tobin's Q_{t+1} across Entry Commitment

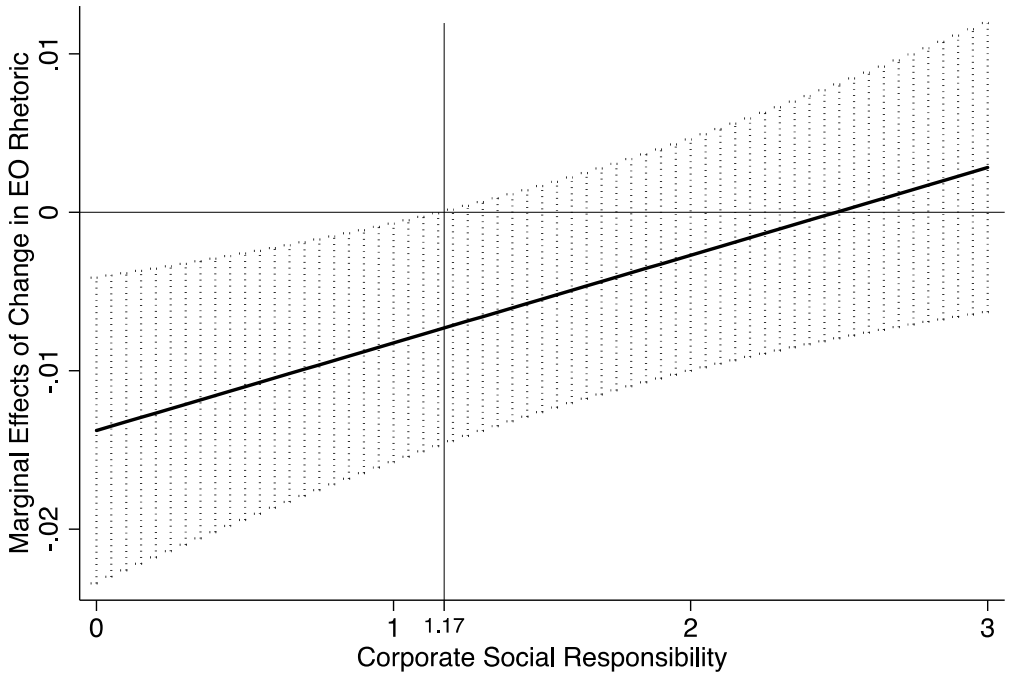


Notes:

1) Plots are based on estimates from the fixed-effects model with both interaction terms;
2) Dashed bars represent 95% confidence intervals;
3) The negative effect of change in EO rhetoric on Tobin's Q_{t+1} was significant when the measure of entry commitment was lower than 0.68.

Figure 2

Marginal Effects of Change in EO Rhetoric on Tobin's Q_{t+1} across Corporate Social Responsibility



Notes:

1) Plots are based on estimates from the fixed-effects model with both interaction terms;
2) Dashed bars represent 95% confidence intervals;
3) The negative effect of change in EO rhetoric on Tobin's Q_{t+1} was significant when the measure of corporate social responsibility was lower than 1.17.

CHAPTER 2: WHO CARES? CEO OPTION INCENTIVES, ATTENTIONAL VARIATION OF EXTERNAL MONITORS, AND PRODUCT RECALL TIMING

ABSTRACT

Integrating behavioral agency theory with the attention-based view, we argue that CEOs are cognizant of attention variations by external monitors (periods of low and peak awareness concerning the firm). We hypothesize that CEOs preserve their option wealth by initiating product recalls to exploit periods of low monitoring attention or delaying product recalls during periods of heightened monitoring attention. As a result, option incentives may lead to CEO opportunistic behaviors that compromise external monitoring effectiveness. Further, we hypothesize that CEOs' long-term orientation mitigates these opportunistic behaviors. We find general support for these hypotheses by analyzing medical device recalls initiated by US firms during 2004–2017. This study gives boards of medical device firms behavioral levers to protect customers and shareholders in the long run.

Keywords: agency costs, stock options, attention exploitation, loss aversion, product recalls

INTRODUCTION

On July 20, 2018 (Friday), Bayer finally announced the withdrawal of Essure from the US following other markets such as Australia and Brazil (Ducharme, 2018; Feely & Fisk, 2018). As a long-time controversial permanent contraceptive device, Essure had been reported for its adverse health effects ranging from migraines and hair loss to organ perforation and dangerous pregnancies (FDA, 2020; Hutchinson, 2020). Although Bayer downplayed the withdrawal by claiming that the decision was based on "declining sales" and that the safety and efficacy of Essure have not changed, it agreed to pay 1.6 Billion USD to settle the majority of 40,000 lawsuits by women in the US who suffered from the adverse effects of Essure (Bayer, 2018; Reuters, 2020). Product recalls' ubiquity and the potentially severe negative consequences for customer welfare continue to remind us of the importance of managerial decisions concerning the timing of faulty product recalls. These decisions can have life and death consequences, especially in the health sciences industry (Diestre, Barber, & Santaló, 2020). Prior research suggests that CEO stock options are likely to play a role in influencing firm decisions on product recalls (Wowak, Mannor, & Wowak, 2015). Yet, we lack an understanding of CEO behaviors that could circumvent the efficacy of incentive alignment mechanisms (stock option ownership) that might hold CEOs accountable for product recalls.

By integrating behavioral agency theory and the attention-based view (ABV) of the firm, we develop a theory of CEO exploitation of attention variance. We posit that CEOs exploit their external monitors' attentional limitations – to preserve their option wealth – when making decisions on product recall timing. Agency theory's core tenet

has been built around the notion that information asymmetry enables CEOs to impose costs on shareholders through tactics such as income smoothing (Zhang, Bartol, Smith, Pfarrer, & Khanin, 2008), or misguided efforts (Aguilera, Filatotchev, Gospel, & Jackson, 2008). Expanding this literature beyond the shareholder primacy paradigm, behavioral agency theory has explored how option incentives also affect CEO decisions that impact other non-shareholder stakeholders (Martin, Wiseman, & Gomez-Mejia, 2020; Zolotoy, O'Sullivan, Martin, & Wiseman, In press). However, within that discourse, we are yet to draw on a behavioral lens to examine how CEOs exploit their monitors' attentiveness – the external market observers that scrutinize CEO performance – and who bears the costs created by that exploitation. If CEOs are aware of these monitors' cognitive limitations, does this affect how timely their firms act in alerting customers about the faulty products through recalls? More specifically, given attention variance of external monitors, how do CEO stock options affect the choices they make regarding product recalls' timing?

Attention — the noticing, encoding, and focusing of time and effort on both the stimuli requiring action and the available repertoire of responses, which define that action — is a scarce commodity (Ocasio, 1997, 2011; Ocasio, Laamanen, & Vaara, 2018). The ABV analyzes audience receptiveness to (noticing of) information (Ocasio, 1997, 2011); since a human brain has limited information processing capacity, it has to select from a range of stimuli to direct attention and react accordingly. External monitors (e.g., investors and analysts) make judgments about a firm's prospects and valuation, which affect CEO option wealth, by observing the firm's actions (Westphal & Graebner, 2010; Zavyalova, Pfarrer, Reger, & Shapiro, 2012). When doing so, however, these

monitors are less attentive at certain times (e.g., the last working day in a week) and more attentive at other times (e.g., when the annual reports are released) (Dellavigna & Pollet, 2009; Ng & Wang, 2004). We suggest that the behavioral agency model (BAM) and ABV are synergistic when predicting CEO use of attention exploitation to preserve personal wealth, such that CEOs prefer a time of low market attentiveness to initiate product recalls and avoid a time of high attention when recalling faulty products to stay away from close scrutiny by external monitors. Moreover, these short-term opportunistic behaviors can be diminished when CEOs have a long-term orientation in decision-making.

By analyzing 6,609 product recalls of 127 firms led by 170 CEOs in the medical device industry, we find overall evidence for our predictions, offering important theoretical insights. First, we advance behavioral agency research by demonstrating the utility of a theory of attention (ABV) in exploring the efficacy of CEO option incentives and external monitoring. Specifically, we argue that a CEO is cognizant of and likely to exploit the attentional variation of external monitors. Moreover, they are more likely to erode the efficacy of external monitoring as their option wealth increases. This suggests that incentives – a form of internal governance – can reduce the effectiveness of external governance. While the ABV and BAM individually have important implications for management research, this is the first study that integrates BAM and ABV to map attentional engagement and predict the temporal dimension of CEOs' decision making. Thus, we demonstrate the utility of a broader array of cognition theories to analyze how CEOs may make self-serving decisions that could (1) place the firm and its customers

at grave risk; and (2) limit the effectiveness of external governance intended to ensure CEO accountability for product failures.

Second, we advance behavioral agency theory by offering insight into how incentives affect CEO decisions that create agency costs for one stakeholder (customer) while advancing another's (short-term shareholder) interests. The study of how CEOs prioritize among stakeholder needs – where there is tension among them – is an increasingly important field of agency research, reflecting a shift in the management literature beyond a shareholder primacy paradigm (Hambrick, Werder, & Zajac, 2008; Martin et al., 2020; Zolotoy et al., In press). The need to move in this direction is highlighted by senior executives' assertions that business exists to create long-term value for multiple stakeholders (Business Roundtable, 2019).

Third, our study has important implications for the product recall literature, given that few firm decisions have more dire consequences for consumers and society at large than product recalls (Hill & Jones, 1992; Jones et al., 2016). Prior research suggests that CEO stock options are likely to play a role in influencing the *likelihood* of product safety problems (e.g., whether the firm has a high probability of encountering product failures) (Wowak et al., 2015). We offer a theoretical framework and empirical evidence highlighting that attempts at CEO-shareholder interest alignment can inadvertently foster CEO decisions regarding the *timing* of recalling faulty products with catastrophic spillover effects (in our case, ill-timed product recalls that may hurt a large number of users to fit the CEO's personal agenda better). Our findings give boards of medical device firms some directions regarding the proper design of incentive systems

for their CEOs and how to be vigilant to ensure product recalls are timed with patients' best interest in mind.

THEORY AND HYPOTHESES

Behavioral Agency and Monitor Attention: CEO Incentives and Stakeholder Alignment

Classical agency theory advocated using stock-based compensation for CEOs to encourage them to take more risks, as any gains in the stock price would also increase their value to CEOs. In their seminal work, Jensen and Meckling (1976) argued that agents are inherently risk-averse since they cannot diversify employment risks, while principals can diversify equity portfolios across multiple firms, making them more risk-neutral. This "risk differential" (Beatty & Zajac, 1995) creates an agency problem for principals. They can mitigate this problem through incentive alignment (Eisenhardt, 1989), such as by compensating agents with stock options.

The behavioral agency model (BAM) proposed by Wiseman and Gomez-Mejia (1998) drew on behavioral decision research to enhance agency theory's conceptualization of risk. Building on prospect theory (Kahneman & Tversky, 1979), BAM proposed that agents may not be consistently risk-averse. Using prospect theory's concept of loss aversion—that is, individuals are more sensitive to losses than to gains—BAM proposes that managerial agents will be less likely to take risks as their wealth-at-risk increases. An agent defines losses or gains in relation to a "reference point" that is assumed to be current wealth (Kahneman & Tversky, 1979). If executives anticipate they will not achieve their referent wealth in the absence of risk-taking (loss-frame), then the executives may exhibit risk-seeking preferences. This proposition has

been supported in studies of CEO decision-making regarding strategic risk-taking (Martin, Gomez-Mejia, & Wiseman, 2013), acquisition and restructuring (Sanders, 2001), earnings management (Zhang et al., 2008), and long-term investments (Martin, Wiseman, & Gomez-Mejia, 2016). Instead of taking risks for the firm, executives may act in a self-serving, opportunistic manner to avoid their wealth losses.

Given the general premise in financial economics that "maximizing shareholder welfare" should be the primary objective of hired agents (DeFusco, Johnson, & Zorn, 1990; Jensen & Meckling, 1976), both classical agency and BAM focus on the outcomes for shareholders. According to the stakeholder agency perspective (Hill & Jones, 1992), a firm can be seen as a nexus of contracts between all stakeholders such as employees, customers, suppliers, creditors, communities, and the general public, even if the contractual relationship is implicit. Further, management is the only group that enters into a contract with all other stakeholders (Hill & Jones, 1992). Thus, a broad range of stakeholders is vulnerable to managers' opportunism, including employees, customers, and society more generally (Hambrick et al., 2008; Jones et al., 2016; Werder, 2011). Stakeholder agency, therefore, shifts the focus from a CEO (agent) – shareholder (principal) relationship to the analysis of an implicit contract between the CEO and any firm stakeholder. It also challenges the assumption that agents would be taking risks that symmetrically impact all the stakeholders.

***Behavioral agency and exploiting inattention of external monitors*.** According to the ABV, external monitors to whom recall information is directed have limited capacity to notice and process information. From a financial interaction perspective, external monitors mainly include analysts and prospective investors.

Product failure represents a threat to the CEO's option wealth since such failure threatens the firm's share price, ultimately affecting the value of the CEO's option wealth (Wiseman & Gomez-Mejia, 1998). In the context of medical device recalls, Thirumalai and Sinha (2011) show that investors tend to sell the firm's stock at a lower price when recalls occur. The selling of stock can further place downward pressure on the share price and reduce the CEO's option wealth (Louis & Sun, 2010). From a public well-being perspective, external monitors include regulators and anyone who may have purchased or used the product. Because any audience has cognitive limitations, they tend to develop patterns that they believe further their information processing effectiveness (Ocasio, 1997; Ocasio et al., 2018). Hence, one way the CEO can reduce losses of endowed wealth associated with product recalls is to initiate them during periods when the intended audience is expected to be less attentive: days that external monitors are less likely to notice them and, therefore, less likely to respond negatively such as by selling the stock.

Researchers have found that investors are less attentive on certain days. Dellavigna and Pollet (2009) show evidence of a muted market response to a firm's information release on the last working day of the week, given that people may be absent from work (Harrison & Hulin, 1989; Herrmann & Rockoff, 2012) or focus their attention on upcoming leisure activities (Sotak, Spain, Dionne, & Yammarino, 2015). For a similar reason, Ehrmann and Jansen (2017) show that stock traded volumes decline by as much as 48% during scheduled FIFA World Cup matches (which they used as proxies for market-inattention days). Taken together, the logic of the ABV and research on market inattention suggest that CEOs may exploit market inattention to preserve

their option wealth when product recalls are in the offing. If the inattentive market day is not the first day that the recall should have been initiated, this equates to serving the short-term interests of shareholders at the cost to customers who may buy or use a faulty product during the period between CEO awareness of the product problem and when the users were alerted.

In sum, the CEO is likely to be cognizant of external monitors' inattention that could be exploited to his or her advantage when product recalls are initiated. By exploiting market inattention, fewer people become alert to a firm's product failures. Therefore, drawing on BAM and the ABV, we argue that option wealth incentivizes the CEO to exploit attention variance by initiating product recalls on inattentive days that would result in a less severe drop in the firm's stock price and thus their option wealth. From a loss aversion perspective (as per BAM), it follows that the incentive to exploit market inattention as a wealth preservation tactic should rise as a function of CEO option wealth (as the CEO's personal bounty subject to loss increases accordingly). Therefore,

> *Hypothesis 1: The greater the CEO*'s *option wealth (and thus the CEO has more financial loss exposure), the higher the likelihood that product recalls are initiated on the market inattentive days (e.g., Fridays).*

Reduced exploitation during the peak attention period. Although the above discussions assume that Fridays are generally the days that monitoring entities are less attentive, this may not always be the case over a fiscal year of the firm. The fiscal year-beginning period is likely to be when external monitor attention is more focused on firm actions. Agarwal, Gay, and Ling (2014) report that markets are more responsive to firm announcements as the new fiscal year begins. Drake, Jennings, Roulstone, and

Thornock (2017) show that investor scrutiny "comoves" with information about the firm fundamentals at the fiscal year-beginning. Also, market analysts are more vigilant during the fiscal year-beginning period because they have to disseminate earnings forecasts and issue stock recommendations of the firms they follow (Lin, Wu, & Chiang, 2014; Wiersema & Zhang, 2011). Overall, we argue that during peak attention periods (i.e., as the fiscal year begins), CEOs would be less likely to perceive that they could reduce their option wealth losses through timing the recalls on inattentive days. Since the fiscal year-beginning period is a peak attention period, the use of market "inattentive" days would not help prevent CEOs' scrutiny. Therefore:

> *Hypothesis 2: The positive relationship between the CEO*'s *option wealth and the likelihood that product recalls are initiated on the market inattentive days (e.g., Fridays) is reduced during a peak attention period (e.g., Fiscal-Year beginning).*

***Avoiding attention during the peak attention period*.** Since during the peak attention period, it is less feasible for CEOs to mitigate option wealth losses by recalling products when external monitors are inattentive, an alternative for them is to delay the losses. The timing of CEO decision-making invites the need for theory exploring myopia in decision making. A related behavioral stream of research emanating from financial economics and prospect theory has examined myopic loss aversion (MLA) of CEOs, suggesting that decision-makers subjectively discount distant losses more aggressively than immediate losses (Benartzi & Thaler, 1995; Thaler, Tversky, Kahneman, & Schwartz, 1997). Said differently, when facing losses, CEOs view losses in a "narrow frame" (Benartzi & Thaler, 1995) and would rather defer the loss (Martin et al., 2016; Shelley, 1993). Thaler and colleagues (1997) show that narrow framing results in investors' near-sightedness at the cost of their longer-term goals or investors'

preoccupation with certain investments at the cost of their portfolio performance. As a result, individuals apply a larger subjective discount to future losses, making future losses preferable to losses in the near-term (Thaler et al., 1997). In the context of behavioral agency, an executive may defer losses to a future period, despite that those future losses may be larger (prior to subjective discounting) (Martin et al., 2016).

We posit that the heightened attention during the fiscal year-beginning period leads to CEO myopia, such that they defer losses to a later period. As the new fiscal year begins, CEOs are cognizant that their performance is under intense scrutiny by the board and markets (Agarwal et al., 2014; Drake et al., 2017). For instance, CEOs often write letters to the firm's shareholders in the new fiscal year that highlights their past year's accomplishments and emphasize strategic intentions that the management plans to pursue in the future (Short, Broberg, Cogliser, & Brigham, 2010). CEOs also conduct earnings calls with the media and investors to announce the past fiscal year's annual results. During this call, the analysts may question the CEO about any concerns they may have about the firm or CEO's performance (Brown, Wei, & Wermers, 2014; Wiersema & Zhang, 2011). Because of this heightened monitoring attention in the fiscal year beginning, we posit that CEOs are likely to seek alternate mechanisms for preserving their option wealth that is prescient about monitors' attention and myopia regarding future losses. That is, they may preserve their option wealth in the short-term despite the potentially greater longer-term losses, thus suggesting that CEOs may postpone product recalls to delay their subjective estimate of the impact it may have on their option wealth, or postponing their "day of reckoning" (Kahneman, 2011). On the basis that shareholders are also myopic, as MLA suggests, the decision to delay is

likely to be consistent with shareholders' desires while exposing customers to financial and/or physical harm that could result from buying or using the faulty product.

In sum, deferring recalls will allow CEOs to delay their loss in option wealth and therefore reduce their subjective estimate of personal loss due to the recall: the higher their option wealth, the stronger the CEO's motivation to do so (Wiseman & Gomez-Mejia, 1998). Consequently, we argue that:

> *Hypothesis 3: The greater the CEO*'s *option wealth, the higher the likelihood that product recalls are delayed during the peak attention period.*

Moderation by CEO long-term orientation. Prior research has documented CEOs' influence over their firm's temporal orientation, reflected in their preference for longer-term or shorter-term investments (Martin et al., 2016; Souder & Bromiley, 2012). We hypothesized above regarding the product recall behavior of CEOs due to their inclination to preserve option wealth by exploiting variation in attention by monitors towards their firm's actions. We have also hypothesized that myopia regarding longer-term losses will lead CEOs to delay losses created by product recalls if the product fault was discovered during the start of a new fiscal year period (when attention is more focused on the firm). Note that in both scenarios (recalls on inattentive days of the week or avoiding recalls during high-attention periods of the year), MLA suggests that the CEO is likely to defer losses. The recall and its costs may be discovered by the market over time or even cause detrimental consequences for customers over the longer-run, which in turn can negatively affect the firm's long-term performance.

The preference for market attentive days or avoidance of high market attention described in Hypotheses 1 and 3 are both likely to be contingent upon CEO temporal

orientation, given that prescience regarding possible longer-term implications of recall decisions are likely to weigh on CEOs when making their decision regarding recall timing. Said differently, CEOs with a longer-term orientation are less inclined to appease the short-term shareholders (and meet their own short-term wealth preservation goals) at the expense of customers' welfare and longer-term interests of their shareholders and their own option wealth. This suggests that CEOs' long-term orientation is likely to attenuate their short-term opportunistic behavior associated with avoiding close attention of monitors when initiating product recalls. Therefore:

> *Hypothesis 4a: The positive relationship between the CEO*'s *option wealth and the likelihood that product recalls are initiated on the market inattentive days is negatively moderated by long-term orientation.*
>
> *Hypothesis 4b: The positive relationship between the CEO*'s *option wealth and the likelihood of delayed recalls during the peak-attention period is negatively moderated by long-term orientation.*

METHODS

Sample and Data Sources

The timeliness of faulty medical device recalls offers an ideal empirical context given our research objectives since such recalls can create divergent outcomes for customers and shareholders. What may be good for customers (e.g., early alerts about product faults) may be bad for shareholders in the short-term (share price decline due to costs or foregone sales associated with recall) and vice-versa. Therefore, medical device recalls allow us to explore how incentives – such as equity or stock options – affect how CEOs balance the competing needs of different stakeholder groups. Medical devices play an indispensable role in delivering quality health care (Thirumalai & Sinha, 2011). However, any failure in medical devices may significantly harm patients and

sometimes medical personnel. When a firm learns of a failure in its medical device, it must initiate a 'corrective action' or recall.

We drew our sample from product recalls of medical devices registered with the US Food and Drug Administration (FDA).[3] When initiating a recall process, the firm submits a plan to the FDA that involves various elements such as the reason, depth, and warning methods of the recall. The FDA reviews the plan, asks for changes (if any), classifies the severity of the recall, and monitors it until deemed terminated (*CFR - Code of Federal Regulations Title 21*, 2019). The FDA posts the recall plan on its website from where we downloaded our data.

The FDA also leaves the discretion to recalling firms about the mode of public warning. In its guiding document to the industry about the public warning and notification of recalls, the FDA states that if "the recalling firm has records that show exactly where the products have gone, a prompt and effective communication to such accounts informing them of the recall may be adequate to prevent the use of a recalled product" (*Public Warning-Notification of Recalls Under 21 CFR Part 7, Subpart C. Guidance for Industry and FDA Staff*, 2019, p. 6). As a result, firms have considerable leeway about when and how to alert the users and suppliers of the malfunctioning product in the recalls.

Appendix A shows a typical recall archived by the FDA. Class 1 recalled products reflect "a reasonable chance that a product will cause serious health problems or death"

[3] In general, medical device recalls are counted as voluntary and not mandatory. Even the FDA requested recalls are counted as voluntary. The FDA has rarely needed to require a medical device recall (FDA, 2018).

(FDA, 2018). Class 2 recalled products may cause temporary or medically reversible health consequences. Class 3 recalled products are not likely to cause any health consequences. We used Class 1 and Class 2 product recalls to construct our sample, given that Class 3 recalls may not affect CEO decision making and stakeholders would not be concerned about them (Wowak et al., 2015).

We matched these product recalls to the financial and performance data on the announcing companies in the COMPUSTAT database,[4] which we then matched to the Execucomp database that contains compensation data for top executives. Since Execucomp tracks only firms that have been listed at least once in the S&P 1500, for firms that appear in COMPUSTAT but not Execucomp, we manually collected the compensation data from proxy statements filed with the Securities Exchange Commission. For board-related variables, we used BoardEx. Our final sample included 6,609 Class I & II product recalls by 127 firms led by 170 CEOs during 2004–2017.

Dependent Variables

We decomposed CEOs' loss-averse behaviors reflected in product recall initiations. The FDA archives the firm initiation date and the FDA posted date. We used the firm initiation date for two reasons – it is the date when the firm first alerts its suppliers and users about the faulty devices, and the information about faulty products gets out of the firm's boundary thus, diffusing to external stakeholders.[5] To measure a

[4] A product recall can be made by a subsidiary of a public company. We first identified each company's subsidiaries from Exhibit 21 of its annual report filed to the SEC. We then matched companies that had announced product recalls with both parent companies listed in the US and all of their subsidiaries during the corresponding year. We finally calculated product recall measures by including recalls made by both the parent and its subsidiaries.

[5] FDA only posts the information on its website after reviewing the recall plan. The mean difference between the dates when the firm initiated and FDA reviewed the strategy and posted it on its website was 131.84 days.

market inattention recall, we used a binary variable (1/0) that reflects whether the product recall was initiated on a market inattention day (Fridays and last working days before the four major U.S. holidays, i.e., Christmas, New Year, Independence Day, and Thanksgiving) (Louis & Sun, 2010). In a robustness check, we examined only the likelihood of product recall initiations on Fridays, and our results remained qualitatively identical.

For near fiscal-year-beginning *delayed recall,* we used a binary variable (1/0) that reflects whether the product recall was initiated in the latter half of the first month (low attention period) instead of the first half (high attention period). To understand how the fiscal-year-beginning recall variable is computed, consider a simplified example. Suppose that the fiscal year-beginning date of a firm was March 31, and thus, the first month of the new year in April. Our variable *delayed recall* would be assigned the value of "1" if a recall was initiated on 16-30th April and "0" if initiated on 1-15th April. Although most of the firm results and conference calls should be over in the first 15 days, our results were qualitatively identical if we changed our threshold day by +/- 5 days.

Independent Variables

Following previous research, we measured *CEO option wealth* as the number of options from each option grant, multiplied by their spread (i.e., the positive difference between the exercise price and stock price) for in-the-money options at fiscal year-end (Larraza-Kintana, Wiseman, Gomez-Mejia, & Welbourne, 2007; Martin et al., 2013).[6] For the moderation test by *peak-attention period*, we used a binary variable (1/0) for the

[6] We exclude "underwater" options since they have no cash value to lose and thus are not a threat to the CEO.

first month of the fiscal year. We measured *long-term orientation*, or CEO investment horizon for the moderation tests, by using the following formula (Martin et al., 2016):

$$\text{Long-Term Orientation} = \frac{\text{Gross PPE (property, plant, and equipment)}}{\text{Depreciation Expense}}$$

Control Variables

We included several variables that have been used in past research on behavioral agency and product recalls. At the firm level, we controlled for the effects of *firm size* using the number of employees (log-transformed), *R&D intensity* (R&D expense divided by sales), *diversification* (an entropy measure introduced by Palepu (1985)), *market performance* (net income scaled by market value), *financial distress* (measured as Altman's Z (Altman, 1968)), and *board independence* (measured as the ratio of independent board members to total board members). To account for the "turn-of-the-year effect" (Ng & Wang, 2004), we created a *fiscal as calendar year* dummy variable for the firms that had their fiscal year coinciding with the calendar year. *Industry dynamism* and *industry complexity* were calculated following Dess and Beard (1984). We also controlled for *time-invariant industry effects* by including industry sector dummies based on four-digit GICS (Global Industry Classification System) codes.

At the CEO level, we controlled for the effects of *CEO total other pay* (cash bonus, salary, and nonequity incentives), CEO *total exercise gains* (cash made from exercising options and restricted stock), *CEO ownership* (the number of shares held multiplied by the year-end stock price), *CEO tenure* (years in the CEO position), *CEO founder status* (a dummy variable that reflects whether the CEO is also the founder or co-founder of the focal firm), *CEO duality* (a binary indicator of whether the CEO also

serves as the board chair) and *CEO throughput-output function* (a binary indicator of whether the CEO started his or her career in process or product R&D functions (Hambrick & Mason, 1984)). We included *recall class* (severity of recall as defined by FDA) and *previous product recalls* (the previous number of product recall announcements in a firm-year) in all the regression models. We also included *year* dummy variables to control for time-fixed effects. All time-varying independent and control variables were lagged by one year.

Instrumental Variables

CEOs who are better at loss-averse behavior may be holding or getting higher wealth in options. Alternatively, some unobservable CEO characteristics may drive our results. Such reverse causality and missing variables induce endogeneity in a study like ours. Previous studies have tried to tackle the problem with an instrumental variable approach (2SLS). We used *Bartik IV* (Bartik, 1991) that exploits the heterogeneous effect of a nationwide regulatory change or shock (Goldsmith-Pinkham, Sorkin, & Swift, 2020). In our setting, the FASB (Financial Accounting Standards Board) changed the reporting of stock options in 2006 and required all firms to expense firm stock options. This change in regulation is correlated to CEO options granted after 2007 by all the firms. Thus, we created a regulatory shock dummy variable (1 for all the firm years in our sample from 2007 onwards and 0 otherwise) and multiplied it by a firm's share of CEO option wealth in its industry. The resultant variable was correlated to our independent variable, *CEO option wealth*. The identifying assumption is that the policy change was exogenous to CEOs' loss-averse behavior, except through its effect on

CEO option wealth. We also used *CEO option wealth* at *t - 2* as the second IV to compare the two variables.

Estimation Method

Since our dependent variable is a binary variable measuring the likelihood of recall announcement on certain dates, we used probit models for a binomial distribution. Specifically, we used “ivprobit” in Stata, which incorporates an instrument variable. To specify our data’s panel data structure correctly, we used CEO-product recall as the level of analysis (Papke & Wooldridge, 2008). Following Wowak et al. (2015), we used robust standard errors (grouped by CEO).

RESULTS

To test CEO market-inattention recall behavior, Table 1 reports descriptive statistics and correlations of the full sample for all measures except the industry and year dummies. The mean of market inattention recall behavior is 0.23. In other words, products are recalled on market-inattention days for 23% of the total working days. Since we are testing beginning-of-the-year CEO loss aversion, in Table 2, we examine a subsample of products that were recalled in the 30-day window. All time-varying independent firm and CEO variables were lagged by one year.

Table 3 provides the expected and actual incidence rates of product recalls on Fridays. Although the above results are descriptive in nature, they lend support to our theory that there is variation in attention by markets, and CEOs behave differently with market inattention day recalls at different fiscal-year periods. Below, we report results about our hypotheses predicting that CEOs use variation in attention by different firm monitors to avoid their losses.

Insert Tables 1-5 and Figures 1-4 about here

CEO Market Inattention Recall Behavior

Table 4 reports the results of the analysis of the effect of CEO wealth on market inattention recall behavior. Models 1 and 2 are the first and second stage models respectively, analyzing the effect of CEO option wealth on the market inattention recall behavior. In the interests of parsimony, industry and year dummy variables are not shown. The F-statistic in first-stage models (predicting CEO current option wealth using instrumental variables) was high and significant ($F = 209.02$, $p < 0.001$ for Bartik IV). The Wald test of exogeneity was significant.[7] In Model 2, we report the second-stage results of the instrumental variable probit model. It produced a positive and significant coefficient for CEO current option wealth as a determinant of market inattention recall behavior ($b = 0.015$, $p<0.001$), supporting Hypothesis 1. Since the coefficients and their significance in probability models are difficult to interpret, we illustrate the predicted probabilities in Figure 1. A one standard deviation increase from the mean value of CEO option wealth (18.6 million USD) leads to a rise in the probability of market inattention recall from 0.22 to 0.34. In other words, the probability of an inattentive recall rises by 55% with a one standard deviation increase in the CEO option wealth from the mean value.

Model 3 reports the results of the moderation effect of the fiscal-year-beginning period on the market-inattentive recall. The interaction term between the CEO option

[7] The null hypothesis of Wald's test is "no endogeneity" (STATA, p. 6). For a further discussion on the Wald test, please refer to Wooldridge (2010), pp. 472–477.

wealth and fiscal-year end period was negative and significant (b = -0.014, p = 0.001), supporting Hypothesis 2. To determine the “true interaction effect” in non-linear models (Wiersema & Bowen, 2009), we graph the marginal effect of the peak-attention period at various levels of CEO option wealth in Figure 2. Model 4 reports the results of the moderation effect of temporal orientation on the market-inattentive recall. The interaction term between the CEO option wealth and fiscal-year end period was negative and significant (b = -0.008, p<0.001), supporting Hypothesis 4a. Figure 3 illustrates the marginal effect of temporal attention at various levels of CEO option wealth. Model 5 is the full model with all the interaction terms with similar results.

CEO Fiscal-year-beginning loss aversion

Table 5 reports the results of the analysis of the effect of CEO wealth on product recall delay behavior during the fiscal-year-beginning period. Models 6 and 7 are the first and second stage models respectively, analyzing the effect of CEO option wealth on the delayed recall behavior. The F-statistic in first-stage models (predicting CEO current option wealth using instrumental variables) was high and significant (F = 43.66, p < 0.001 for Bartik IV). The coefficient of CEO option wealth (Model 7) was positive and significant (b = 0.025, p = 0.034), supporting Hypothesis 3. We illustrate the average marginal effect in Figure 4. A one standard deviation increase from the mean value of CEO option wealth (22.9 million USD) leads to a rise in the probability of delayed recall from 0.49 to 0.62. In other words, the probability of a delayed recall rises by 27% with a one standard deviation increase in the CEO option wealth from the mean value. Model 8 added the interaction term of temporal orientation and CEO option wealth. However, we found no support for Hypothesis 4b (b = 0.002, p = 0.15).

Robustness Tests

We checked whether the cumulative abnormal returns (CAR) after a recall event were negative and thus an influence on CEO decision-making. We measured the effect of product failures on stock prices through an event study. We considered a two-day (0, 1) window with “day 0” when the focal firm initiates the recall, and the external audience becomes aware. For each firm, we computed the abnormal returns using the market model. Following (Pfarrer, Pollock, & Rindova, 2010), the abnormal returns’ estimation window was over the period 255 to 45 trading days before the event date with 70 days as the minimum number of days with valid returns. The mean CAR was negative and significant for the recall events (-0.153%, CIs (95 %) = -0.21%, -0.09%).[8] Further, we checked whether the adverse effect was lesser on inattentive days and more pronounced during the fiscal year-beginning period through t-tests of CAR. We found that indeed the CAR drop was lesser on events coinciding with inattentive days (Mean Difference = -0.18%, t = -2.53). During the fiscal year-beginning period, the drop in CAR was significantly more (Mean Difference = 0.56%, t = 4.87). These results give confidence that the variations in negative reactions of markets would be influencing CEO decisions.

DISCUSSION

We set out to investigate how CEOs exploit attentional variance of monitoring principals’ to preserve their option wealth. Our findings demonstrate that CEOs are likely to exploit market inattention during the week and avoid peak-attention (at year

[8] Detailed results are not reported in the interest of parsimony. They are available upon request.

beginning) when initiating product recalls. A longer-term orientation attenuates the use of intra-week exploitation of inattention. Our study provides theoretical contributions and contributions to practice, which we outline below.

Theoretical Contributions

First, we advance behavioral agency theory by elucidating the role of attention – and the CEO's prescience regarding attention variation – in understanding the agency costs created by stock options. Behavioral agency theory and the ABV have not previously been used in an integrated fashion to understand how a CEO may blunt the external market's effectiveness, which purportedly acts as a deterrent for CEO opportunistic behaviors (Shi, Connelly, & Hoskisson, 2017). Our theory suggests that accumulated stock-option wealth can undermine the effectiveness of that external market discipline. This occurs because option wealth creates greater incentives for CEOs to exploit market inattention. Hence, by elucidating the downside of increasing option wealth and therefore of increasing agent risk-bearing, we advance theory highlighting the fallibility of external monitoring and potentially perverse consequences of CEO stock option compensation.

Second, we advance stakeholder agency theory by enriching knowledge regarding the consequences of CEO stock options for customers and shareholders. While CEO option wealth may align interests with the short-term shareholder by incentivizing monitor attention exploitation, it increases the probability that a product fault has a greater negative impact on customers. As a major stakeholder group, customers are more susceptible to CEO opportunism than shareholders for two reasons: higher information asymmetry and power imbalance (Werder, 2011).

Customers buy infrequently and may not have the knowledge to engage in due diligence to understand product recall cases or to second guess management's self-serving behavior when recalls are initiated (Hersel, Helmuth, Zorn, Shropshire, & Ridge, 2019). Further, in specialized industries such as medical devices, better alternatives may not be readily available to customers. Thus, customers, users, and their families are especially vulnerable to opportunistic managers.

Third, we advance ABV by demonstrating its utility in predicting CEO behaviors by anticipating external monitors' inattention. Since principals have a "bandwidth" problem (or scarce attention), it is difficult for principals to monitor agents all year round (Ocasio, 1997). The concept of attention has a long and rich history in organization science with diverse roots in managerial cognition (Weick, 1995), issue selling (Dutton, 1997), strategic change (Ocasio et al., 2018), ecology (Hansen & Haas, 2001), and selective perception in social psychology (Beyer et al., 1997). Traditionally, most of the attention-related research focused on stimuli or bottom-up attentional processing. However, cognitive scientists have started to highlight the importance of both top-down (goal-driven) and bottom-up (data-driven) information processes, termed as attentional engagement (Corbetta & Shulman, 2002; Ocasio, 2011). In other words, goal-driven CEOs may be strategically trying to avoid negative attention by data-driven audience-members. Our study shows that CEOs may manage the product recall dates, contingent upon stakeholder groups' attention. Further, the CEOs that lead more long-term-oriented firms are less likely to indulge in such opportunistic behavior. By adding ABV as another theoretical foundation from behavioral science and cognitive psychology, we

advance behavioral agency theory to understand agent responses to incentives better when the context is framed as a loss.

Jensen and Meckling (1976) highlighted both the importance of incentive alignment and agent monitoring to address the agency problem. Since then, we have a better understanding of perverse incentives [primarily through higher risk-bearing; see Deya-Tortella, Gomez-Mejia, de Castro, and Wiseman (2005)] and, to a lesser extent, problems in monitoring (Tuggle, Sirmon, Reutzel, & Bierman, 2010). We look at the agency problem from both ends and find that stock-based incentives can lead to higher loss aversion, *and* incomplete monitoring can help CEOs avoid their losses differently. In other words, we map variation in the attention of a firm's fiscal-year by various monitors and examine how CEOs engage with that attention to avoid their stock-linked losses.

This study also encourages scholarly efforts and theory development on the business's core purpose and how business leaders should choose to accomplish those purposes. In the spirit of stakeholder capitalism being urged by the Business Roundtable (2019), the consequences of CEO incentives for customers (stakeholders other than shareholders) deserve greater academic attention. According to the statement emerging from the Business Roundable (2019), generating value for shareholders has become only one of the multiple objectives of business leaders. Furthermore, it is a *long-term* value for shareholders that has been emphasized in the statement. However, the use of stock options continues to be a ubiquitous tool intended to increase CEO-shareholder alignment, meaning that the anticipated short-term market reaction to their choices still largely influences CEOs' decisions. How to motivate

corporate leaders to fulfill other corporate objectives – creating value for stakeholders other than shareholders – remains an elusive question. Advancing prior research indicating that CEOs may act differently with different temporal orientations (Martin et al., 2016; Souder & Bromiley, 2012), we provide evidence that CEO's option wealth can impact when the firm alerts its users about faulty products. Therefore, our study highlights the negative and unintended consequences of stock options – as they accumulate value – for aligning CEO-shareholder interests and CEO-customer interests. More broadly, this study adds to the larger body of research questioning the extent to which CEOs deserve the pay they get [for recent reviews see - Aguinis, Gomez-Mejia, Martin, and Joo (2018); Aguinis, Martin, Gomez-Mejia, O'Boyle, and Joo (2018)].

Finally, there is a growing literature in the management field on the topic of ethical leadership (e.g., Bazerman, 2020; Blasi, 2004; Ehrhart, 2004; Mayer, Aquino, Greenbaum, & Kuenzi, 2012; Shao, Aquino, & Freeman, 2008) and it would seem pertinent and interesting in future research to link the theory and results presented here to this construct. A building block of ethical leadership is the notion of the moral manager or agents who encourage normative behavior and discourage unethical behavior in the firms they lead. Except in the more egregious cases, the handling of product recalls described here is not illegal per se, but most observers will probably see them as unscrupulous or iniquitous. According to Blasi (2004), "moral leaders" see success not only in terms of outcomes but by how those outcomes are achieved. Aquino and Freeman (2009) argue that moral identity functions as a self-regulatory mechanism that prevents managers from acting in an opportunistic fashion, which in our

case would translate into being honest and transparent with product recalls (process) rather than protecting the executive's equity wealth (outcome).

Practical Implications

This study raises some red flags for the board of directors in general and compensation committees in particular. To avoid losses, CEOs may indulge in questionable tactics related to adverse events. The behavior we document in the study has parallels in earnings manipulation and income smoothing (Zhang et al., 2008). Some of these behaviors are legal but can damage the firm's legitimacy. For instance, Bayer continues to face criticism over delayed recall of Essure from the US (mentioned at the beginning of this study) and law suits from women in multiple countries (Ducharme, 2018; Hutchinson, 2020). Boards (and perhaps other interested parties such as consumer groups) monitoring top executives should be aware of CEOs' nefarious tactics, including inattention exploitation and peak-attention avoidance, that may be difficult to detect yet prompted by the incentive system. The old truism that "you get what you pay for" is often forgotten by those who design incentive systems (Gomez-Mejia, Berrone, & Franco-Santos, 2014), and CEO opportunism seems to be one of them.

This study also has important implications for policymakers. For example, government watchdogs should be more alert to possibilities for reducing product recall manipulations, that is, unusual product recall activities around Fridays and in firms' fiscal-year-beginnings. For instance, Diestre et al. (2020) show that drug-related deaths would be reduced by 22-36% if the safety alerts on side-effects were sent on any working day other than Fridays when markets are less attentive. Furthermore, it is

necessary to formulate and enact regulations to mitigate opportunistic tactics. For example, regarding the 2019 Boeing 737 Max crashes, a recent report issued by the congressional investigators suggested that Boeing knew of the safety concerns as early as 2012 but "did not inform the FAA (Federal Aviation Authority)" (Levin, 2020). The US Congressional Committee also criticized the "culture of concealment" by the company. In a hearing, the US Congress reprimanded the then CEO Dennis Muilenburg that "You are the CEO. The buck stops with you." The new CEO, Dave Calhoun, who took charge in January of 2020, admitted that Boeing would try to regain the culture of "lost transparency" (Levin, 2020). Experts agree that the second crash killing all 157 onboard the Ethiopian Airlines plane could have been avoided had Boeing acted sooner in its faulty plane recall.[9] Such tragedies call into question not only management decisions but also the broader role a firm plays in society and the importance of governance mechanisms that could mitigate the possibility that a firm's executives make self-serving decisions that negatively impact customers and society (Haney & Simpson, 2019).

This study has some limitations that offer important directions for future research. One limitation of our study is that we do not know precisely when the CEO learned of the fault. Hence, we cannot determine how far CEOs may have gone to protect their option-linked wealth. Future research can rely on other data sources to identify when CEOs knew that their firms' products were faulty. This time point is certainly earlier than when a product's recall is announced (Hora, Bapuji, & Roth, 2011). Future research that can examine the broader time frame is important and promising. Another limitation is

[9] Boeing admits it "fell short" on safety alert for 737. *BBC*, retrieved from https://www.bbc.com/news/business-48461110

our assumption that the FASB's policy change came as a shock to the firms in our sample; it may be that some firms were better able than others to predict this change. Although the policy change makes for a better instrument than used by the previous literature, we hope that some future research will be better at identifying causality.

Conclusion

We have elucidated the CEOs' prescience regarding attention variance of their monitors and therefore, we have also highlighted the perverse consequences of option wealth and the fallibility of external monitoring. As a result, we have also advanced theory by demonstrating that stock options could create a long-term misalignment in the CEO-shareholder and CEO-customer relationships. We hope our study brings attention to CEOs' self-serving behaviors towards other stakeholders and ways that this may be prevented.

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TABLES AND FIGURES

Table 1: Descriptive Statistics and Correlations of the Sample

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1)Inattentive Recall	0.23	0.42	1.00													
2)Non-founder	0.94	0.23	-0.05	1.00												
3)Recall Class 2	1.93	0.25	0.01	-0.05	1.00											
4)Total Recalls	78.73	78.95	0.00	0.17	0.11	1.00										
5)R&D Intensity	0.1	0.34	-0.02	0.03	-0.01	-0.08	1.00									
6)Log Employees	2.46	1.44	-0.00	0.40	-0.06	0.26	-0.20	1.00								
7)Mar. Performance	0.03	0.09	0.03	0.06	0.04	0.14	-0.44	0.27	1.00							
8)Altman Z	1.84	1.32	0.05	-0.01	0.10	0.31	-0.40	0.28	0.63	1.00						
9)Ind. Dynamism	0.14	0.1	-0.00	0.07	0.01	-0.01	0.11	0.03	-0.21	-0.12	1.00					
10)Ind. Complexity	0.09	0.03	-0.08	0.15	-0.12	-0.16	0.21	0.22	-0.27	-0.35	0.42	1.00				
11)Firm Diversification	0.68	0.66	-0.06	0.07	-0.00	0.10	-0.06	0.45	0.17	0.17	0.13	0.14	1.00			
12)CEO Other Pay	2.7	2.8	0.00	0.15	-0.01	-0.01	-0.03	0.47	0.05	-0.01	-0.12	0.17	0.21	1.00		
13)Stock Exercise	5.2	8.92	0.10	0.09	0.01	-0.09	-0.03	0.24	0.07	0.02	-0.05	0.07	0.02	0.30	1.00	
14)Tenure	6.19	5.55	0.04	-0.65	0.03	-0.23	-0.04	-0.30	-0.00	0.04	-0.08	-0.12	-0.10	-0.04	0.10	1.00
15)Duality	0.53	0.5	-0.08	-0.18	0.02	-0.12	-0.07	0.23	0.08	0.08	-0.07	0.04	0.38	0.31	0.18	0.28
16)Throughput-Output	0.18	0.39	0.02	-0.13	-0.05	-0.27	0.05	-0.09	0.01	-0.05	-0.04	0.13	0.16	0.12	0.03	0.04
17)Ownership	26.7	64.95	-0.05	-0.02	0.04	-0.04	-0.02	0.09	0.04	0.10	0.15	0.05	0.20	0.07	0.11	0.30
18)Fiscal as Calendar	0.77	0.42	0.02	-0.07	0.06	0.16	0.03	-0.12	-0.09	-0.06	-0.16	-0.15	-0.42	-0.17	-0.11	0.12
19)Ind. Dir. Ratio	0.88	0.09	-0.01	0.29	0.01	0.02	-0.00	0.38	-0.01	-0.07	-0.00	0.15	0.16	0.18	0.10	-0.32
20)Peak-Attention	0.08	0.27	-0.06	-0.06	-0.02	-0.05	-0.01	-0.05	0.02	0.03	0.05	-0.04	0.05	-0.02	-0.03	0.04
21)Long-term Orien.	8.75	3.45	0.02	-0.24	0.06	-0.02	-0.14	0.04	0.25	0.24	-0.15	-0.09	0.17	-0.11	-0.20	0.07
22)Bartik IV	0.13	0.2	0.12	0.09	0.06	0.03	-0.07	0.00	0.16	0.18	-0.29	-0.37	-0.10	0.02	0.07	0.10
23)Option Wealth	18.6	23.29	0.04	0.12	0.06	-0.06	-0.04	0.12	0.09	0.20	0.00	-0.01	-0.08	0.14	0.40	0.04

	Mean	SD	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
15)Duality	0.53	0.5	1.00								
16)Throughput-Output	0.18	0.39	0.05	1.00							
17)Ownership	26.7	64.95	0.27	0.06	1.00						
18)Fiscal as Calendar	0.77	0.42	-0.17	-0.49	-0.11	1.00					
19)Ind. Dir. Ratio	0.88	0.09	-0.07	-0.03	-0.02	-0.09	1.00				
20)Peak-Attention	0.08	0.27	0.03	0.03	0.01	-0.04	-0.04	1.00			
21)Long-term Orient.	8.75	3.45	0.16	-0.03	-0.04	-0.07	-0.11	0.05	1.00		
22)Bartik IV	0.13	0.2	-0.03	-0.03	-0.05	0.09	-0.05	-0.01	0.08	1.00	
23)Option Wealth	18.6	23.29	0.14	-0.04	0.28	0.01	0.01	-0.00	0.01	0.23	1.00

Note: Correlation coefficients with an absolute value larger than 0.03 are significant at the .05 level. Compensation variables are in millions (USD).

Table 2: Descriptive Statistics and Correlations of the Fiscal-Year beginning Sample

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1)Delayed Recall	0.46	0.5	1.00													
2)Non-founder	0.9	0.3	0.00	1.00												
3)Recall Class 2	1.93	0.25	-0.21	-0.12	1.00											
4)Total Recalls	50.41	52.64	-0.16	0.20	0.17	1.00										
5)R&D Intensity	0.1	0.14	0.17	0.19	-0.02	-0.16	1.00									
6)Log Employees	2.59	1.34	0.03	0.62	-0.20	0.29	-0.02	1.00								
7)Mar. Performance	0.03	0.04	0.03	0.04	-0.13	0.08	-0.41	0.31	1.00							
8)Altman Z	2.1	0.95	-0.10	-0.04	-0.10	0.35	-0.53	0.26	0.64	1.00						
9)Ind. Dynamism	0.17	0.11	0.05	0.22	-0.03	-0.01	0.31	0.12	-0.06	0.07	1.00					
10)Ind. Complexity	0.09	0.03	0.14	0.19	-0.08	-0.31	0.38	0.23	0.02	-0.35	0.41	1.00				
11)Firm Diversification	0.86	0.71	0.13	0.07	-0.24	0.00	-0.03	0.45	0.28	0.17	0.22	0.28	1.00			
12) CEO Cash	2.71	3.01	-0.04	0.21	-0.01	-0.04	-0.01	0.44	0.08	-0.07	-0.16	0.14	0.17	1.00		
13)Stock Exercise	5.69	7.46	0.32	0.21	-0.25	-0.36	0.06	0.26	0.16	0.03	0.04	0.30	0.20	0.24	1.00	
14)Tenure	6.53	6.36	0.06	-0.86	0.04	-0.31	-0.14	-0.54	0.02	-0.00	-0.35	-0.16	-0.13	-0.11	0.02	1.00
15)Duality	1.71	0.45	0.37	-0.25	-0.27	-0.26	-0.07	0.18	0.27	-0.03	-0.15	0.25	0.43	0.22	0.40	0.34
16)Throughput-Output	0.16	0.37	-0.04	-0.02	-0.08	-0.16	0.12	-0.08	0.05	-0.16	0.08	0.30	0.31	0.18	-0.14	-0.03
17)Ownership	44.59	67.95	0.28	0.05	0.06	-0.28	0.15	0.01	0.09	0.02	0.36	0.34	0.21	0.03	0.42	0.08
18)Fiscal as Calendar	0.67	0.47	-0.20	-0.21	0.33	0.36	-0.16	-0.10	-0.13	-0.01	-0.36	-0.38	-0.39	-0.17	-0.37	0.21
19) Ind. Dir. Ratio	0.88	0.11	0.01	0.49	-0.10	-0.02	0.13	0.38	-0.00	-0.16	0.08	0.17	0.23	0.21	0.25	-0.40
20)Long-term Orient.	8.87	3.73	-0.06	-0.43	-0.14	-0.01	-0.44	0.02	0.24	0.45	-0.15	-0.06	0.15	-0.12	-0.04	0.34
21)Bartik IV	0.12	0.15	0.04	0.28	-0.08	-0.07	-0.17	0.29	0.20	0.38	-0.06	-0.13	0.05	0.17	0.36	-0.18
22)Option Wealth	22.91	19.39	0.10	0.32	0.03	-0.04	-0.04	0.29	0.12	0.29	0.10	0.11	-0.01	0.18	0.41	-0.24

Note: Correlation coefficients with an absolute value larger than 0.11 are significant at the .05 level. Compensation variables are in millions (USD).

Table 2: Descriptive Statistics and Correlations of the Fiscal-Year beginning Sample

	Mean	SD	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
15)Duality	1.71	0.45	1.00							
16)Throughput-Output	0.16	0.37	0.06	1.00						
17)Ownership	44.59	67.95	0.29	-0.03	1.00					
18)Fiscal as Calendar	0.67	0.47	-0.26	-0.46	-0.29	1.00				
19) Ind. Dir. Ratio	0.88	0.11	0.02	0.02	0.03	-0.18	1.00			
20)Long-term Orient.	8.87	3.73	0.20	-0.15	-0.12	-0.01	-0.24	1.00		
21)Bartik IV	0.12	0.15	0.03	-0.27	0.16	-0.04	0.10	0.07	1.00	
22)Option Wealth	22.91	19.39	-0.03	-0.20	0.38	-0.07	0.08	0.02	0.65	1.00

Note: Correlation coefficients with an absolute value larger than 0.11 are significant at the .05 level.
Compensation variables are in millions (USD).

Table 3: Descriptive Statistics of Friday Recalls

Firm-Year Period	Expected share of Friday Recalls	Actual Friday Recalls (Study's Sample)	Deviation of actual from expected share
Rest of the year	20 %	21.9 %	1.9
Fiscal-year beginning	20 %	4.7 %	(-)15.3

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Table 4: Market Inattention Regressions

	(1)	(2)	(3)	(4)	(5)
Non-founder	12.741	-0.487	-0.501	-0.004	-0.005
	(4.213)	(0.132)	(0.133)	(0.131)	(0.131)
Recall Class 2	-0.432	-0.030	-0.039	-0.082	-0.089
	(0.612)	(0.075)	(0.075)	(0.073)	(0.073)
Total Recalls	-0.029	-0.000	0.000	-0.001	-0.001
	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)
R&D Intensity	-0.301	-0.069	-0.071	0.050	0.050
	(0.800)	(0.042)	(0.043)	(0.058)	(0.058)
Log Employees	-3.080	0.039	0.039	0.047	0.048
	(0.535)	(0.022)	(0.022)	(0.021)	(0.021)
Market Performance	15.751	-0.141	-0.133	-0.929	-0.934
	(3.326)	(0.431)	(0.433)	(0.341)	(0.342)
Altman Z	4.340	-0.050	-0.054	0.018	0.016
	(0.309)	(0.025)	(0.025)	(0.028)	(0.028)
Ind. Dynamism	-56.948	1.105	1.163	0.841	0.869
	(3.652)	(0.309)	(0.311)	(0.294)	(0.296)
Ind. Complexity	26.948	-5.152	-5.164	-1.658	-1.619
	(17.560)	(0.850)	(0.856)	(1.065)	(1.071)
Firm Diversification	-10.611	0.156	0.155	0.122	0.120
	(0.706)	(0.049)	(0.049)	(0.043)	(0.043)
CEO Other Pay	0.715	0.010	0.010	0.009	0.009
	(0.076)	(0.008)	(0.008)	(0.008)	(0.008)
CEO Stock Exercises	0.461	0.013	0.012	-0.004	-0.004
	(0.023)	(0.004)	(0.004)	(0.007)	(0.007)
CEO Tenure	-0.335	0.009	0.008	0.013	0.013
	(0.144)	(0.006)	(0.006)	(0.005)	(0.006)
CEO Duality	2.376	-0.364	-0.360	-0.225	-0.220
	(0.662)	(0.050)	(0.050)	(0.053)	(0.053)
CEO Throughput-Output	2.307	0.126	0.104	-0.018	-0.034
	(2.298)	(0.065)	(0.066)	(0.072)	(0.073)
CEO Ownership	0.152	-0.003	-0.003	-0.002	-0.002
	(0.009)	(0.000)	(0.000)	(0.000)	(0.000)
Fiscal as Calendar	8.895	0.107	0.092	0.183	0.175
	(1.293)	(0.062)	(0.063)	(0.060)	(0.060)
Independent Director Ratio	-23.654	0.253	0.250	1.206	1.216
	(5.631)	(0.233)	(0.233)	(0.254)	(0.253)
Peak-attention	1.514	-0.307	-0.056	-0.301	-0.138
	(0.542)	(0.077)	(0.100)	(0.071)	(0.102)
Long-term Orientation	1.307	0.012	0.012	0.136	0.137
	(0.127)	(0.007)	(0.007)	(0.020)	(0.020)
Bartik IV	42.200				
	(1.495)				
CEO Option Wealth		0.015	0.017	0.076	0.078
		(0.003)	(0.003)	(0.013)	(0.013)
CEO Option Wealth X Peak-attention			-0.014		-0.009
			(0.004)		(0.005)
CEO Option Wealth X Long-term Orient.				-0.008	-0.008
				(0.001)	(0.001)
Constant	3.860	-2.462	-2.453	-5.172	-5.197
	(10.618)	(0.681)	(0.685)	(0.698)	(0.696)
Observations	6609	6609	6609	6609	6609
Wald Chi Sq.(D)	7649.23(39)	553.48(39)	552.97(40)	653.05(40)	659.25(41)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Table 5: Delayed Recall Regressions in the Fiscal-Year beginning period

	(6)	(7)	(8)
Non-founder	0.802	-0.947	-1.242
	(8.571)	(0.722)	(0.743)
Recall Class 2	10.663	-0.712	-0.642
	(1.590)	(0.302)	(0.311)
Total Recalls	0.046	0.008	0.008
	(0.016)	(0.002)	(0.002)
R&D Intensity	43.165	6.371	5.623
	(11.162)	(2.035)	(1.912)
Log Employees	-2.976	0.051	0.089
	(1.287)	(0.155)	(0.147)
Market Performance	-43.492	9.793	8.625
	(29.055)	(4.518)	(4.382)
Altman Z	5.815	-0.967	-0.843
	(1.730)	(0.298)	(0.297)
Ind. Dynamism	7.079	1.154	1.130
	(9.859)	(1.684)	(1.728)
Ind. Complexity	250.940	-17.425	-17.102
	(51.572)	(5.358)	(5.285)
Firm Diversification	2.450	0.070	-0.091
	(1.883)	(0.252)	(0.262)
CEO Other Pay	0.677	-0.109	-0.111
	(0.210)	(0.039)	(0.039)
CEO Stock Exercises	0.150	0.038	0.043
	(0.084)	(0.022)	(0.022)
CEO Tenure	0.346	-0.020	-0.019
	(0.389)	(0.039)	(0.039)
CEO Duality	-10.242	0.798	0.868
	(2.237)	(0.269)	(0.283)
CEO Throughput-Output	-9.477	0.253	0.392
	(3.981)	(0.425)	(0.437)
CEO Ownership	0.100	0.007	0.008
	(0.019)	(0.005)	(0.005)
Fiscal as Calendar	-9.311	-0.515	-0.542
	(3.256)	(0.337)	(0.340)
Independent Director Ratio	5.371	-0.491	-0.860
	(9.721)	(1.037)	(1.022)
Long-term Orientation	1.475	0.053	0.052
	(0.449)	(0.049)	(0.052)
Bartik IV	75.585		
	(6.805)		
CEO Option Wealth		0.025	0.022
		(0.012)	(0.012)
CEO Option Wealth X Long-term Orient.			0.003
			(0.002)
Constant	-48.920	4.917	5.471
	(15.826)	(1.866)	(1.855)
Observations	426	426	426
Wald Chi Sq.(D)	1132.16(33)	114.6(33)	146.26(34)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note: Standard errors in parentheses. Two-tailed tests.

Figure 1

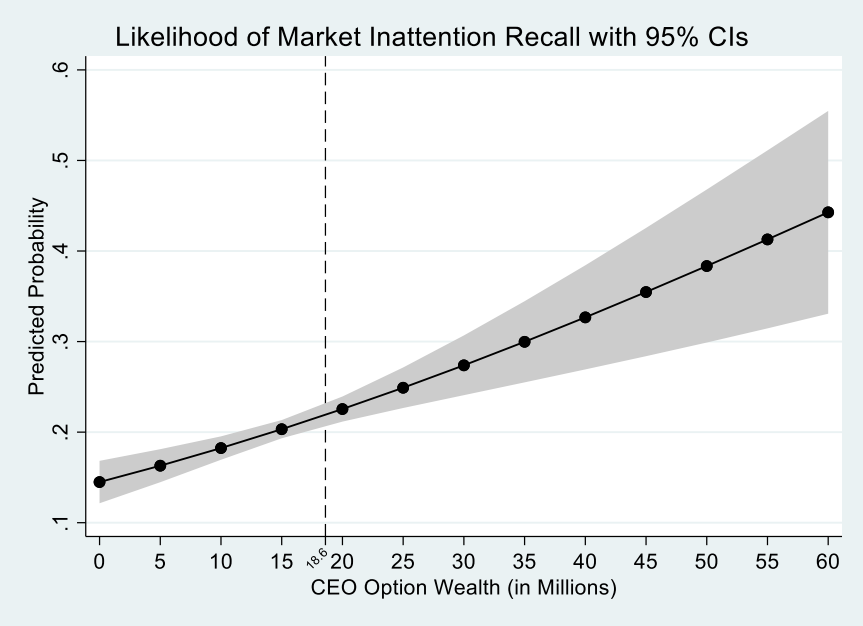


Figure 2

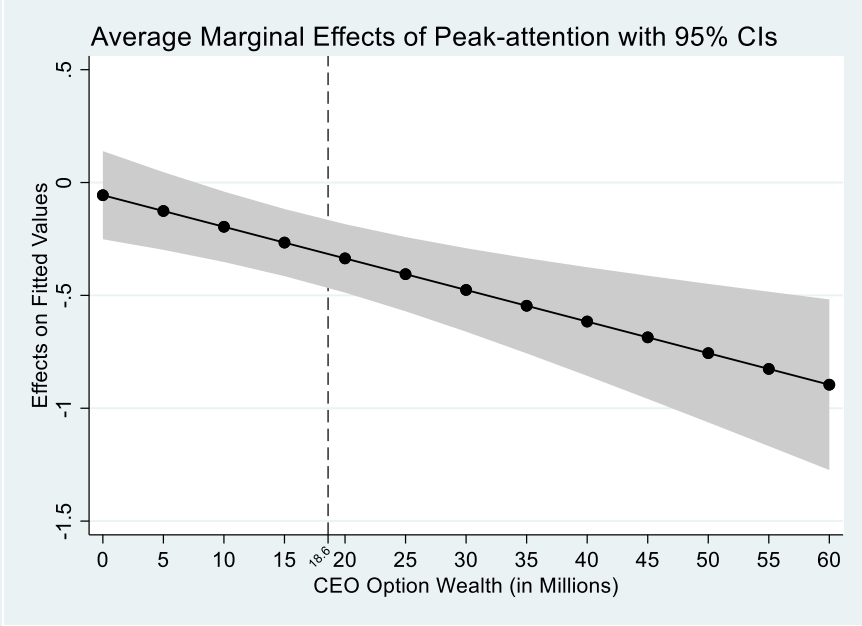


Figure 3

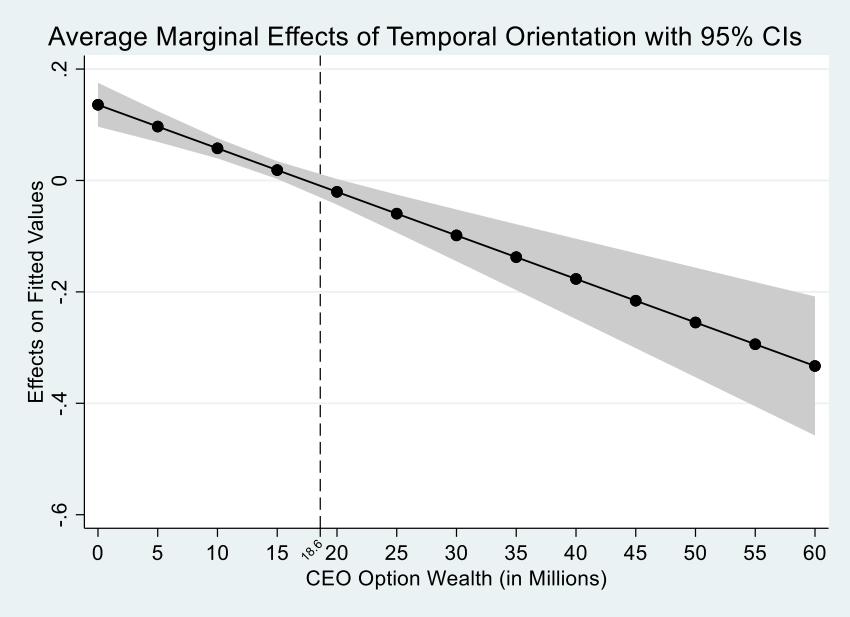
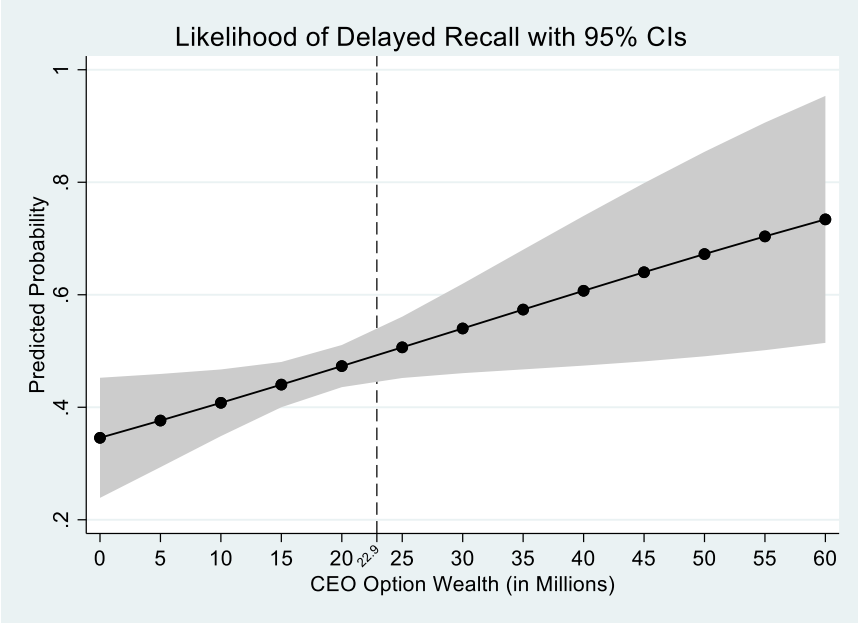


Figure 4



Appendix A: Sample Recall Announcement

Date Initiated by Firm	December 16, 2009
Date Posted	March 04, 2010
Recall Status	Terminated on July 02, 2014
Recall Number	Z-0824-2010
Product Classification	Ventricular (assisst) bypass - **Product Code** DSQ
Product	Abiomed AB5000 Circulatory Support System, Catalog Number: 0015-0000. Manufactured by Abiomed, Inc. Danvers, MA. Intended to provide complete short-term support of the left and/or right sides of the heart to patients suffering from potentially reversible ventricular dysfunction.
Recalling Firm/ Manufacturer	Abiomed, Inc. 22 Cherry Hill Dr Danvers MA 01923
FDA Determined Cause	Process control
Action	Abiomed initiated the recall by telephone contact and followed with a Recall Letter dated January 27, 2010. Consignees were informed that a Field Service Engineer will be in contact and schedule a time to visit and correct the affected device. For further information, contact Abiomed Quality Assurance at 1-978-656-1543 or Abiomed Field Service at 1-800-554-8666.
Quantity in Commerce	496 units
Distribution	Worldwide Distribution -- United States, Australia, Brazil, China, Hong Kong, Japan, Mexico and Germany.

CHAPTER 3: I DID IT MY WAY! YOUTUBERS NAVIGATING THE EXPECTATIONS OF NOVELTY AND CONFORMITY

ABSTRACT

Optimal distinctiveness (OD) theory suggests that producers need to balance between conforming to categorical norms (to gain legitimacy) and being distinctive from other producers (to gain innovation rents). This paradox is salient to entrepreneurs who are driven by novelty but also suffer from liabilities of newness. The problem is further compounded in cultural industries in which novelty plays a crucial role. We suggest a way for creative entrepreneurs to achieve OD by testing the assumptions of a homogeneous audience, crisp boundaries of the categories, and high-status benefits. We examine these assumptions by analyzing 207,989 videos of 265 YouTubers nominated for the “Streamys” – prestigious awards in online video – and find positive results overall. Our results inform firms and entrepreneurs about how they can position themselves to augment their value among audiences.

Keywords: novelty, optimal distinctiveness, category partiality, audience multiplicity, status, cultural entrepreneurship, YouTubers

INTRODUCTION

On the 26th of September, 2017, YouTuber Lilly Singh won the best first-person series, “Streamys” or “the Oscars of the web”[10]. Singh started her entrepreneurial journey on YouTube in 2010 and, at the time of this writing, has more than 14 million subscribers for her YouTube channel. Since her success on YouTube, she has spanned her career in movies, been on the New York Times bestseller list, started her own production house, and most notably, signed her late-night show with NBC - one of the big four US networks - making her not only the first woman of South-Asian origin to host a show on a major US network but also the first YouTuber to crossover successfully to mainstream media[11].

Singh’s case presents us with an opportunity to explore how cultural entrepreneurs balance the paradox of conformity and novelty. The extant literature is divided in its recommendation. One stream (Categorical Imperative: Zuckerman, 1999) suggests that since the audience devalues market offerings that do not fit in its cognitive categories or threaten the status quo, producers should conform in order to gain legitimacy (Leahey, Beckman, & Stanko, 2016; Leung, 2014; Phillips, Turco, & Zuckerman, 2013; Suchman, 1995). The resistance to novelty is compounded for entrepreneurs or innovative “outsiders”, often lacking legitimacy (Cattani, Ferriani, & Lanza, 2017; Merton, 1972). Another stream suggests that novelty is actively sought by audiences, such as VCs who want to capitalize on novel ideas (Pontikes, 2012) or crowd-funders on platforms such as Kickstarter, who actively back novel ideas or products (Taeuscher, Bouncken, & Pesch, 2020). The above case is especially true in cultural industries where novelty plays a vital role and attracts “tempered radicals” who like to challenge the status quo (Caves, 2000;

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[10] *Vanity Fair*, Retrieved from https://www.vanityfair.com/hollywood/2010/04/previewing-the-streamys-the-oscars-of-the-web

[11] *BBC*, Retrieved from https://www.bbc.com/news/entertainment-arts-49726027

Durand, Rao, & Monin, 2007; Haans, 2019; Jones, Lorenzen, & Sapsed, 2015; Meyerson & Scully, 1995).

Recognizing this paradox, the extant literature suggests that producers be optimally distinctive (OD: Zhao, Fisher, Lounsbury, & Miller, 2017). For entrepreneurs, the suggestion is to err on the side of caution and to follow categorical conventions until they reach a certain threshold of legitimacy or attain high status (Navis & Glynn, 2011; Zimmerman & Zeitz, 2002; Zuckerman, 2017). However, there can be multiple ways of being optimally distinctive in a market, especially given the heterogeneity of the audience, fuzzy boundaries of the categories in which the entrepreneurs operate, and different status perceptions (Cattani, Ferriani, & Allison, 2014; Hannan, 2010; Podolny, 1993). Since different audience-members may have different objectives, they may not derive the same value from novelty (Cattani et al., 2014). Further, Hannan and colleagues have cautioned from ignoring partiality - both producers identifying with and consumers deriving value from categories by varying degrees (Hampton, 2007; Hannan, 2010; Hannan, Pólos, & Carroll, 2007). Finally, a status-boost is considered positive halo-generating for market players (Podolny, 1993). However, some audiences may discount novelty by high-status players as desperate attempts to gain popularity (Kovács & Sharkey, 2014). So we ask, how can cultural entrepreneurs attain OD in a market with multiple audience groups and fuzzy categories?

In this study, we offer a path for cultural entrepreneurs to attain OD by testing the assumptions of a homogeneous audience, well-defined categories, and positive status effects. The extant literature has reported contradictory findings of what the audience finds “comprehensible” and “culturally-supported” (Scott, 2013). For instance, venture capitalists seek novelty in entrepreneurs (Pontikes, 2012), while stock market analysts devalue

"impure" stocks (Zuckerman, 1999) or scientists systematically misconstrue "ideas outside the established paradigm" (Boudreau, Guinan, Lakhani, & Riedl, 2016). We attempt to resolve this conflict by arguing that category gatekeepers (in our case, jury of prestigious awards) and regular platform audiences are driven by different objectives and evaluate novelty differently. Specifically, the professional audience wants to maintain and/or further its category's boundaries and thus, consider excellent that is closer to their work (Abbott, 1981; Lee, Hiatt, & Lounsbury, 2017; Thornton, Ocasio, & Lounsbury, 2012). At the same time, regular consumers in creative contexts care about expanding their utility and enthusiastically seek novel offerings (Durand et al., 2007; Taeuscher et al., 2020).

Furthermore, how the two audience-groups value novelty also depends on the category partiality. Thus, jury members (usually experienced industry professionals), with better cognitive powers evaluate novelty favorably in fuzzier than well-defined categories (Maćkowiak, Matějka, & Wiederholt, 2018; Murphy, 2004). On the other hand, the regular audience members do not like the information "overload" and might react less favorably to novelty in fuzzier categories than well-defined ones. Finally, we hypothesize that winning prestigious awards gives entrepreneurs a status-boost that jury-members respond with ingroup behavior while the regular audience reacts less enthusiastically (Kovács & Sharkey, 2014; Tajfel, Billig, Bundy, & Flament, 1971). We test our hypotheses by analyzing 207,989 videos of 265 YouTubers nominated for the "Streamys"– prestigious awards in online video and, after correcting for endogeneity, find positive results overall.

We integrate the literature on novelty (Boudreau et al., 2016; Cattani et al., 2017; Ford & Gioia, 1995; Reitzig & Sorenson, 2013; Sreenivasan, 2013) and categorization theory (Durand & Paolella, 2013; Lo, Fiss, Rhee, & Kennedy, 2020; Vergne & Wry, 2014) to build and test a theoretical model for entrepreneurial players in cultural industries to

attain OD (Navis & Glynn, 2011; Zhao et al., 2017). First, we show a different evaluation of novelty by different audiences. Extant literature assumes the audience as a monolithic wall that can only be scaled by conforming to its expectations. However, we provide evidence that producers can choose to target multiple audiences, which may derive different values from novel offerings (Berg, 2016; Pontikes, 2012). Further, a sophisticated audience may handle information overload of fuzzier categories better. Since fuzzy categories complicate measures and methods, most of the studies assume categories with well-defined boundaries. While most of the studies assume categories with well-defined boundaries, the assumption is rather bold and threatens the substantive conclusions about categorical imperative in the real world (Hannan, 2010). We test the differences in how the entrepreneurs are evaluated in well-defined and fuzzy categories. Finally, in an industry with “symmetric ignorance” (Caves, 2000) that makes status signaling important for evaluation, a consecration might not always be met with deference (Cattani et al., 2014; Kovács & Sharkey, 2014). We show evidence that the audience groups react differently to novel attempts by high-status players.

Second, our study incorporates both the supply and demand-side forces and examines the interactions between audience expectations and entrepreneurial agency. Categorization theory has been criticized for being too fixated on the disciplinary powers of categorical norms and discounting the agency (Lo & Kennedy, 2015; Lounsbury & Glynn, 2019; Schneiberg & Berk, 2010). It has also primarily studied the impact of entrepreneurial identity, narratives, and rhetoric in attracting stakeholders while ignoring the reception and recognition of actual products or services (Lounsbury, Gehman, & Ann Glynn, 2019; Navis & Glynn, 2011; Wry, Lounsbury, & Glynn, 2011). We take an alternative approach to ask if innovative entrepreneurs can offer novelty from the get-go. In other words, the

entrepreneurs can strategically position their offerings based on their creativity and drive for better evaluations from enthusiastic audience or gatekeepers.

Third, we study a digital creative context with very different social structures that attracts more “misfits and mavericks” and allows for more experimentation than traditional industries (Becker, 1982; Jones, Svejenova, Pedersen, & Townley, 2016; Yoo, Boland, Lyytinen, & Majchrzak, 2012). Although novelty is crucial for revitalizing a creative industry, we propose that the innovative producers account for the multiple audience groups, category fuzziness, and status differences to devise their unique way to be optimally distinctive. Our empirical setting allows us to have fine-grained data on several categories and the entire history of YouTubers, enabling us to observe social and temporal differences better.

THEORY

Novelty and Optimal Distinctiveness

Creativity consists of both novelty and usefulness, and novelty separates creativity from merely well-done ideas or offerings (Amabile, 1996; Amabile, Barsade, Mueller, & Staw, 2005). Because novel offerings expand the utility for market participants, their desirability is a foregone conclusion. However, they also have incomprehensibility (or surprise) attached that may desist users with cognitive limits from trying them (Mueller, Melwani, & Goncalo, 2012; Piezunka & Dahlander, 2015). This need for cognitive legitimacy may be amplified if novelty comes from entrepreneurs suffering from liabilities of newness (Scott, 2013; Suchman, 1995). As a result, “outsiders” - who are not constrained by the norms of a field – and primed to offer novelty, may face resistance since they lack legitimacy and/or status (Cattani et al., 2017; Merton, 1972; Podolny, 1993). Thus, novelty can come in the path of attaining legitimacy since it prevents audiences from linking the

novel offerings to a familiar cognitive template (Lounsbury & Glynn, 2019; Navis & Glynn, 2011).

The optimal distinctiveness theory (Barlow, Verhaal, & Angus, 2019; Navis & Glynn, 2011; Taeuscher & Rothe, 2021; Zhao et al., 2017) suggests that producers reconcile the paradoxical demands of novelty and conformity by being the same and different simultaneously. Since entrepreneurs lack legitimacy (Suchman, 1995), the theory of OD suggest them to err on the side of caution and shape their offerings according to the categorical norms until they reach a certain threshold (Durand & Paolella, 2013; Zimmerman & Zeitz, 2002; Zuckerman, 2016). However, conforming to gain legitimacy is antithetical to entrepreneurs who are attracted to a market because they believe they have a novel offering (Lounsbury et al., 2019; Navis & Glynn, 2011). Further, in a creative industry that thrives on novelty (Caves, 2000; Durand et al., 2007; Jones et al., 2016), conforming producers run the risk of being ignored by the audience (Smith, 2011).

Optimal Distinctiveness Revisited

In this study, we suggest an alternate way for innovative entrepreneurs in creative industries to be optimally distinctive by testing the assumptions of – audience homogeneity (Cattani et al., 2014; Pontikes, 2012), category partiality (Hannan, 2010), and high-status benefits (Azoulay, Stuart, & Wang, 2014; Podolny, 2010). An assumption of a homogeneous audience by the extant literature has led to conflicting evidence (Leahey et al., 2016; Pontikes, 2012; Taeuscher et al., 2020; Wry, Lounsbury, & Jennings, 2014). For instance, Pontikes (2012) showed that VCs, who gain from investing in innovative products, found organizations offering categorically impure products more appealing. On the other hand, we have considerable evidence to the contrary. Institutional theorists have long argued that conformity pressures may come in the way of novelty (DiMaggio &

Powell, 1983; Thomson, 1967). For instance, Zuckerman (1999, 2000) shows that security analysts specializing in their respective industries discount the diversified stocks (illegitimacy discount). The evidence for categorical purity has been found at the level of offerings, e.g., scientists' research (Leahey et al., 2016), individual actors, e.g., online freelancers (Leung, 2014), and organizations, e.g., corporate law firms (Phillips et al., 2013).

The literature on categories has come under criticism for its assumption of the crisp boundaries of categories. Hannan and colleagues have cautioned from ignoring partiality, defined as the degree by which producers identify with, and consumers derive value from categories (Hampton, 2007; Hannan, 2010; Hannan et al., 2007). As noted, "If the world being analyzed is nearly crisp (has minimal partiality), then this practice makes little difference for substantive conclusions (Hannan, 2010: 160)."

A popular proposition in social contexts is that high status comes with various benefits (Matthew Effect: Azoulay et al., 2014; Durand & Kremp, 2016; Podolny, 2010). Thus, a higher social hierarchy position is seen as an antidote to liabilities of newness suffered by entrepreneurs (Milanov & Shepherd, 2013). By testing the above audience-side assumptions, we build our theoretical propositions that guide innovative players to position themselves strategically.

Research Context and Hypotheses

We build our theoretical model in the context of innovative entrepreneurs nominated for prestigious awards (Streamys) on a creative platform (YouTube). Although the first video was uploaded to YouTube in April 2005, it took some time for the platform to gain traction. By July 2006, a particular video was first to cross the one million views mark. In October of 2007, the Content ID program was launched, which allowed copyright holders

to monetize their content[12]. YouTube is now a lucrative transaction space for creators and the audience. The platform has paid out more than 2 Billion USD in advertising revenues since its inception and, at the time of this writing, reaches over two billion people (approximately one-third of internet users) with local versions in over 100 countries[13].

Streamy Awards, dubbed as “Oscars of the web,” are the prestigious awards coveted by YouTubers and followed by their fans (Burgess & Green, 2018). Although not explicitly stated, the nominated YouTubers are creative entrepreneurs such as Singh (mentioned at the beginning of this study) that started their career on YouTube. The awards exclude mainstream media organizations, which also happen to have YouTube channels. In other words, we will find “PewDiePie” – an independent YouTuber, and not “T-Series” – a Bollywood studio, in the nomination list, although both are amongst the most popular YouTubers worldwide.

The context of nominated creative players allows us to test the theoretical assumptions we stated above. We have two audience groups – the gatekeepers or the awards jury members and the enthusiasts or the regular audience members of YouTubers’ videos. The nominations and awards are judged by “an independent judging body of creators and executives in the online video industry.” [14]

We also have various nominated categories with varying degrees of fuzziness in which the YouTubers operate. We can also observe the effect of winning an award or status-boost by the two audience groups. Finally, and most importantly, we restrict ourselves to studying professional YouTubers who are considered innovative players in their respective categories. The Streamy awards website explicitly states its aim of

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[12] *Key YouTube Stats @ 5 years - YouTube5Year.* Retrieved from - https://sites.google.com/a/pressatgoogle.com/youtube5year/home/5-year-metrics
[13] *Press – YouTube* - https://www.youtube.com/intl/en-GB/yt/about/press/
[14]About the Streamy Awards. Retrieved from - https://www.streamys.org/about/

"honoring excellence" in the online video, and its nominees are creators making the most "innovative and well-watched" content in the world.[15] Restricting ourselves to studying awards nominees is important because YouTube is a highly skewed platform. Bärtl (2018), through a random sample, shows that, on average, 85% of all the views go to a small minority of 3% YouTubers. Practically anyone with a camera can become a YouTuber (including one of the authors of this study). However, only a small number of professional YouTubers are nominated for the Streamy awards[16]. Thus, we can construct a sample of innovative digital entrepreneurs.

Novelty and Audience Multiplicity

Categorization is one "theoretical tool" or screen that helps the audience derive value from exchange opportunities (Zuckerman, 1999). Audience implies a set of individuals with shared objectives and standards of quality to consume and can affect the evaluations of fellow audience members (Zuckerman, 2017). For an audience, the most common form of the screen to derive value is to consume conventional offerings that have generated sufficient value in the past. In other words, following the norms of a category or conforming to the domain consensus gives suppliers cognitive legitimacy (Scott, 2013; Suchman, 1995; Thomson, 1967).

In this study, we test the assumption of audience homogeneity demanding one or the other, i.e., novelty or conformity. Since the audience uses categorization as a tool to derive value, it is but logical that different audience groups will behave differently towards novelty. In other words, multiple audiences will derive different values from it. First, we

[15]About the Streamy Awards. Retrieved from - https://www.streamys.org/about/
[16] Despite what the family and friends of the co-author believe, s/he is sticking with her day job.

argue that the jury of prestigious awards would be looking to defend or further its category's boundaries and would discount novelty.

The antipathy towards novelty by the jury is because of two reasons. First, the jury is comprised of professionals who show deference towards professionally pure. In the seminal study, Abbott (1981) argued that intraprofessional status or "status assigned groups within a profession by professionals themselves (p. 820)", differs from the prestige conferred to the same professional by the general public. The aversion towards the impure – "that which violates the categories and classifications of a given cultural system (p. 824)" – is because it breaches the very foundations of a category. Thus, the professionals confer prestige to colleagues who deal with the tried and tested or "predigested and predefined". Cattani et al. (2014) further elaborated on this demand in the context of Hollywood and found that industry peers consider excellence that is closer to their work and consecrate conforming "insiders" with prestigious awards. In a similar vein, in the provocatively titled "Does Science Advance One Funeral at a Time?" Azoulay, Fons-Rosen, and Zivin (2019) show that a star scientist's death leads to a surge in contribution from outsiders who draw from a different scientific corpus. In other words, the category gatekeepers keep any novel attempt at bay outside of the category's boundary.

In addition to the above objective of defending the category's boundaries, the jury also wants to further them. By awarding the prototypical candidates, the juries can establish the legitimacy of their respective categories (Barlow et al., 2019; Rosch & Mervis, 1975). Innovative producers threaten the very legitimacy of the category in which the jury operates. The award category may be dropped or merged with another category in the future. Bowers and Prato (2017) showed that an award category removal, in their case All-American Analyst Awards, leads to a lower market impact of its investment analysts. Thus,

the jury acts in the interest of its category by awarding the conventional. Therefore, we hypothesize:

H1: Higher novelty leads to a lower likelihood of winning awards.

While the gatekeepers obsess over categorical purity, the general audience is unconcerned about it. We argue that the regular audience of nominated YouTubers likes novelty. It is enthusiastic about novel offerings for a few related reasons. First, a lay audience cares about expanding its personal utility and comes to a creative platform such as YouTube, seeking novel offerings that may or may not be easily accessible elsewhere. In other words, its objective is satisfied once it finds a novel solution to its problem (Durand & Paolella, 2013). For instance, if audience member seek to learn a particular recipe through online videos, they will create a consideration set of YouTubers offering cuisine-related videos and will like those that taught them something new (and valuable), i.e., novel.

There has been increasing interest in research showing that conformity is not always valued by the audience, such as one that values complex tasks (Leung, 2014) or in markets where the screening process is sufficient to reduce the quality-related uncertainty (Merluzzi & Phillips, 2016). Taeuscher et al. (2020) show that audience on the crowdfunding platform Kickstarter funds more novel campaigns. The authors challenge the assumption that entrepreneurs gain legitimacy through conforming, but instead, in creative contexts, they gain it through novelty. Creative industries attract novelty enthusiasts who derive value from consuming offerings that have "distinctive aesthetic properties with symbolic functions that enable meaning making, whether entertainment, identity-building or social display (Jones et al., 2016, p. 752)." Thus, on a creative platform such as YouTube, the audience is likely to receive novelty enthusiastically.

Second, an enthusiastic audience searches for novel content. It comes to a platform such as YouTube rather than other mediums (broadcast TV) because it can easily search through content (Burgess & Green, 2018). Thus, the platform is designed to help audience members construct a consideration set of their content (Zuckerman, 2000). In the above example of an audience member seeking to learn a particular recipe, she will search and like videos that offer that recipe. In other words, the search algorithm of YouTube makes the first-stage screening easier for the platform audience.

Finally, in an online environment, the regular audience is enthusiastically sharing their favorite content with their contacts on social media platforms such as Twitter and Facebook. This sharing makes some of the content go "viral" (Burgess & Green, 2018). Due to the "echo-chamber" effect of social media (Barberá, Jost, Nagler, Tucker, & Bonneau, 2015; Quattrociocchi, Scala, & Sunstein, 2016), the enthusiastic audience's contacts also end up liking the shared contact. Thus, more novel content may see a growth rate in "likes". Therefore, we hypothesize:

H2: Higher novelty leads to a rise in "likes" at an increasing rate.

Novelty and Category Fuzziness

The literature on OD has been criticized for its assumption of the crisp boundaries of categories. Since, in the real world, both producers and consumers identify and derive value from categories by varying degrees, it is difficult to generalize from the research that assumes minimum partiality (Hampton, 2007; Hannan, 2010; Hannan et al., 2007). Because the fuzzy categories complicate both the theoretical and estimation models, most of the past studies assume categories with crisp boundaries.

Not only fuzziness complicates models for researchers, but also for the audience. In this study, we argue that the awards jury evaluates novelty more favorably than a

regular audience. First, an experienced audience can deal with ambiguity better (Berg, 2016; Murphy, 2004). The jury is from professionals who have made a mark in their fields, so it is better to handle the information overload that comes with fuzziness. For instance, building on the idea of "rational inattention" – that agents choose to pay attention to certain information due to cognitive costs (Sims, 2003) – scholars are finding that experienced professionals are better at dealing with information overload due to past learning and information acquisition (Bhattacharya & Howard, In press; Maćkowiak et al., 2018).

Second, fuzzier categories are likely to attract heterogeneous audience members (Hannan, 2010). The decision to grant an award is easier for jury members with past experience in fuzzier categories than regular audience members (Maćkowiak et al., 2018; Maćkowiak, Matějka, & Wiederholt, 2020). They know the boundaries and landscape of their category well and can evaluate novel offerings in it better. On the other hand, a regular audience may get overwhelmed with the various offerings in a fuzzy category and likely to screen out novel ones. Thus,

> *H3a: Category fuzziness positively moderates the negative relationship between novelty and the likelihood to win awards.*
> *H3b: Category partiality negatively moderates the positive relationship between novelty and the rate of increase in "likes".*

Novelty and Status Boost

Extant research suggests high status has benefits for producers, especially entrepreneurs, since they are working with scarce resources and fighting for survival during the start of their entrepreneurial journey (Milanov & Shepherd, 2013; Podolny, 2010; Zimmerman & Zeitz, 2002). For cultural industries, the role of consecration is especially important since it produces prestige hierarchies (Bourdieu, 1993; Cattani et al., 2014; DiMaggio, 2011). Thus, in a field with "symmetric ignorance" (nobody knows: Caves,

2000), the awards provide an important signal of quality to evaluators and future collaborators (Connelly, Certo, Ireland, & Reutzel, 2011; Kim & Jensen, 2014).

The status-boost, however, can signal different attributes to different audience groups. For instance, Kim and Jensen (2014) show that since the cultural knowledge of different audience groups is different, intermediary audiences (foreign distributors) and end audiences (foreign consumers) of films respond differently to critically acclaimed and commercially successful films. We argue that novel offerings by a higher status producer (who has won a Streamy previously) are received warmly by the jury but lukewarmly by the regular audience.

Winning a Streamy signals legitimacy to the jury, which considers the YouTuber as an insider to its category (Cattani et al., 2014; Cattani et al., 2017). Thus, any novel offerings by the said high-status YouTuber are likely to gain legitimacy for the entire category and, in turn, bring benefits for the jury members (Bowers & Prato, 2017). In other words, jury members are likely to identify with the high-status producers and display positive ingroup behavior towards their novelty (Ashforth & Mael, 1989; Hogg, 2012; Tajfel et al., 1971).

On the other hand, winning a Streamy gets media attention to the winners. The mainstream media widely cover the awards and the winners interviewed in various outlets. This popularity gains a new audience, which has recently learned about them and is curious about their offerings. However, paradoxically, the new audience is also coming with its own perceptions of novelty and is likely to be disappointed (Kovács & Sharkey, 2014). Even the existing audience is likely to be off-put by the novel offerings as desperate attempts to gain popularity (Berger & Heath, 2008). Since the cultural products are consumed by an audience with the intention to construct their social identity (Bourdieu,

1984, 1993), popularity is eschewed by the early adopters (Berger & Le Mens, 2009). This "paradox of publicity" was illustrated by Kovács and Sharkey (2014) in their study of the Man Booker prize-nominated books. They showed that the prizewinning books received less favorable subsequent evaluations than the short-listed books. To summarize, the previous winning of a Streamy is likely to drive up the jury's novelty evaluations but drive them down by the regular audience. Thus,

> *H4a: A previous win positively moderates the negative relationship between novelty and the likelihood to win awards.*
> *H4b: A previous win negatively moderates the positive relationship between novelty and the rate of increase in "likes".*

DATA AND METHODS

To test our hypotheses, we study "YouTubers" – entrepreneurs in an emerging online industry – and their interaction with socio-cognitive institutions. Oxford English Dictionary added the word "YouTuber" in 2016 in its list, legitimizing the video content creators. We first collected the list of nominations, winners, and award announcement dates for Streamys for the years 2013-2018 (both inclusive). We started data collection with the year 2013 (the 4th annual Streamys) because the first three awards were broader in focus (overall internet content). From the fourth award onwards, Streamys became about video content, and now they have a tie-up with YouTube itself (https://www.streamys.org/about/). This way, we constructed a sample of 265 YouTubers nominated for Streamys in 14 categories for the six years.

We then collected the data on uploaded content by nominated YouTubers using the YouTube API (application program interface). The data is at video level and gives us various details such as the date of the upload, the tile of the video, description, tagged keywords, duration, views, video likes, dislikes, and some social media statistics that we describe below.

Next, we downloaded the category data to use as a dictionary from YouTube 8M dataset (https://research.google.com/youtube8m/). YouTube has made it available for research, and the 8 million videos in it are a representative sample of the entire YouTube video population. Through machine learning algorithms and further verified by human raters, YouTube came up with 24 “verticals” or categories. Each vertical has sub-categories that are “tags” YouTubers put on their videos. Thus, 24 verticals have 4,716 tags in total. On average, each sub-category had 3,552 training videos, with the most popular vertical *Gaming* having 0.79 million training videos. YouTube released the 8m dataset for research since it wants to understand better the categorization of its content library that is increasing at an exponential rate. A competition, “Google Cloud & YouTube-8M Video Understanding Challenge” (https://www.kaggle.com/c/youtube8m) was held on Kaggle.com, and prizes worth USD 100,000 were at stake for the winners. We took the verticals as established categories and used them as a dictionary to conduct our analysis. Finally, we collected social media information at the Youtuber level – Twitter, Instagram, and Facebook followers. In the broadest sense, we were left with a sample of 207,989 videos by the 265 YouTubers. However, as we report in our analysis below, some of the models had a smaller number of observations due to differences in model specifications.

Dependent Variables

Our hypotheses *H1*, *H3a,* and *H4a,* predict *the likelihood of winning an award* by nominated YouTubers. We used a binary (1/0) variable that reflects whether the nominated YouTuber’s video was awarded or not (or if the video was uploaded before the award date). Hypotheses *H2*, *H3b,* and *H4b* predict the reception of YouTuber’s novelty by their audience. We measure the audience *likes* with the number of likes (log-transformed) that the YouTubers receive on their videos.

Independent Variables

Following research by information scientists, our *novelty* measure is based on Bayesian Surprise (Itti & Baldi, 2009; Sreenivasan, 2013). The underlying logic behind the measure is - given the probability of words in a video text (tags or keywords) occurring, how surprising it is to see a particular tag. It was calculated at the level of a tag. Then, we averaged it over a video level.

Formally,

$$Novelty_i = \frac{1}{N_t}\sum_{1}^{N_t}(-LogP_t)$$

Where P_t is the probability computed by taking the ratio of how many times a tag *t* appears in the set of videos released before the video *i*, and the total number of previous videos published by nominees.

Our measure is similar in logic as used by Boudreau et al. (2016), measuring novelty of scientific research proposals. To understand the calculation of the above measure, consider a simple example. There are a total of three videos uploaded according to time (V1 first, V3 last) with four words (in tags) each.

Videos	Tag 1	Tag 2	Tag 3	Tag 4
V1	Comedy	Superwoman	Funny	Stupid
V2	Comedy	Superwoman	Funny	Silly
V3	Superwoman	Desi	12 collabs of Xmas	Honest talk shows

We will first calculate the novelty measure of V3. The first word, “superwoman” appears in all three videos. Thus, $P_{SW} = \frac{3}{3} = 1$, $P_{Desi} = \frac{1}{3} = 0.33$, $P_{12Collabs} = \frac{1}{3} = 0.33$, and $P_{Honesttalk} = \frac{1}{3} = 0.33$. Next, we compute the surprise factor of each probability. Thus, we

compute, $-\log(P_{SW}) = 0$, $-\log(P_{Desi}) = 1.10866$, $-\log(P_{12collabs}) = 1.10866$, and $-\log(P_{Honesttalk}) = 1.10866$. Finally, we aggregate the surprise factors to reach the novelty measure of a video.

$$Novelty_{V3} = \frac{0 + 1.10866 + 1.10866 + 1.10866}{4} = 0.8315$$

Similarly,

$$Novelty_{V2} = 0.1733, \text{ and } Novelty_{V1} = 0.6931.^{17}$$

One limitation of the Novelty measure is that if a video is visually novel but does not describe it in its keywords, the measure will fail to capture it. For instance, if the video uses a drone to capture an event and does not describe it in its keywords, then the novelty measure will not capture it. However, since all the search engines use text to find videos, the YouTubers (especially the professional ones that comprise our sample) have incentives to use the keywords to highlight their videos' features. Further, if any YouTuber misuses the keywords to climb-up in search results, their videos can be reported to the platform by audiences or other competitors. For face validity, Appendix A shows two video screenshots of Singh – one with the lowest novelty measure and the other with the highest novelty measure in her videos.

To measure *category fuzziness,* we used Shannon´s entropy measure (Shannon, 1948). First, we calculated the text similarity between the nominated categories and 24 YouTube verticals to measure the vertical's share in the focal nominated category. Then we measured the entropy of award categories across established 24 YouTube verticals (categories). Thus, the higher the entropy measure, the fuzzier the award category. As a

[17] We added 1 in the denominator for the first video. Thus, the V3 is the most novel with only one word repeating. V2 is the least novel with one new word. V1 has the score in the middle.

robustness check, we also used the 1-Herfindahl Index of award categories to measure the fuzziness and found qualitatively identical results. Appendix B lists all the nominated categories with their fuzziness scores. We created a *previous win* dummy variable if the YouTuber had won an award before the current nomination.

Control Variables

We used several variables to account for the variation in our analysis. Since our data from YouTube API is at the video level, we control for the video *Duration*, the number of *Views* (log transformed), *Dislikes* (log transformed), *Facebook shares* (a video is shared on Facebook, log transformed), *Tweets* (a video is tweeted through twitter, log transformed)*, Reddit Posts* (the number of posts on the Reddit platform for a video)*,* and *Reddit Upvotes* (the number of upvotes on the Reddit platform for a video). At the YouTuber level, we collected the number of Twitter, Instagram, and Facebook followers and combined them into one variable - *Social Media Presence* (in thousands)*.* We also calculated the *cumulated number of videos* posted by the YouTubers until the current video from their content timeline. For all the models, *Year* and *Month* dummy variables were included to control for time-fixed effects. All the time-varying independent and control variables were lagged by one video.

Instrumental Variable

The YouTubers might be doing something unobservable to us, leading them to win awards or likes, such as using costly equipment or employing better search engine optimization (SEO) techniques. Failure to account for all variation induces endogeneity in a study like this one. We tackle this with an instrumental variable approach (2SLS). We used *Bartik IV* (Bartik, 1991) that exploits the heterogeneous effect of a platform-wide regulatory change or shock (Goldsmith-Pinkham, Sorkin, & Swift, 2020). In August 2016, YouTube

announced a platform-wide “demonetization” policy change that would disable monetizing content that would be deemed unfriendly to advertisers. This change in regulation is correlated to the novelty score of YouTubers after August 2016. Thus, we created a regulatory shock dummy variable (1 for all the YouTuber videos in our sample from August 2016 onwards and 0 otherwise) and multiplied it by a video’s share of Novelty score by all the videos’ released on a particular day. The resultant variable was correlated to our independent variable *Novelty*. The identifying assumption is that the IV will be exogenous to the likelihood of YouTubers winning an award or receiving likes, except through its effect on novelty. We also used *the number of words in the video description* as the second IV to compare the two variables.

Estimation Method

For models measuring the likelihood of winning an award, we used probit models for a binomial distribution (“ivprobit” to incorporate IV). For measuring likes, we used “xtivreg” command in STATA to incorporate instrumental variable. The analysis was at the YouTuber-video level with robust standard errors. Wherever possible, we used YouTuber fixed effects in all the models to account for time-invariant unobservable characteristics of YouTubers. The Hausman test also (strongly) suggested that fixed-effect models are more appropriate. However, ivprobit models, do not allow for entity fixed effects. Therefore, we also report the linear probability model (LPM) with YouTuber fixed effects in our robustness tests.

RESULTS

The descriptive statistics and correlations for the entire sample are reported in Table 1. On average, 7% of the videos uploaded are after the nominated YouTubers have

won a Streamy in their category. Further, an average video has received approximately 55,400 likes with a standard deviation (SD) of approximately 140,000 likes.

Insert Tables 1-3 and Figures 1-3 about here

Novelty and the likelihood of winning a Streamy

Table 2 reports the analysis of novelty, category fuzziness, and previous win on the likelihood of winning a Streamy. In the interests of parsimony, year and month dummy variables are not shown. The F-statistic in first-stage models (predicting novelty using instrumental variables) was high and significant ($F = 1480.17$, $p<0.001$ for Bartik IV). The Wald test of exogeneity was significant.[18] In Model 2, we report the second-stage results of the instrumental variable probit model. It produced a negative and significant coefficient for novelty as a determinant of winning a Streamy ($b = -0.61$, $p<0.001$), supporting Hypothesis 1. Since the coefficients and their significance in probability models are difficult to interpret, we illustrate the predicted probabilities in Figure 1. A one standard deviation increase from the mean value of novelty (6.67 units) leads to a decline in the probability of winning a Streamy from 0.276 to 0.076 – a decline of approximately 72.5%.

Model 3 added the interaction of category fuzziness and novelty. The interaction coefficient was positive and significant ($b = 0.73$, $p < 0.001$), supporting Hypothesis 3a. To determine the "true interaction effect" in non-linear models (Wiersema & Bowen, 2009), we graph the marginal effect of the category fuzziness at various levels of novelty in Figure 2. Model 4 reports the results of the moderation effect of a previous win on the likelihood of a Streamy. The interaction term between the novelty and previous win was positive and

[18] The null hypothesis of Wald's test is "no endogeneity" (STATA, p. 6). Thus, a significant Wald's test points that the two-stage model is appropriate. For a further discussion on the Wald test, please refer to Wooldridge (2010), pp. 472–477.

significant (b = 0.51, p<0.001), supporting Hypothesis 4a. Figure 3 illustrates the marginal effect of a previous win at various levels of novelty. Model 5 is the full model with all the interaction terms with similar results.

Novelty and likes' growth by regular audience

Table 3 reports the results of the effect of novelty by YouTubers on the growth of likes they received. Models 6 and 7 are the first and second stage models respectively, analyzing the effect of novelty on likes received. The F-statistic in first-stage models (predicting novelty using instrumental variables) was high and significant (F = 1591.09, p < 0.001 for Bartik IV). The coefficient of novelty (Model 7) was positive and significant (b = 0.76, p = 0.013), supporting Hypothesis 2. Model 8 added the interaction term of category fuzziness and novelty. However, we found no support for Hypothesis 3b (b = -1.21, p = 0.16). Model 9 reports the results of the moderation effect of a previous win on the rate of likes. The interaction term between the novelty and previous win was negative and significant (b = -0.68, p = 0.012), supporting Hypothesis 4b. Model 10 is the full model with all the interaction terms with similar results.

Robustness Tests

Middle-status conformity. Previous literature has suggested that innovation tends to come from the highest status candidates who are emboldened to deviate from the standards (or very low-status outsiders who do not care about conforming to categorical norms). Termed as "middle-status conformity" (Phillips & Zuckerman, 2001; Prato, Kypraios, Ertug, & Lee, 2019), it suggests that entrepreneurs, working with scarce resources and with the knowledge that conventional works with the audience, tend to conform. However, once entrepreneurs win public validation of their work through prestigious awards, they get a status boost that the audience uses as an alternative screen

instead of categorical purity. Further, the status boost helps entrepreneurs attract more resources at a lower cost (Podolny, 1993; Pollock & Gulati, 2007). Now they have more resources to experiment with novelty. Additionally, a higher status makes the trade-off between affordable exploitation and risky exploration attractive to suppliers and helps them shed the conservatism (Zuckerman, 2017). We tested if the YouTubers were shunning the middle-status conformity once they won a Streamy. And indeed, we found evidence that a win was related to more novelty in the future. Appendix C reports the regression models of a win's effect on future novelty. As can be seen, the coefficient of winning was positive and significant.

Linear probability models. We also tested whether our probability model results held with linear models and if our results were not just dependent on a particular model specification. Thus, we used "xtivreg" also for the likelihood of winning a Streamy with fixed-effects for YouTubers and found the results to be qualitatively identical.[19]

Curvilinear relationships. Finally, we checked for possible U or inverse-U effects of our novelty variable on both the likelihood of winning and growth in likes (Haans, Pieters, & He, 2016). However, we did not find evidence of such relationships.

DISCUSSION

Testing the assumptions of audience homogeneity, fuzzy categories, and the Matthew effect of higher status, we show that a regular platform audience is more enthusiastic about novelty than category gatekeepers. We also found that entrepreneurs are more likely to be awarded for their novelty in fuzzier than in well-defined categories. Further, the jury members welcome the high-status entrepreneurs, while the regular

[19] In the interest of parsimony, I do not report those results here. They are available on request.

audience perceives the novel attempts as desperate attempts to gain popularity. These results offer both theoretical and practical implications.

Theoretical Contributions

When it comes to innovative producers, two belief systems guide them – one which says that following the categorical or social norms gains them legitimacy, and thus, conventionality is good (DiMaggio & Powell, 1983; Scott, 2013; Zuckerman, 1999). On the other hand, not only do the entrepreneurs enter a market because they believe they have a superior solution that will earn them success, but also, some enthusiasts actively seek novelty (Pontikes, 2012; Taeuscher et al., 2020). Thus, the extant literature came up with the theory of legitimate or optimal distinctiveness (Navis & Glynn, 2011; Zhao et al., 2017). However, the theory of OD may err on the side of caution and suggest entrepreneurs conform more, especially at the beginning of their entrepreneurial journey when they suffer from liabilities of newness and are learning to be better social players (Stinchcombe, 1965; Suchman, 1995). The problem of balancing the paradox of novelty and conventionality is compounded in cultural-creative industries that depend on novelty to grow and revitalize (Bourdieu, 1993; Cattani et al., 2014; Caves, 2000; Jones et al., 2015; Peltoniemi, 2015).

The above problem presents a disappointing picture to innovative outsiders or entrepreneurs. Because of their very characteristic that they are outsiders and can “think outside the box” of categorical conventions, they are crucial carriers of novelty (Bourdieu, 1993; Cattani et al., 2017). However, novelty generation and novelty recognition are two separate processes. Since outsiders lack legitimacy or status, they are screened out by their target audience.

The actual picture is not so bleak since we observe convention-defying novel acts in the market regularly. In other words, if the categorical imperative were *really* imperative,

we would not observe novelty, and it would lower the utility of all market participants. This divergence between the theory and practice is because the extant literature, amongst others, assumes a homogenous audience, partial categories, and positive status effects (Azoulay et al., 2014; Hannan, 2010; Zuckerman, 2017).

We test the above assumptions to suggest an alternative part for creative entrepreneurs. First, we test the assumption of homogeneity of the audience. The positive evaluations of novelty depend on the audience evaluating the novelty generating organization. Pontikes (2012) showed that since VCs deal with ambiguous labels better and are interested in redefining the market structures, they are more likely to use novel offerings to their advantage. In our context, we show that there may be differences between a regular audience and category gatekeepers. Although the regular audience is novelty-seeking in a new platform such as YouTube, the professionals are institutionalized in their professional cultures and consider work closer to theirs as a mark of excellence. In other words, the different audience groups have different objectives and, thus, evaluate novel offerings differently.

Second, we question the assumption of the partiality of categories. Hannan et al. (2007) have been vocal against this assumption since, in the real world, we hardly see categories with crisp boundaries. As noted elsewhere, “researchers invariably sweep partiality from the picture by design. If the world being analyzed is nearly crisp (has minimal partiality), then this practice makes little difference for substantive conclusions (Hannan, 2010, p. 160).” Not only it is difficult for researchers to measure category fuzziness, but also it creates cognitive overload for audience members. However, research on rational inattention and cognition has shown that as people gain experience, they get better at handling information (Maćkowiak et al., 2018, 2020; Murphy, 2004). We find that

jury-members, who are experienced industry professionals, are better at evaluating novelty in fuzzier categories.

The third assumption we test in this study is that of higher-status benefits (Azoulay et al., 2014; Podolny, 2010). Higher status is widely regarded to shower benefits. Status is especially important in creative industries, with uncertainty about the outcome. In the foundational work on creative industries, Caves (2000) states that unlike other markets with asymmetric information, creative industries suffer symmetric ignorance. The author eloquently puts the property as “nobody knows”. Consumption of creative products also makes identity statements and a public commitment by the consumers towards suppliers (DiMaggio, 2011; Jones et al., 2016). However, higher status can signal different information to different audience groups(Kim & Jensen, 2014). To industry insiders, who care about protecting and promoting their profession’s boundaries, novelty by higher status players is welcomed (Cattani et al., 2014; Cattani et al., 2017). However, the regular audience, unconcerned about categorical norms, perceives novelty by higher status players as attempts to gain popularity (Berger & Heath, 2008; Berger & Le Mens, 2009). Higher status also attracts new audience members who have their own expectations about novelty (Kovács & Sharkey, 2014).

We also find that once the entrepreneurs gain higher status, they are more likely to offer novelty in the future (Phillips & Zuckerman, 2001; Prato et al., 2019). High-status allows them to access better resources and shed the conservatism in favor of exploration. In other words, the belief in suppliers about better returns by exploration is present, but the trade-off looks attractive after achieving high-status.

By testing the above assumptions, we show that entrepreneurs can be strategic in choosing their audience or categories. The literature on the disciplinary powers of

categories has been criticized for ignoring the role of entrepreneurial agency (Lee et al., 2017; Lo & Kennedy, 2015). Since the entrepreneurs are operating with little or no resources, the literature on cultural entrepreneurship has mostly seen the impact of entrepreneurial identity, narratives, and rhetoric in attracting critical resources while ignoring the reception and recognition of actual products or services (Lounsbury et al., 2019; Navis & Glynn, 2011; Wry et al., 2011). In the present study, we try to address that important gap and investigate how entrepreneurs driven to extract Schumpeterian rents can navigate a creative market.

Practical Implications

Balancing the paradox of novelty and conformity can be telling on entrepreneurs. Lilly Singh (mentioned at the beginning of the study) admitted that she was struggling with burnout after posting non-stop videos since 2010. She also admitted that she was not “particularly proud” of some of her content and decided to take time off from YouTube ("'Superwoman' Lilly Singh to take a break from YouTube," 2018). Singh is not the only famous YouTuber to struggle with contradictory audience demands on them. Many top YouTubers have admitted that playing by the audience’s expectations is “mentally exhausting” and taking time off from the platform (Alexander, 2018). One implication of our study is that the entrepreneurs *can* choose how to position themselves based on their inclination for novel pursuits. In other words, outsiders driven by novelty can first try to target novelty-seeking audiences. Thus, entrepreneurs have a better chance of getting their novel ideas funded on crowdfunding platforms such as Kickstarter rather than winning institutionalized business awards. However, the entrepreneurs will have a better chance with status competitions if they are in fuzzier categories. Once they win such competitions, they can attract better talent and resources to offer novelty further. Thus, we propose

innovative entrepreneurs not be constrained by social-cognitive rules and be strategically novel in their offerings.

Limitations and Future Research

No research is perfect, and ours is not an exception. One assumption that we make in our study is that the search terms used by the YouTubers give the right information about their offerings. However, since the search engine algorithms use keywords, YouTubers are incentivized to put the right words. Also, any misinformation by them would get their videos reported – a big risk for professionals. Second, although we try to reach as close to causality as possible through an IV approach, our setting is not a controlled lab. We hope that some of the future research will be better at identifying causality.

Concluding Comment

Despite our limitations, we offer a way out to entrepreneurs or innovative outsiders to balance the paradox of novelty and legitimacy. We show that the novelty is liked by the regular audience but discounted by category gatekeepers. Further, the fuzziness of categories that the producers operate in and previous win in those helps them with an experienced audience, but not with a regular audience. Once the producers achieve high status, they can break the curse of middle-status conformity. By integrating both the demand and supply-side forces, our study offers a more hopeful picture for cultural entrepreneurs.

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TABLES AND FIGURES

Table 1: Summary and Correlations

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1)Winner	0.07	0.26	1.00									
2)Likes (log)	9.38	2.29	0.07	1.00								
3)Videos	827.60	753.33	0.17	0.04	1.00							
4)Views	2469806	10829017	-0.00	0.19	-0.05	1.00						
5)Duration	602.61	708.84	0.02	0.15	0.22	0.02	1.00					
6)Dislikes	1617.64	20858.16	0.01	0.06	0.00	0.30	0.00	1.00				
7)FB Likes	673.19	83604.89	-0.00	0.00	-0.00	0.02	-0.00	0.01	1.00			
8)Tweets	3.24	4.92	0.02	0.18	0.03	0.05	0.05	0.02	0.00	1.00		
9)Red. Votes	57.97	1234.46	0.01	0.04	0.02	0.06	0.00	0.03	0.02	0.08	1.00	
10)Red. Posts	0.67	1.89	0.06	0.17	0.07	0.14	0.04	0.09	0.01	0.28	0.27	1.00
11)Social Media	10353170	21541188	-0.03	0.12	0.13	0.04	-0.03	0.02	0.00	0.16	0.01	0.00
12)Fuzziness	4.35	0.11	-0.03	0.08	0.34	0.00	0.25	-0.00	0.00	0.12	0.00	0.06
13)Previous Win	0.13	0.33	-0.02	0.03	0.08	-0.04	-0.03	-0.01	-0.00	-0.06	-0.01	-0.01
14)Bartik IV	0.01	0.07	0.00	-0.10	0.20	-0.03	-0.04	-0.00	-0.00	0.00	0.01	0.00
15)Novelty	6.67	1.61	0.07	-0.14	0.05	0.01	-0.03	0.00	0.00	0.12	0.03	0.10

	Mean	SD	(11)	(12)	(13)	(14)	(15)
11)Social Media	10353170	21541188	1.00				
12)Fuzziness	4.35	0.11	-0.02	1.00			
13)Previous Win	0.13	0.33	-0.11	0.13	1.00		
14)Bartik IV	0.01	0.07	0.33	-0.05	0.00	1.00	
15)Novelty	6.67	1.61	-0.02	-0.11	0.07	0.13	1.00

Note: Correlation coefficients with an absolute value larger than 0.02 are significant at the .05 level.

Table 2: Likelihood of Winning Regressions

VARIABLES	(1)	(2)	(3)	(4)	(5)
Videos (Std)	-0.019	0.018	0.023	0.009	0.013
	(0.006)	(0.009)	(0.009)	(0.010)	(0.010)
Duration (Std)	0.031	-0.050	-0.051	-0.056	-0.056
	(0.003)	(0.009)	(0.009)	(0.010)	(0.010)
Views (log)	-0.026	-0.041	-0.027	-0.049	-0.039
	(0.005)	(0.008)	(0.009)	(0.009)	(0.009)
Likes (log)	0.063	-0.049	-0.053	-0.035	-0.039
	(0.005)	(0.010)	(0.010)	(0.011)	(0.011)
Dislikes (log)	-0.005	0.017	0.014	0.025	0.023
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
FB Likes (log)	0.017	0.022	0.022	0.019	0.019
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tweets (Log)	0.012	0.013	0.016	0.012	0.015
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Reddit Posts (Std)	0.049	0.103	0.096	0.095	0.090
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Reddit Upvotes (Std)	0.007	-0.005	-0.002	-0.004	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Social Media (Std)	-0.063	-0.214	-0.212	-0.225	-0.223
	(0.071)	(0.010)	(0.010)	(0.010)	(0.011)
Category Fuzziness	0.115	-1.464	-1.506	-1.457	-1.484
	(0.614)	(0.046)	(0.046)	(0.048)	(0.048)
Previous Win	-0.260	-0.043	-0.047	-3.360	-3.197
	(0.228)	(0.012)	(0.012)	(0.061)	(0.059)
Bartik IV	0.830				
	(0.043)				
Novelty		-0.614	-0.618	-0.615	-0.618
		(0.009)	(0.009)	(0.011)	(0.011)
Novelty x Fuzziness			0.727		0.545
			(0.027)		(0.028)
Novelty x Previous Win				0.510	0.484
				(0.010)	(0.010)
Constant	5.356	8.026	8.072	7.657	7.690
	(2.651)	(0.177)	(0.201)	(0.204)	(0.218)
Chi. Sq (D)	29542.61(30)	15919.92(23)	91165.61(28)	176885.59(29)	84817.72(32)
Observations	185,127	185,127	185,127	185,127	185,127
Month FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Note: Standard errors are in parentheses. Two-tailed Tests.

Table 3: Likes Growth Regressions

VARIABLES	(6)	(7)	(8)	(9)	(10)
Videos (Std)	-0.035	0.075	0.095	0.125	0.133
	(0.005)	(0.109)	(0.109)	(0.110)	(0.112)
Duration (Std)	0.024	-0.024	-0.019	-0.016	-0.013
	(0.003)	(0.018)	(0.016)	(0.015)	(0.014)
Views (log)	0.006	0.084	0.085	0.087	0.087
	(0.005)	(0.115)	(0.113)	(0.109)	(0.108)
Likes (log)	-0.010	0.355	0.351	0.334	0.333
	(0.004)	(0.135)	(0.134)	(0.131)	(0.131)
Dislikes (log)	0.002	0.015	0.011	0.008	0.006
	(0.003)	(0.017)	(0.016)	(0.015)	(0.015)
FB Likes (log)	0.016	-0.025	-0.023	-0.019	-0.018
	(0.001)	(0.006)	(0.005)	(0.004)	(0.004)
Tweets (Log)	0.024	-0.010	-0.009	-0.003	-0.003
	(0.001)	(0.011)	(0.011)	(0.010)	(0.010)
Reddit Posts (Std)	0.036	-0.041	-0.033	-0.032	-0.028
	(0.003)	(0.019)	(0.017)	(0.018)	(0.017)
Reddit Upvotes (Std)	0.009	-0.008	-0.007	-0.009	-0.009
	(0.003)	(0.006)	(0.006)	(0.006)	(0.006)
Social Media (Std)	-0.045				
	(0.068)				
Category Fuzziness	-0.166				
	(0.592)				
Previous Win	-0.290				
	(0.220)				
Bartik IV	0.929				
	(0.043)				
Novelty		0.765	0.746	0.714	0.706
		(0.314)	(0.328)	(0.302)	(0.311)
Novelty x Fuzziness			-1.208		-0.733
			(0.870)		(0.769)
Novelty x Previous Win				-0.685	-0.634
				(0.255)	(0.246)
Constant	0.902	5.983	6.853	6.642	7.121
	(2.673)	(0.451)	(0.763)	(0.517)	(0.787)
Chi Sq. (D)	38668.98(38)	1986.44(34)	1663.18(35)	1215.50 (35)	1111.20 (36)
Observations	207,989	207,989	207,989	207,989	207,989
Month FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
YouTuber FE	Yes	Yes	Yes	Yes	Yes

Note: Standard errors are in parentheses. Two-tailed Tests.

Figure 1

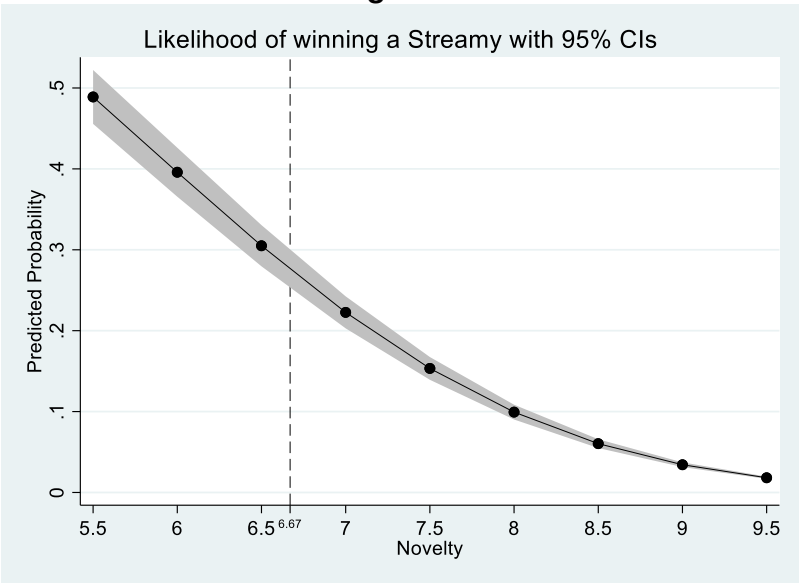


Figure 2

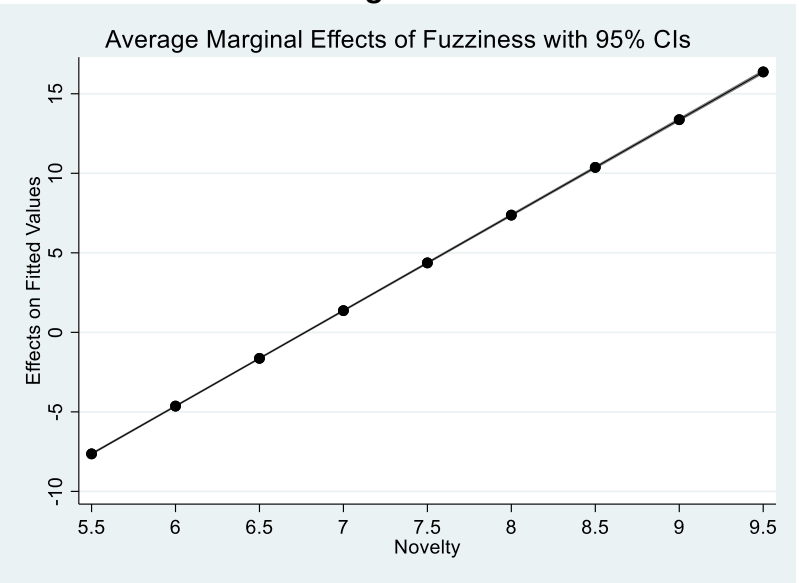
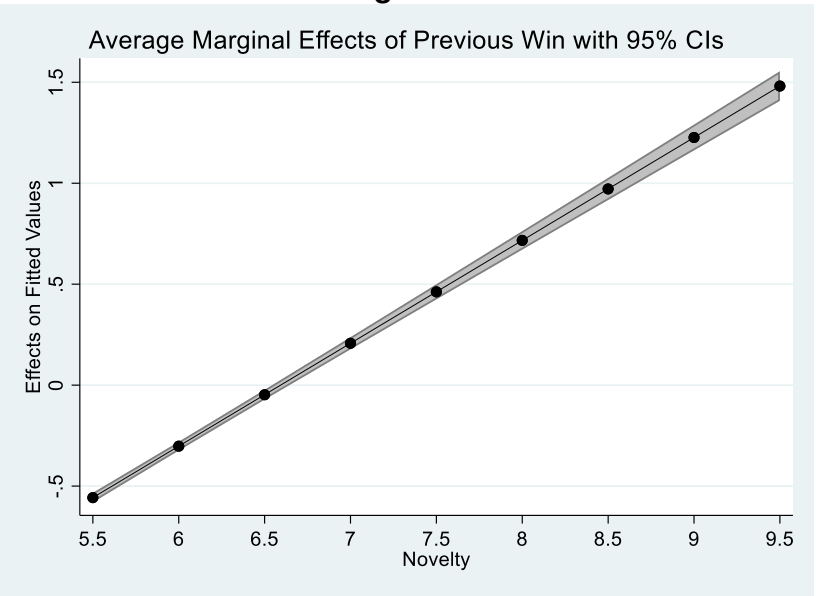
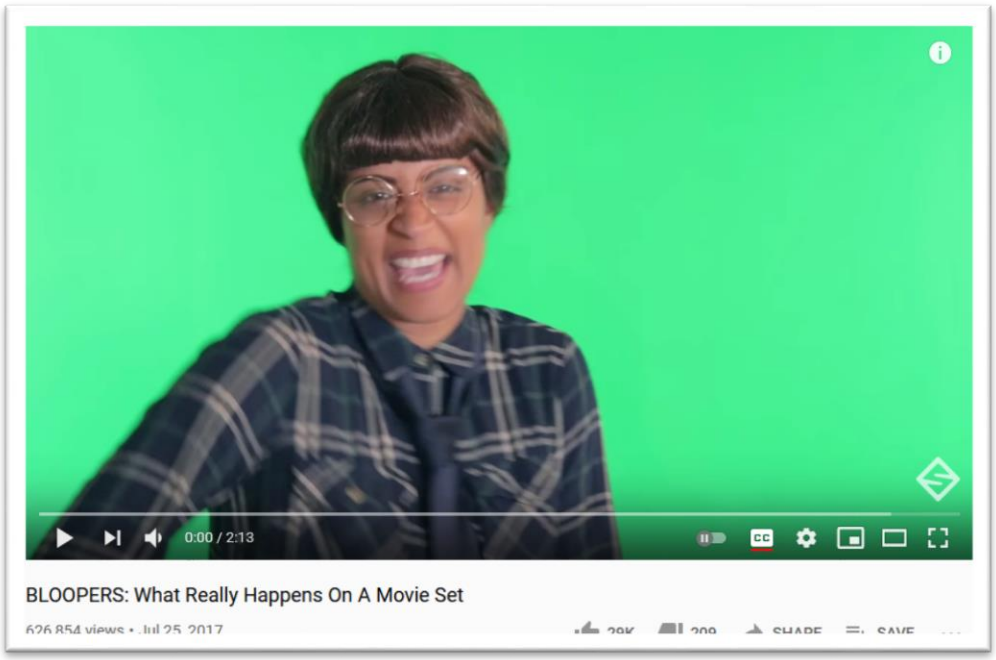


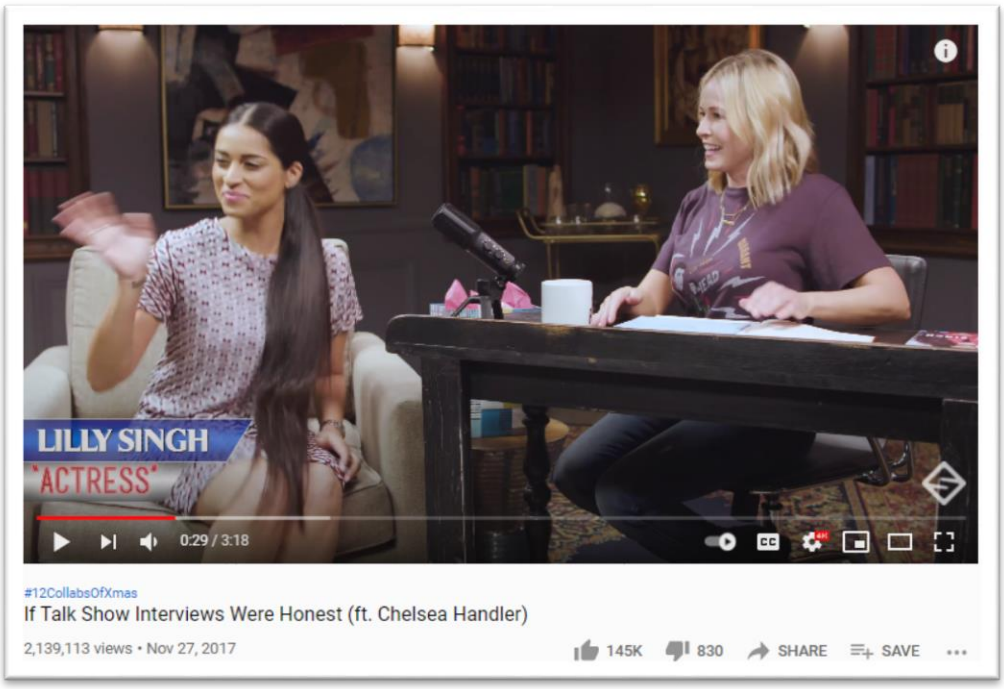
Figure 3



Appendix A – Lowest and Highest Novelty score videos of Lilly Singh (SuperWoman)



NOVELTY – 4.21 - superwoman, comedian, funny, rant, skit, sketch, hilarious, humor, stupid, silly, lol, joke, brown, indian, desi, punjabi, hindi
https://www.youtube.com/watch?v=JK9ha2JkRQc



NOVELTY – 9.34 - superwoman, chelsea handler, 12 collabs of xmas, interviews, interviews were honest, honest talk shows
https://www.youtube.com/watch?v=hkFYWyy9Jek

Appendix B
Fuzziness Scores of Nomination Categories

	Nominated Award Category	Fuzziness Score
1	Lifestyle	4.136045
2	Food	4.199166
3	Comedy	4.248644
4	Sports	4.249151
5	Breakout Creator	4.259164
6	Health and Wellness	4.279148
7	Beauty	4.309370
8	Fashion	4.324730
9	Kids and Family	4.340474
10	First Person	4.349550
11	International	4.374660
12	News, Culture and Current Events	4.377478
13	Science or Education	4.410994
14	Gaming	4.510232

Appendix C
Novelty after Winning Regressions

VARIABLES	(1)	(2)
Videos (Std)	-0.016	-0.016
	(0.100)	(0.097)
Duration (Std)	0.009	0.009
	(0.011)	(0.011)
Views (log)	-0.018	-0.018
	(0.038)	(0.038)
Likes (log)	0.013	0.018
	(0.046)	(0.045)
Dislikes (log)	-0.010	-0.011
	(0.010)	(0.010)
FB Likes (log)	0.010	0.010
	(0.003)	(0.003)
Tweets (Log)	0.024	0.023
	(0.008)	(0.007)
Reddit Posts (Std)	0.029	0.027
	(0.016)	(0.016)
Reddit Upvotes (Std)	-0.002	-0.002
	(0.004)	(0.004)
Previous Win		0.381
		(0.160)
Constant	0.095	0.054
	(0.317)	(0.315)
Observations	208,453	208,453
R-squared	0.152	0.155
Month FE	Yes	Yes
Year FE	Yes	Yes
YouTuber FE	Yes	Yes

Note: Standard errors are in parentheses. Two-tailed Tests.

CONCLUSION

This dissertation offers new perspectives on risk-taking market players' interactions with the three institutional pillars – regulatory, normative, and cognitive. The regulative pillar stresses the explicitly regulatory processes: rule-setting, monitoring, and sanctioning activities. The normative pillar emphasizes rules that introduce a prescriptive, evaluative, and obligatory dimension into social life. Normative systems include both values and norms. The cultural-cognitive institutions or the "taken for granted" are the frames through which meaning is made (Scott, 2013).

As institutions both facilitate and constrain market activity, they can significantly impact the growth and survival of risk-taking players. Since powerful incumbents can influence the rules of the game, it can make an entry for entrepreneurial players significantly more difficult (Bradley & Klein, 2016). Further, entrepreneurs face resource constraints and "liabilities of newness" until they achieve growth or learn how to be better social actors (Stinchcombe, 1965).

This dissertation systematically explored the interaction of risk-taking or entrepreneurial players with the three institutional pillars. It contributes to the management literature in various ways. The first study focused on the distinctive characteristics of health science firms with long product development horizons due to strict multistage regulations. It decomposed the signaling mechanism of EO rhetoric into the effects of average EO rhetoric and change in EO rhetoric over time, thus distinguishing between-firm and within-firm differences. Finally, it showed how soft- and hard-information signals can jointly affect investor reactions, an influence that is particularly important in regulated industries with high information asymmetry between firm insiders and outsiders.

The second chapter focused on CEO opportunism when it comes to recalling faulty products. It advances behavioral agency research by demonstrating the utility of a theory of attention (ABV) in exploring the efficacy of CEO option incentives and external monitoring. Specifically, it argues that a CEO is cognizant of and likely to exploit the attentional variation of external monitors. It offers insight into how incentives affect CEO decisions that create agency costs for one stakeholder (customer) while advancing another's (short-term shareholder) interests.

The third chapter focused on the cultural–cognitive institutions. It offers a path for cultural entrepreneurs to attain optimal distinctiveness (OD). It shows in the context of YouTubers (creative entrepreneurs) that category gatekeepers (in our case, jury of prestigious awards) and regular platform audiences are driven by different objectives and evaluate novelty differently. Specifically, the professional audience wants to maintain and further its category's boundaries and thus, consider excellent that is closer to their work (Abbott, 1981; Lee, Hiatt, & Lounsbury, 2017). At the same time, regular consumers in creative contexts care about expanding their utility and enthusiastically seek novel offerings products (Durand, Rao, & Monin, 2007; Taeuscher, Bouncken, & Pesch, 2020). Furthermore, how the two audience-groups value novelty also depends on the category partiality. Thus, jury members (usually experienced industry professionals) with better cognitive powers evaluate novelty favorably in fuzzier than well-defined categories. Finally, winning prestigious awards gives entrepreneurs a status-boost that jury-members respond with ingroup behavior while the regular audience reacts less enthusiastically.

Overall, this dissertation offers new insights into the interactions between risk-taking players and different institutions. Entrepreneurs (or risk-taking players) have been hailed as engines of economic growth and employment (Bradley & Klein, 2016). Organizations

are also expected by society solve some of its pressing problems due to market failures such as environmental pollution and energy needs. A comprehensive framework is thus required by management scholars to map the various interactions entrepreneurs would have with institutions (Scott, 1995). Not only it will help the entrepreneurship field to track the progress and find under-researched or ignored questions, but also it will chart the territory of the field and increase its legitimacy (Shane & Venkataraman, 2000; Shepherd, 2015). This dissertation is a step in the above direction.

CONCLUSIÓN

Esta tesis ofrece una nueva perspectiva sobre las interacciones de los agentes del mercado que asumen riesgos con los tres pilares institucionales: regulador, normativo y cognitivo. El pilar regulador énfasis en los procesos explícitamente reguladores: actividades de establecimiento de normas, supervisión y sanción. El pilar énfasis en las normas que introducen una dimensión prescriptiva, evaluativa y obligatoria en la vida social. Los sistemas normativos incluyen tanto valores como normas. Las instituciones culturales-cognitivas o lo "dado por sentado" son los marcos a través de los cuales se hace el significado (Scott, 2013).

Dado que las instituciones facilitan y limitan la actividad del mercado, pueden influir significativamente en el crecimiento y la supervivencia de los actores que asumen riesgos. Dado que los poderosos titulares pueden influir en las reglas del juego, pueden dificultar considerablemente la entrada de los actores emprendedores (Bradley & Klein, 2016). Además, los emprendedores se enfrentan a limitaciones de recursos y a "pasivos de novedad" hasta que logran el crecimiento o aprenden a ser mejores actores sociales (Stinchcombe, 1965).

Esta disertación exploró sistemáticamente la interacción de los actores emprendedores o que asumen riesgos con los tres pilares institucionales. Contribuye a la literatura sobre gestión de varias maneras. El primer estudio se centró en las características distintivas de las empresas de ciencias de la salud con largos horizontes de desarrollo de productos debido a las estrictas regulaciones de varias etapas. Descompone el mecanismo de señalización de la retórica de la OE en los efectos de la retórica media de la OE y el cambio en la retórica de la OE a lo largo del tiempo, distinguiendo así las diferencias entre

empresas y dentro de ellas. Por último, se muestra cómo las señales de información blanda y dura pueden afectar conjuntamente a las reacciones de los inversores, una influencia que es especialmente importante en los sectores regulados con una gran asimetría de información entre las personas de dentro y de fuera de la empresa.

El segundo capítulo se centra en el oportunismo de los directores generales a la hora de retirar productos defectuosos. Avanza en la investigación de la agencia conductual demostrando la utilidad de una teoría de la atención (ABV) para explorar la eficacia de los incentivos de la opción del CEO y la supervisión externa. En concreto, sostiene que un director general es consciente de la variación atencional de los supervisores externos y es probable que la aproveche. Ofrece una visión de cómo los incentivos afectan a las decisiones de los directores generales que crean costes de agencia para una parte interesada (el cliente) mientras promueven los intereses de otra (el accionista a corto plazo).

El tercer capítulo se centra en las instituciones culturales-cognitivas. Ofrece un camino para que los emprendedores culturales alcancen una distinción óptima (DO). Muestra, en el contexto de los YouTubers (emprendedores creativos), que los guardianes de la categoría (en nuestro caso, el jurado de los prestigiosos premios) y el público habitual de la plataforma se mueven por objetivos diferentes y evalúan la novedad de forma distinta. En concreto, el público profesional quiere mantener y ampliar los límites de su categoría y, por tanto, considera excelente lo que está más cerca de su trabajo (Abbott, 1981; Lee, Hiatt & Lounsbury, 2017). En el mismo tiempo, los consumidores habituales en contextos creativos se preocupan por ampliar su utilidad y buscan con entusiasmo productos de oferta novedosa (Durand, Rao, & Monin, 2007; Taeuscher, Bouncken, & Pesch, 2020). Además, la forma en que los dos grupos de público valoran la novedad también depende

de la parcialidad de la categoría. Así, los miembros del jurado (por lo general, profesionales experimentados del sector) con mejores facultades cognitivas evalúan favorablemente la novedad en las categorías más difusas que en las bien definidas. Por último, ganar premios prestigiosos da a los empresarios un impulso de estatus al que los miembros del jurado responden con un comportamiento dentro del grupo, mientras que el público habitual reacciona con menos entusiasmo.

En general, esta tesis ofrece nuevas perspectivas sobre las interacciones entre los actores que asumen riesgos y las diferentes instituciones. Además, abre nuevas puertas para la futura investigaciones sobre gestión en un área relevante e importante.