INSIDE OR OUTSIDE: THE SOCIAL MECHANISMS OF ENTREPRENEURSHIP CHOICES. EVIDENCE FROM THE MUTUAL FUND INDUSTRY

by

Aleksandra J. Kacperczyk

A dissertation submitted in partial fulfillment
of the requirements of the degree of
Doctor of Philosophy
(Business Administration)
in The University of Michigan
2009

Doctoral Committee:

Professor Gerald F. Davis, Chair
Professor Michael Jensen
Professor Mark S. Mizruchi
Professor Kathleen M. Sutcliffe

For My Mom Irena Kacperczyk

ACKNOWLEDEMENTS

My dissertation reflects one important lesson I learned over the five years spent in the PhD program: individuals are social actors in that their various decisions, preferences, and actions carry a visible imprint of the social environments in which these individuals operate. In the same way, I view myself as, by and far, a product of the environment in which I have been formed. Some most exceptional scholars in the field have imprinted my five-year long journey towards the doctorate. Together, they have set up high standards for scholarship, and I will be working in the future to meet their expectations. I am particularly grateful to my advisor – Jerry Davis; no words can describe what great feedback, support and optimism he offered throughout my studies. He inspired me to search for important questions and be rigorous in the ways I find answers. He read countless drafts of my papers, each time offering constructive comments and critiques. Kathie Sutcliffe taught me how to believe in my own judgment and encouraged me to stand up for my ideas. She convinced me that what matters the most in academia is the passion and the love for the subject. Michael Jensen infected me with enthusiasm for research even before I entered the PhD program. I would have never joined the academic community if it was not for him. In the past five years, Michael was most generous in offering his advice on and support regarding any type of matter. Last but not least, Mark

Mizruchi taught me how to think critically about research in social sciences and how to find interesting research problems. He demonstrated high scholarship standards, pushing my research further than what I thought would be achievable.

In addition to my committee, I am grateful to many other faculty members who kindly provided me with their feedback and support; Jim Walsh, Wayne Baker, Jeffrey Sanchez-Burks, and Jane Dutton have taken a special interest in contributing to my scholarly development. Generously offering their advice and time, they left an important imprint on my interests, my theoretical and methodological approach, and the passion for the subjects, more broadly. Moreover, I am grateful to many of my wonderful colleagues and friends in the department and the school, including Michelle Barton, Jeff Bednar, David Benson, Marlys Christianson, Adam Cobb, Natalie Cotton, Kathryn Dekas, Maria Farkas, Pranav Garg, Dan Gruber, Chak Fu Lam, Samir Nurmohamed, Laura Rees, Brent Rosso, Amit Seru, Flannery G. Stevens, Vivek Tandon, Ned Wellman, and David Zhu. While on the job market, my work has greatly benefited from scholars and students at other institutions; I was privileged to present my job market paper at Chicago, Wharton, Harvard, MIT, INSEAD, Dartmouth, LBS, Washington University, IESE, RSM, University College London, Wisconsin-Madison, University of Colorado, McGill, University of Lausanne, and UTSA. These presentations have gratefully enriched my work; I appreciate the detailed comments of Damon Phillips, Ron Burt, Ezra Zuckerman, Toby Stuart, Michael Lounsbury, and Pino Audia, amongst others.

Finally, my family and friends provided unconditional support, love and care. My

brother Marcin Kacperczyk, and my two sisters, Katarzyna Kacperczyk and Elzbieta Lambert always boosted my motivation beyond offering useful advice. Julian Atanassov and Gerald Gazzo were always there for me to listen. Most importantly, I owe everything to my most wonderful Mom - Irena Kacperczyk – whose love and support have no limits. It is to her that I dedicate this thesis.

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ABSTRACT

In my dissertation, I investigate the choice between internal and external venture formation. Actors often leave in pursuit of new ventures, even though entrepreneurial opportunities may exist inside the firm. While a bulk of work has focused on understanding the determinants of entrepreneurial transition (e.g., Aldrich and Ruef, 2006; Dobrev and Barnett, 2005; Robinson and Sexton, 1994; Sørensen, 2007a; 2007b), whether nascent entrepreneurs leave to form new ventures or stay put inside the organization remains less clear. Addressing this research lacuna, my dissertation examines the conflicting choices faced by nascent entrepreneurs and their consequences for established organizations. Whereas economic perspectives have focused almost exclusively on the role of incentive structures in determining entrepreneurial choices (Anton and Yao, 1995; Hellman, 2006), my dissertation emphasizes the impact of the social context in determining the direction in which would-be entrepreneurs deploy their efforts. Drawing on the rich sociological tradition of embedding an individual's decision making in the social context (e.g., Granovetter, 1985), I uncover the social determinants of entrepreneurial choices and their consequences for existing organizations. In the first two studies, I offer a socio-structural perspective on the choices pursued by nascent entrepreneurs; I develop a theoretical framework that relates these choices to an actor's

formative experiences (first study), and his or her position in the informal network (second study). In the first study, I suggest that formative experiences may affect the direction of the entrepreneurial choices, by providing exposure to risk-taking, autonomy, and entrepreneurial coworkers. Findings corroborate the hypothesized relations; nascent entrepreneurs transition to external more than to internal ventures when, early in the career, they gain exposure to risk and are socialized with coworkers who founded external ventures. The imprinting effect is partially mitigated by adaptive learning: negative feedback that individuals receive when performing their actions decreases the influence of imprinting on entrepreneurship choices. In the second study, I draw on the network literature to suggest that informal social ties serve as external referents pertaining to the conflicting choices of entrepreneurship. Findings indicate that formal organizational structures influence the choice of entrepreneurship: nascent entrepreneurs provided with greater discretion and compensation are more likely to found internal rather than external ventures. Moreover, I find that nascent entrepreneurs are more likely to found external (internal) ventures if their school network members created external (internal) ventures in the past. The effect of school networks is amplified with geographic proximity and gender homophily. The third study focuses on the consequences of the entrepreneurship choices; notably, I explore the impact of these choices on established organizations. Using a conceptual framework of power dependence (Emerson, 1962), I predict that organizations will strengthen their internal incentive structures to retain prospective entrepreneurs, when faced with the risk of entrepreneurial defections. I find

that established organizations adapt to entrepreneurship choices: organizations provide greater compensation and discretion to employees at higher risk of departures. Organizational adaptation to the threat of entrepreneurial departures decreases with organizational performance and scope. Together, my dissertation has important theoretical implications: it enhances the understanding of an individual's role in redrawing organizational boundaries. I test my hypotheses using longitudinal data on the development of new funds in the mutual fund industry between 1979 and 2006.

CHAPTER I: INTRODCUTION

Overview

In today's fast-paced environment, organizations face an increasing challenge to foster growth through product innovation and internal venture formation (Baum and Oliver, 1996; Lumpkin and Dess, 1996; Powell, Koput, and Smith-Doerr, 1996). Although, every year, organizations invest billions of dollars to train their employees to create new divisions and products, organizational members with good ideas often leave to found their own ventures. For example, several employees of Fairchild left to found Intel and a number of Google's managers have recently defected to start new organizations. A theme underlying the above examples is that, in an increasingly knowledge-based post-industrial economy, where talent and skills are readily portable, individuals are faced with the following decision: should they deploy their creative efforts internally, or should they leave to found new organizations. Because this decision is vital for the entrepreneur and the parent company itself, it is important to understand its determinants and consequences. Hence, the objective of the dissertation is to theoretically outline and empirically assess (1) the determinants of *entrepreneurship choices,* and (2) their impact on established organizations.

The question regarding the conflicting alternatives available to nascent entrepreneurs can be framed within a broader context of an individual's role in creating

new organizations (e.g., Aldrich and Widenmeyer, 1993). A large body of work has documented that entrepreneurs emerge from existing organizations (Aldrich and Widenmeyer, 1993; see Audia and Rider, 2006 for review), which provide bountiful resources that enhance an individual's motivation and ability to create new ventures (e.g., Burton, Sørensen, and Beckman, 2002; Freeman, 1986; Higgins and Gulati, 2003; Gompers, Lerner and Scharfstein, 2005; Robinson and Sexton, 1994; Romanelli, 1989; Romanelli and Schoonhoven, 2001). For example, past employment has been shown to equip organizational members with confidence (Higgins, 2005; Sorenson and Audia, 2000), information about entrepreneurial opportunities (Romanelli, 1989), and social capital (Aldrich and Zimmer, 1986; Higgins, 2005), all of which facilitate transition to entrepreneurship. While they provide a useful insight, studies in this area have largely focused on actors who have already self-selected to found new organizations and rarely examined the preceding decision pertaining to internal versus external venture formation. Instead, the standard accounts in strategic management and economics have related entrepreneurial departures to a lack of opportunities for an internal venture formation. From this perspective, organizational members leave to pursue innovative ideas outside, when parent firms miss opportunities beyond their core businesses (Henderson and Clark, 1990, Tushman and Anderson, 1986), or lack interest to support an employee-generated innovation (Klepper, 2001; Wiggins, 1995). Although informative, these approaches focus largely on the organization and attribute less weight to the social actor. Yet, as organizations become dependent on an individual's talent for innovation, the role of

organizational members in affecting the locus of new ventures becomes increasingly important. Consequently, there is a growing need to model the decision regarding internal versus external venture formation on an individual level.

My dissertation addresses the limitations of prior research in several ways. The first two empirical studies examine the factors that influence the choice between conflicting entrepreneurial trajectories. While much insight can be gained from economic approaches emphasizing the role of financial incentives (e.g., Anton and Yao, 1995), my dissertation offers a uniquely socio-structural perspective. In the first study, I relate entrepreneurship choices to career histories and argue that formative career conditions, which I term *career imprints*, influence whether potential entrepreneurs deploy their efforts internally or externally. The second study expands the initial model by further exploring the role of a social structure in affecting the entrepreneurship choices. I embed my arguments in several literatures, including studies on career histories (e.g., Higgins, 2005; Shane and Khurana, 2003), theories of social imprinting (e.g., Stinchcombe, 1965), and research on interpersonal networks (e.g., Granovetter, 1973). In the third empirical study, I shift the focus away from individuals to examine the impact of entrepreneurship choices on established organizations. To that end, I address the following question: How do firms change their structures in response to the risk of entrepreneurial defections? I expect that firms will strengthen their internal incentive structures in an effort to retain valuable entrepreneurial talent, when faced with a risk of entrepreneurial exits. I embed my arguments in power-dependence theory (Emerson, 1962), the sociological

perspectives that study individual career choices and organizational life chances (e.g., Phillips, 2002), and the studies on talent management (e.g., Cappelli, 2004; 2006; 2008).

In response to the limitations of previous work, my dissertation examines factors responsible for an individual's decision to found a new venture either internally or externally. The three papers have theoretical implications that extend well beyond entrepreneurial process; they pertain to the vital question regarding organizational boundaries. Organization theorists and economists alike have long been concerned with the way organizations are bounded and delimited from their external environment (e.g., Coase, 1937; Kogut and Zander, 1996; Thompson, 1965; Williamson, 1985). Although boundaries of the firm have been conceptualized differently across various theoretical paradigms (see Santos and Eisenhardt, 2005 for review), each proposing a distinct set of rules to specify the sphere of an organizational activity or influence, a common assumption underlying these theories suggests that organizational boundaries are placed, regulated, and maintained by the unitary decision-maker that amounts to more than just the sum of its parts – the organization itself.[1] However, less attention has been devoted to understanding how members of the organization at the operational level, redraw the boundaries of the organization by choosing to deploy their efforts towards the creation of new ventures either internally or externally. By determining the locus of a new venture, nascent entrepreneurs influence which activities will be conducted inside the

[1] Examples of inclusion criteria that specify organizational boundary include power and influence (e.g., Pfeffer and Salancik, 1978), resources (e.g., Penrose, 1959, Chandler, 1977), identity (e.g., Kogut and Zander, 1996), and efficiency (e.g., Coase, 1937; Williamson, 1985).

organization, and which activities will fall outside an organizational boundary. Moreover, research on organizational boundaries has been largely dominated by the atomistic exchange efficiency approaches that focus on incentives and pecuniary self-interests held by organizational actors (Santos and Eisenhardt, 2005). As a result, our understanding of organizational boundaries has been largely divorced from contextual influences on the actors' behaviors. For example, less is known about the impact of a social structure on the choice of a new venture.

In the next section, I discuss in greater detail the theoretical motivation underlying the research questions addressed in the dissertation. Thereafter, I provide a short overview of the study's empirical design. Finally, I summarize the key contributions of the dissertation to the sociological perspectives on entrepreneurship and organization theory.

Research Problem and Theoretical Motivation

Diverse streams of research have attached different definitions to entrepreneurial activity. While entrepreneurship has been typically seen as the creation of de novo start-ups (e.g., Aldrich, 1999; Aldrich and Ruef, 2006; Thornton, 1999), entrepreneurial activity does not require the creation of new organizations (Amit, Glosten, Mueller, 1993; Casson, 1982; Shane and Vekataraman, 2000). The Schumpeterian perspective associates entrepreneurship with an innovative combination that can lead to a set of outcomes, including the formation of a new method of production, a new market, a new source of supply, or a new industry organization (Schumpeter, 1934). In Schumpeter's view,

entrepreneurial processes may take place inside or outside the organization. In both cases, organizational members represent an engine behind the exploitation of innovative ideas. While some actors choose to leave in pursuit of entrepreneurial opportunities outside, others develop their innovations inside, turning into *intrapreneurs* (Pinchot, 1985).[2] Hence, the fundamental dilemma faced by organizational members is whether to pursue new ideas inside the firm, or leave the employer to establish a new venture outside.

The tension between an internal and external venture formation is considerable, given the important trade-offs implicated in the choice. From the employee's perspective, internal venturing has the advantage of lower risk, as compared to the pursuit of new ventures outside. First, internal venture formation relies on resources that remain, to some extent, nested in the larger resource combination constituted by the firm (e.g., Burgelman, 1983; Pinchot, 1985). Instead of having to independently mobilize an array of resources, intrapreneurs can utilize a pool of organizational resources destined towards the development of employee-generated innovations. Moreover, intrapreneurs face lower labor market risks because the parent company can always reallocate a failed intrapreneur to another task (Scharfstein and Gromb, 2002). By contrast, the choice of an external entrepreneurship requires that nascent entrepreneurs mobilize social and material resources dispersed in the environment with their own unique resources (Stinchcombe,

[2] Although studies on corporate entrepreneurship typically consider a new venture formation as a firm-level phenomenon, they have nevertheless emphasized the role of individual initiatives (Bourgeois and Brodwin, 1984). For example, Burgelman (1983) suggests that "the motor of corporate entrepreneurship resides in the autonomous and strategic initiative of individuals at the operational level of the organization." (1983: 241). Aghion and Tirole (1997) further suggest that because the "real authority" lies with the management, managers rather than directors have the operational power to create new ventures.

1965). In this process, rewards and payoffs are highly uncertain (Knight, 1921), and many potential entrepreneurs fail to even secure the necessary resources (Sørensen and Sorenson, 2003).

Despite the challenges of exploiting a new venture through a start-up, organizational members often choose to pursue their ideas externally based on, at least, two grounds. First, entrepreneurship is perceived as a lucrative alternative (Kirzner 1973), whereby talented individuals are able to derive profits on their human capital (Groysberg, Nanda, and Prats, 2007), instead of sharing them with the parent firm. Second, entrepreneurs may trade higher security of internal venturing for greater autonomy, when exploiting innovative ideas through start-ups. Because entrepreneurs represent *de facto* owners, they are equipped with greater discretionary powers over a new venture.

In my dissertation, I address some of the shortcomings evident in the previous literature. I propose three empirical studies to explore the determinants and consequences of the entrepreneurship choices. Because the question of entrepreneurial choices allows for probing the role of a social actor in shaping the boundaries of the organization, the dissertation contributes to a richer understanding of how organizational boundaries are socially constructed in a knowledge-intensive economy.

Empirical Design

To test my theoretical framework, I use an empirical context of the mutual fund industry. The mutual fund setting provides an excellent arena in which to investigate the

determinants of entrepreneurship choices for several reasons. First, modeling the dependence of internal and external entrepreneurship choices is non-trivial; it requires finding a context in which both internal and external venture formation can be observed and studied in conjunction.[3] Unlike many other settings, the mutual fund context offers a unique opportunity to empirically isolate *both* internally and externally created ventures. In this knowledge-intensive environment absent non-compete clauses, highly skilled and mobile managers are able to easily found a new venture either inside (i.e., a new fund) or outside an established organization (i.e., a new company). Moreover, over the past three decades, the mutual fund industry experienced an unprecedented growth in the formation of internal and external ventures alike – overall, the number of funds grew from 564 to over 8,000 between 1980 and 2000s. Finally, the mutual fund context offers an advantage of studying and comparing the *entire* population of intra- and entrepreneurs.

Contributions

In my dissertation, I address the limitations of prior research by trying to understand an individual's decision to create a new venture internally versus externally. Specifically, I offer a socio-structural perspective to examine (1) the determinants of entrepreneurship choices, and (2) the consequences of such choices for the firm. More

[3] Existing research has theorized about the conditions under which employees choose to commercialize their ideas in external spinoffs rather than within the firm (Anton and Yao, 1995, Klepper and Sleeper, 2002, Klepper, 2001, Klepper and Thompson, 2006). The present study is different from that research in at least two respects. First, while previous studies have typically related the outside decision to the entrepreneur's inability to choose inside, I examine entrepreneurial choices when possibilities for both inside and outside ventures exist. Second, the present study compares *empirically* internal and external venture formation, whereas existing studies have been largely theoretical (e.g., Anton and Yao, 1995), or have only measured the creation of external ventures.

broadly, the goal of the dissertation is to contribute to organizational theory by enhancing the understanding of an individual's role in shaping the boundaries around organizations. While prior literature has primarily taken an exchange efficiency approach to understand organizational boundaries (e.g., Williamson, 1985), I hope to provide a more "socialized" account by taking into consideration career trajectories and social structure to predict the direction (i.e., inside or outside) in which nascent entrepreneurs will deploy their efforts. Finally, by examining the determinants of entrepreneurial choices, I contribute to the literature that tries to understand theoretical mechanisms behind spin-offs (e.g., Brittain and Freeman, 1986; Romanelli, 1989), and the research on the emergence of new organizations (Aldrich and Ruef, 2006), more broadly.

Understanding the locus of new ventures is also essential on practical grounds. Entrepreneurial defections represent an important opportunity cost associated with losing potential internal ventures that could otherwise generate value for the firm via growth and profitability (Covin and Slevin, 1986; 1991; Hisrich and Peters, 1998; Zahra, 1991). Entrepreneurial exits increase the risk of knowledge appropriation by organizational members (Rajan and Zingales, 2001), as important organizational knowledge and routines are transferred from the parent firm to a progeny via the migrating personnel (Agarwal, Echambadi, Franco, and Sarkar, 2004; Pfeffer and Leblebici, 1973; Phillips, 2002). Because human capital is highly mobile and can quit at will, knowledge can easily be transferred (Boeker, 1997) and expropriated by organizational members (Arrow, 1962). Hence, from the firm's perspective, understanding the conditions under which

organizational members choose to leave in pursuit of new ventures, as opposed to staying put, lies at the heart of creating value and maintaining competitive advantage.

Finally, examining the conditions that privilege one type of entrepreneurial activity over another provides additional insights into the dynamics behind economic growth. In today's corporate America, 71 percent of young and new firms have been founded by entrepreneurial actors who encountered the idea during their past employment (Bhide, 2000). As the emergence of new independent ventures shapes the landscape of industries and the economy as a whole, exploring the sources of those ventures is essential to comprehend the dynamics of the knowledge-based economy. Following the Schumpeterian tradition, entrepreneurship leads to economic progress and wealth creation (e.g., Lumpkin and Dess, 1996; Schumpeter, 1934; Scherer, 1984). Therefore, enhancing the understanding of wealth creation in the society represents an additional benefit of my dissertation.

CHAPTER II: MUTUAL FUND INDUSTRY GROWTH, 1979-2006

Introduction

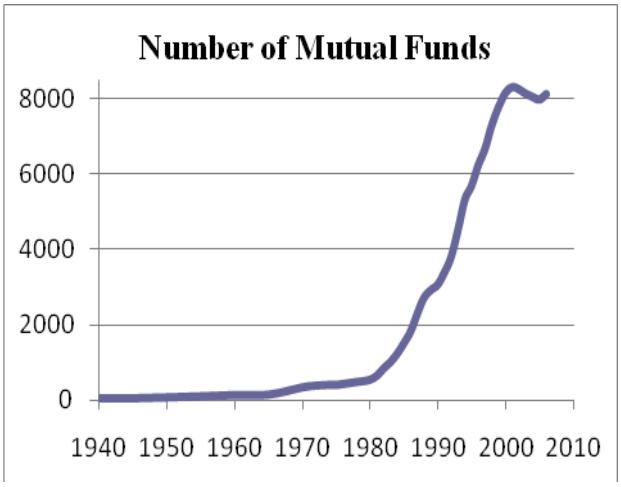
This chapter provides some background on the mutual fund industry growth in the period between 1979 and 2006. The chapter is organized as follows. I first discuss the advantages of the mutual fund industry as an empirical context for the research questions addressed. I further offer an organizational perspective on mutual funds by providing a background on their organizational structures and functions. Finally, I define entrepreneurship in the mutual fund industry: I discuss actors and processes relevant to the entrepreneurship choices. Overall, the objective of the present chapter is to provide an overview of the industry and to better situate the three papers in the empirical context.

The Mutual Fund Industry: Choice of Empirical Setting

I use the context of the mutual fund industry to understand when organizational members create internal ventures, as opposed to leaving to found new ventures outside. This context provides an ideal setting for several reasons. First, over the past three decades, the mutual fund industry experienced an unprecedented growth both in internal and external ventures, as numerous products, product categories, and free-standing ventures have been developed and marketed by individual and organizational actors (Davis, 2008). The number of mutual funds grew from 564 to over 8,000 between 1980

and 2007, and the funds' population increased exponentially by 168% in the 1990s alone due to a higher demand for retirement savings and personal pension plans, such as 401k (Investment Company Institute).[4] Currently, there are more mutual funds in the United States than companies listed on the U.S. stock exchanges, and mutual funds have become the most significant corporate owners in the United States, holding 25% of the outstanding stock of all publicly traded U.S. companies and a total of $13 trillion in assets. Forty-five percent of all U.S. households owned mutual funds in 2008, compared with less than 6 percent in 1980.

Figure 1: Mutual funds' expansion, 1940-2007. (Data compiled by the Investment Company Institute)



The second advantage of the mutual fund context pertains to the fact that the industry represents a knowledge-based environment, where highly skilled and talented portfolio managers are responsible for buying and selling securities, based upon

[4] The households owning mutual funds rose from 4.6 million to 52.5 million, and the number of shareholder accounts rose from just 12 million to about 265 million between 1980 and 2008. For more information on mutual funds http://www.icifactbook.org/

investment judgment and extensive financial research (e.g., Chevalier and Ellison, 1999). Whereas existing theoretical paradigms have been typically rooted in the Schumpeterian tradition of efficiency, economies of scales and manufacturing (Schumpeter, 1934), we know less about entrepreneurial processes in the post-industrial era, marked by legitimacy enhancement (DiMaggio and Powell 1983) and knowledge production (e.g., Bell 1973; Crook, Pakulski and Waters 1992). As a human capital-intensive environment, referred to as "a people-driven business" (Darragh, Dodig, and O'Hanley, 1997), asset management is uniquely suited to theorizing about the mechanisms of post-industrial entrepreneurship.

Compared to other knowledge-based industries, the mutual fund context offers another important advantage; because the industry is absent non-compete clauses, mobile fund managers are able to create new ventures (funds) not only inside but also, foremost, outside their parent companies. Consequently, entrepreneurial fund managers face two choices: they may create new funds inside, or they leave to start up a new fund externally.

Finally, studying mutual funds enhances the understanding of entrepreneurship in financial markets. Financial services have rapidly become a terrain fruitful for innovation and entrepreneurship, as numerous products, product categories, and free-standing ventures have been developed and marketed by individual and organizational actors (Davis, 2008; 2009). Moreover, the past two decades witnessed the emergence and proliferation of new financial industries, such as hedge funds, on-line brokerages, and free-standing mortgage firms. Despite the rapid growth of novel financial tools and

products, entrepreneurial mechanisms and agents behind them have received only a scarce scholarly attention. However, as financial services have grown to become larger in scale than ever before, spanning a wide range of products and services, the need to understand financial institutions and their expansive influence over the society has become evident (Davis, 2008; 2009). Therefore, by examining the creation of new ventures in the mutual fund context, this study tries to enhance the understanding of the mechanisms behind the recent expansion of financial markets.

Organizational Perspective on Mutual Funds

To uncover the entrepreneurial processes in financial services, it is first necessary to understand the structure and the functions of mutual funds. In many ways, funds are comparable to a typical organization in the United States; the "relevant" organizational unit is an investment company, also referred to as an "advisor," or a "management company." The majority of investment companies represent independent publicly traded or privately owned firms. The rest are either wholly owned subsidiary of financial services, such as banks and insurance companies, or independent securities broker-dealers, known as "fund distributors." Despite the rapid growth of the industry over the last two decades, most assets remain allocated in the hands of a few large independent investment companies - Fidelity, Vanguard, American Funds, T. Rowe Price, and Janus.[5] The single largest shareholder is the Fidelity family that offers more than 300 mutual

[5] The Investment Company Institute indicates that the holdings of the top fund families have not changed between 1985 and 2007, where the top 5 investment companies held, on average 35%, and the top 25 companies 73% of all industry assets.

funds.

Like in the case of Fidelity, new ventures are typically created by independent investment companies, whereby a single organization can launch multiple funds, each representing a strategic business unit with a separate legal entity, its own directors, and its own portfolio managers. Funds differ across the spectrum of investment styles, size, fees and expenses, region and industry specialization, as well as services provided to their owners. Broadly, each fund can be classified with respect to its investment objective as either equity or fixed-income (i.e. bonds). All funds are actively or passively managed. Active management involves buying and selling securities based upon economic, financial, and market analyses and investment judgment, whereas passive management requires that designated market indexes are matched in an attempt to achieve the same investment return as those indexes. The main objective behind the "indexing approach" is to reduce the risk that the fund will perform differently from the index. While some investment companies specialize predominantly in one type of funds (e.g., the Vanguard), most firms offer a broader array of fund types to their investors. Newly created funds may have a novel investment objective; for instance, a new fund may represent the first socially responsible fund in its parent family. Alternatively, a new fund may serve as an addition to an already existing category of funds; for example, a European fund may be the first in the category of equity funds. In cases, a new business division or a product line is created inside an established investment company.

A collection of funds bound together by a brand name, shared distribution

channels, research managers, and traditions represents a "fund family." While funds belonging to the same family are typically managed in-house by the founding investment company, the company may choose to outsource funds' management to a "sub-advisor" or an external management company. Figure 2 illustrates a structure of internally managed funds, whereby the investment company manages all its products in-house. Figure 3 presents the structure of outsourced funds, whereby the management of at least one of the two funds is contracted out to an external advisor. A seminal example of the fund family that contracts out to investment management companies is Vanguard, which outsources its active equity management to sub-advisors, such as the Wellington Capital. External fund management is more prevalent across smaller fund families that lack expertise required to manage newly launched funds. For this reason, the majority of funds continue to use in-house money management and to develop internal labor markets (Kuhnen, 2007).

Figure 2: Internally managed funds

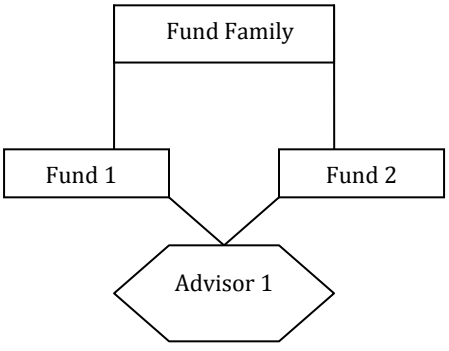
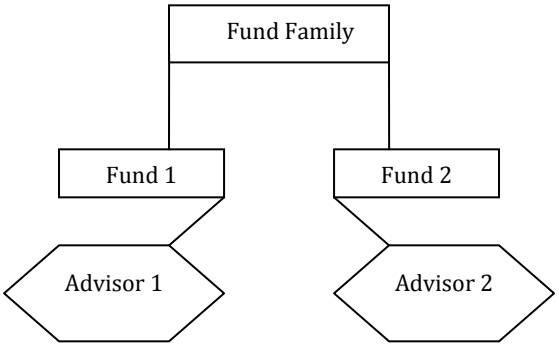


Figure 3: Sub-advised funds



Internal and External Entrepreneurship Choices in Mutual Funds

In the mutual fund industry, boundary choices can include several decisions. One way to demarcate an organizational boundary is to decide whether to manage funds internally, or contract them out to investment management, or else implement a mixture of the two. Boundaries can further be shaped by the decision regarding distribution channels – whether developed and owned by the company, or outsourced to a distributor outside. In my dissertation, I focus on yet another decision that pertains to a firm's boundary: the choice of a new product line. Specifically, I examine when the organization expands its product line by founding a new fund internally and when, by contrast, a new fund is founded outside via the departure of an entrepreneurial employee.

Highly skilled portfolio managers represent the engine behind the creation of both internal and external funds for several reasons. First, managers are uniquely positioned to access diverse internal and external information sources, which may stimulate the development of ideas for new fund strategies. For example, one of the most successful portfolio managers, the Fidelity's Peter Lynch, would "talk to dozens of company managers, brokers and analysts every day." [6] Creative portfolio managers typically face two conflicting alternatives; they may either launch their fund inside, or leave to exploit ideas for new ventures outside. From the perspective of entrepreneurial managers, these choices involve evident trade-offs.

There have been ample opportunities for portfolio managers to launch internal

[6] http://www.incademy.com/courses/Ten-great-investors/-Warren-Buffett/6/1040/10002

funds over the last two decades. Since their emergence, independent professional management companies have been the pioneers of entrepreneurship and innovation, allowing portfolio managers to develop new product lines across different kinds of securities (Lounsbury and Leblebici, 2004). As a result, the average number of funds under the supervision of a single manager increased from 1 in 1979 to 2.5 in 2006 (author's analyses). This suggests that a typical portfolio manager would oversee more than two funds in 2006, some of which could be attributed to the manager's entrepreneurial ideas. Informal interviews, conducted as a part of the study, provide evidence that fund managers play an important role in internal fund creation. One manager explained:

> "I came up with an idea to open a technology fund, when I realized that smaller high tech companies are an attractive buy for us. My fund turned out a big success, given the market conditions."

Because, in mutual funds, manager's profits are directly based on his on her performance, successful managers are able to derive substantial revenues even when developing a new venture inside. Maybe the most known example, the mastermind behind the Fidelity's Magellan - Peter Lynch - made millions of dollars, as his fund has grown from $18 million to $14 billion in assets between 1977 and 1990. Moreover, intrapreneurial portfolio managers face lower risk, when exploiting innovative ideas inside. Although portfolio managers experience high turnover rates, as they often are fired for below-the-market performance (Chevalier and Ellison, 1999), a decision to exploit innovative ventures internally is nevertheless associated with lower uncertainty;

in this process, risk is shared between the employer and the employee.

While portfolio managers derive substantial profits from internally launched ventures, they nevertheless contemplate an alternative trajectory of leaving to pursue ideas outside. Managers can walk out the door if they are unhappy," as they enjoy "great freedom of movement" (Darragh, Dodig, and O'Hanley, 1997). From the manager's perspective, external entrepreneurship offers several advantages. First, entrepreneurs may derive higher profits from their human capital, consistent with the findings showing the probability of entrepreneurial transition to increase for star analysts (Groysberg, Nanda, and Prats, 2007). For instance, in May 1996, Jeffrey Vinik, the head of Magellan – the Fidelity's flagship and then the largest actively managed mutual fund in the United States – left to open a hedge fund. His hedge fund, Vinik Partners, has earned a total return of 646% before fees since he launched it versus 110% for the S&P 500. As a result, Vinik and his two partners have pocketed around $800 million as their share of the fund's profits.

Another important factor that may underline the decision to leave the current employer is the quest for autonomy and discretion. Because portfolio managers are motivated by autonomy (Arvedlund, 2002), they search for environments allowing for greater discretion. Consistently, anecdotal evidence suggests that greater decision-making power and lower administrative constraints may have motivated portfolio managers to massively leave for less regulated hedge funds. George Hall, a hedge fund manager, describes it in the following way:

> "[Hedge funds] isolate what the manager actually does. His ability becomes picking stocks, not having to bother with the administrative trouble of putting 85% of his fund's stock into an index because he knows that if he doesn't attack the index pretty closely, he could lose his job."[7]

That portfolio managers value autonomy and discretion has further been reflected in the efforts of the investment companies to foster entrepreneurial culture in order to attract and retain prospective entrepreneurs. For example, Freedom Capital Management states,

> "Our firm encourages entrepreneurial thinking and debate. Each manager and analyst has high level of responsibility and control over making recommendations on securities" [8]

Similarly, another manager notes:

> "Our process allows us to test and challenge our assumptions amongst our colleagues from our value equity, growth equity and fixed income teams, avoiding the autocratic and bureaucratic limitations that may exist in other firms."[9]

Finally, Darragh and colleagues (1997) contend,

> "Virtually all entrepreneurial industries – from autos in the 1920s to software in the 1990s – have eventually reached a point where technical and functional excellence was no longer sufficient for success. Investment management is no different. The art is to design an organization that ensures professional management without impeding the flexibility and autonomy of existing talent to do what they are best at."

While externally launched funds may yield higher profits and help secure greater autonomy, they are inevitably associated with considerable financial and reputational

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[7] Source: Forbes, 2001.

[8] Source: Nelson's Directory of Investment Managers

[9] Source: Nelson's Directory of Investment Managers

risks. In a competitive asset management industry, entrepreneurial failure rates are high and individual actors often incur substantial losses. As described in the popular press:

> "When Gilbert's fund flamed out, he became paralyzed with depression, closed the curtains and refused to leave his bed. Wife Sharon was left to tell his team of 12 that they no longer had jobs, and to liquidate the firm." (Biggs, 2006: 56).

Conclusion

Overall, the mutual fund industry provides an excellent setting to uncover the mechanisms behind the manager's decision to exploit an innovative idea either inside or leave and pursue market opportunities outside. Highly skilled mutual fund managers play a central role in developing new funds internally and externally. As a result, creative managers are faced with an important choice that involves evident trade-offs: they may either deploy their efforts internally, or leave to found new ventures outside. By examining how portfolio managers decide between the conflicting trajectories, I hope to contribute to the development of the theoretical mechanisms that could be generalized to contexts outside the asset management. Given the knowledge-intensive nature of the industry, I expect my findings to be externally valid across other human-capital based contexts. Examples may include academia, film, and software industries. As the economy becomes increasingly dependent on an individual's talent, there is a growing need to understand the micro-level processes behind some fundamental phenomena, including innovation and entrepreneurship.

CHAPTER III: THE PRESENCE OF THE PAST: CAREER IMPRINTS AND ENTREPRENERUSHIP CHOICES

Abstract

In this chapter, I examine the impact of an individual's early career experiences on entrepreneurship choices. Whereas past work has documented the influence of career histories on entrepreneurial entry (e.g. Boeker, 1988; Brittian and Freeman, 1986; Carroll and Mosakowski, 1987; Higgins, 2005; Shane and Khurana, 2003), the question of whether and how formative experiences influence the direction in which organizational members choose to exploit their innovative ideas has received less attention. Moreover, past research has largely focused on the imminent characteristics of past employer to predict the probability of entrepreneurial transition; in contrast, I suggest that conditions present at the incipient stage of an individual's career, which I term *career imprints,* leave an indelible mark that continues to affect one's decisions and behaviors today. Specifically, I argue that an exposure to risk, discretion and entrepreneurial coworkers, early in one's career, increases the propensity of external rather than internal venture formation. As expected, *career imprints* have an effect on the future choice of entrepreneurial activity; I find that an early career exposure to risk increases the probability that nascent entrepreneurs deploy their efforts outside rather than inside. Moreover, organizational members whose early career coworkers founded new ventures

outside are more likely to transition to entrepreneurship in the future. Interestingly, higher rates of coworker-founded internal ventures do not predict an individual's entry into intrapreneurship. The imprinting effect is partially mitigated by a negative feedback (i.e., an actor's low performance), which suggests that adaptive learning is an integral part of the imprinting mechanism. Together, findings in the present study provide evidence that formative environments factor into an actor's decision-making model and that they should be considered to enrich the understanding of entrepreneurial choices.

Introduction

A well-established stream of research in sociology, organization theory, and entrepreneurship has related entrepreneurial transition to early career histories of potential entrepreneurs. There is ample evidence to suggest that entrepreneurial entry is influenced by educational and professional experiences that occur prior to a new venture founding (e.g., Boeker, 1988; Brittian and Freeman, 1986; Carroll and Mosakowski, 1987; Haveman and Cohen, 1994; Higgins, 2005; Higgins and Gulati, 2003; Shane and Khurana, 2003). A theme in this literature indicates that entrepreneurs are "organizational products" (Freeman, 1986) in that organizations provide a social setting, in which to acquire a range of resources that enable the identification and the pursuit of entrepreneurial opportunities. For example, past employers procure their would-be entrepreneurs with information (Freeman, 1986; Romanelli, 1989; Shane and Khurana, 2003), help build skills and social capital (e.g., Burton, Sørensen and Beckman 2002; Gompers, Lerner and Scharfstein, 2003; Higgins, 2005), and enhance confidence in one's

ability to found new organizations (Shane and Khurana, 2003; Sorenson and Audia, 2000). While organizations are considered as "breeding grounds" for entrepreneurs, certain organizational characteristics may hinder entrepreneurial transition. For example, a well-established finding relates organizational size, age, and the degree of bureaucratization to a lower probability of entrepreneurial entry, as these characteristics correlate with a limited exposure of organizational members to entrepreneurial opportunities (e.g., Dobrev and Barnett, 2005; Gompers, Lerner and Scharfstein, 2005; Sørensen, 2007a).

Although the theoretical and empirical link between an organizational context and entrepreneurial transition has been well established, the majority of studies consider only the imminent organizational characteristics and rarely examine the conditions present earlier in one's career. This neglect in the literature obscures our understanding of entrepreneurial processes for at least three reasons. First, the current theories have not taken into consideration inter-organizational mobility, even though talented workers move across organizations over the course of their careers, gaining exposure to a range of organizational practices, routines, and norms (Boeker, 1997; Pfeffer and Leblebici, 1973; Sørensen, 1999). Because highly mobile knowledge workers may work for multiple employers during their careers, our theoretical frameworks should incorporate the characteristics of both the incipient and recent employers.

Second, the existing accounts make an implicit assumption about the stability of organizational environments. However, in the fast-paced economy, focused on services

and innovation, organizations constantly change to adjust to the demands of the external environment (e.g., Eccles, Nohria and Berkley, 1992; Lawrence and Lorsch 1967; Scott, 1995; Weick and Quinn, 1999). In these fast-changing organizational environments, actors are likely to gain an exposure to an array of organizational characteristics, even if working for only one employer throughout their careers. Because early career experiences are likely to differ from the recent ones, both should be considered, when studying the impact of career histories on entrepreneurial decisions.

To examine the impact of formative experiences on entrepreneurship choices, I use a conceptual framework of social imprinting. Studies in sociology and social psychology have documented that formative experiences and founding conditions carry over to the later stages of an individual's career (e.g., Boeker, 1988; Fiske and Taylor, 1991; Stinchcombe, 1965). Specifically, research on social imprinting suggests that social actors have their cognitive schemata molded by formative experiences, which continue to guide one's future behaviors and decisions (e.g., Hall, 2004; Higgins, 2005). Based on this theory, I argue that an individual's formative career experiences will impact the choice between the pursuit of internal versus external ventures, shaping the nascent entrepreneurs' preferences, belief structures, and skills.

The present study builds upon and contributes to the work on career histories and entrepreneurial process (Brittain and Freeman, 1986; Higgins, 2005; Higgins and Gulati, 2003; Shane and Khurana, 2003). In contrast to other studies, focused on entrepreneurial entry, I theorize and empirically document the relation between career histories and the

decision to exploit an innovative idea either internally or externally. While previous studies have largely focused on understanding the characteristics of an imminent employer to predict the probability of entrepreneurial transition, I expand the current frameworks by taking into account organizational environments, experienced by an actor early in their career. More broadly, by specifying the imprinting conditions critical to the entrepreneurship choices, the study enriches our understanding of the micro-level mechanisms underlying the critical notion of organization's boundaries.

The rest of the paper is organized as follows. The first section presents the theoretical framework that examines how entrepreneurship choices are influenced by conditions present at formative stages of an individual's career. This section is followed by a section describing the methodology, sample, and variables. The subsequent section presents the main results, and several robustness checks. Finally, I discuss the implications and contributions in the concluding section.

Theory and Hypotheses

Career Imprints and Entrepreneurship Choices

Much evidence can be marshaled to support the claim that formative experiences and founding conditions cast a lasting imprint that continues to shape individuals and organizations over time (e.g., Stinchcombe, 1965). Social psychologists, for example, argue that belief structures and mind-sets are most susceptible to an influence during the incipient stages of the development. Conditions present during such stages contribute to the formation of cognitive schematas and knowledge structures regarding specific

concepts, events and entities (Fiske and Taylor, 1991). They help individuals orient themselves within their experiential terrain (Weick, 1979), leading to the utilization of knowledge that has already been stored.

Building on the imprinting logic, career scholars have further related the formation of professional norms, beliefs, and values to the developmental stages in one's career (e.g., Hall, 2004; Higgins, 2004; 2005); professional training or the nature of a work environment, early in the career, can cast an imprint on a social actor to guide his or her future behavior in the profession. Once the cognitive schemas and basic concepts have been developed, incoming information will be assimilated into the already existing knowledge structures. For example, Higgins (2004) argues that, at an early stage in their careers, young leaders are particularly vulnerable to the influence of the expectations and behaviors of others. Similarly, Bercovitz and Feldman (2006) find that individuals trained at institutions where the participation in technology transfer was actively practiced, adopted similar practices later in their careers. Sociologists of work have further documented that structural and technological changes would mark the experience and work trajectories of various cohorts in the labor force. For example, unemployment encoded and carried forward into the future, produced later effect on an individual's career trajectory (Abbott, 2005). Consistently, Ryder (1965) finds that various cohorts share cohort-specific differences resulting from common patterns of material resources, and similar social, political, economic, and labor force experiences. In his labor market study, Oyer (2007) shows that macroeconomic conditions present at the time of an

individual's entry into the labor market influence long-term outcomes, such as promotions patterns or future wages. Applied to the context of entrepreneurship choices, the imprinting logic suggests that conditions present at an early stage of an individual's career, will carry over into the future to affect the decision regarding internal versus external entrepreneurship.

If early career experiences influence entrepreneurship choices, the question arises as to the theoretical mechanisms operating behind this process. While a range of different mechanisms may be present, I build on the existing entrepreneurship literature to distinguish two main channels through which social imprinting should affect entrepreneurship choices: (1) an exposure to the social environment, and (2) an exposure the technical environment of the organization. This logic is based on the emerging line of inquiry that relates the transition to entrepreneurship to the attributes of a social context, in which entrepreneurs operate (e.g., Aldrich and Ruef, 2006; Aldrich and Zimmer, 1986; Carroll and Mosakowski, 1987; Saxenian, 1990; Shane, 2003). Broadly, research in this tradition suggests that the identification and the pursuit of opportunities for new ventures are contingent on the properties of the context. For example, peers define the informational and normative environments within which individuals reach the decision to become entrepreneurs (Nanda and Sorensen, 2008), while social capital facilitates entrepreneurial entry by structuring the opportunities and helping the acquisition of resources (e.g., Aldrich and Zimmer, 1986; Burt, 1992; Higgins, 2005). Because social and technical properties of the context influence the probability of entry to

entrepreneurship, I argue that both should affect entrepreneurial choice. Building on the entrepreneurship literature and the theories of social imprinting, I thus suggest that entrepreneurship decisions will be affected by (a) the past choices of coworkers, and (b) the amount of discretion and risk experienced at the onset of a social actor's career.

Coworkers' Influence

Building on the literature that documents the impact of a social context on entrepreneurial entry (e.g., Aldrich and Ruef, 2006), I argue that certain attributes of the social context at an early stage of the career, affect later decisions regarding the exploitation of novel ideas. Specifically, I focus on one aspect of the social environment – socialization with coworkers - and argue that early career exposure to coworkers will have a profound effect on the subsequent decisions regarding entrepreneurial choices. Coworkers may influence an individual's future behaviors in several ways. First, coworkers are likely to transmit norms and beliefs about the profession to newcomers (Ashforth and Saks, 1996; Merton and Rossi, 1957; Schein, 1983). For example, in her essay on leadership, Higgins (2004) argues that, at the early career stage, individuals are particularly vulnerable to the belief structures and norms held and communicated by coworkers. Norms acquired through coworker socialization have been further shown to impact a range of an individual's career-related choices, including the decision to engage in technology transfer (Bercovitz and Feldman, 2008), and in a range of other activities in the scientific community (Kenney and Goe, 2004; Louis, Blumenthal, Gluck, and Stoto, 1989). Hence, a nascent entrepreneur may learn about norms regarding internal and

external entrepreneurship through his or her coworkers. Second, an early career interaction with coworkers may profoundly contribute to the formation of an individual's skills. Social learning theories point to "similar others" as a valuable source of new knowledge and skills in the profession (Bandura, 1986; Duflo and Saez, 2000). Because one's coworkers often act as referents, nascent entrepreneurs are likely to acquire new skills and insights by observing the choices of their coworkers. Finally, coworkers may provide socio-emotional and instrumental resources (e.g., advice, other contacts) that allow to identify and pursue opportunities for either internal or external ventures.

Based on this logic, I argue that, as individuals become socialized into organizations with a high prevalence of coworker-founded internal ventures, they will be more likely to pursue entrepreneurial opportunities inside. Conversely, a higher rate of external coworker-founded ventures should increase the probability that a nascent entrepreneur founds a new venture outside. This leads to the following set of hypotheses:

> **Hypothesis 1a**: Higher rates of internal coworker-founded ventures in the actor's early career increase the probability that the entrepreneur will found a new venture inside in the future.
>
> **Hypothesis 1b**: Higher rates of external coworker-founded ventures in the actor's early career increase the probability that the entrepreneur will found a new venture outside in the future.

Risk and Discretion

In addition to the properties of the social context and the coworkers' past decisions more specifically, entrepreneurship choices may be affected by the organization's technical environment. Based on the literature investigating the determinants of entrepreneurial entry, I focus on the amount of risk and discretion present

in the parent organization as the properties of the technical environment relevant to entrepreneurship choices.

The literature defines risk as "the degree to which managers are willing to make commitments associated with a reasonable chance of costly failures" (Miller and Friesen, 1978: 923). There is ample evidence suggesting that tolerance for risk increases the probability of entrepreneurial entry (e.g., Khilstrom and Laffont, 1979; Knight, 1921; Moskowitz and Vissing-Jørgensen, 2002). Compared to a general population, entrepreneurs have been shown to frame situations in terms of opportunities rather than risks (Sarasvathy, Simon and Lave, 1998), and to have a higher risk-taking propensity, and lower uncertainty avoidance (Drucker, 1995; Stewart and Roth, 2001). Although other studies have found no differences (e.g., Palich and Bagby, 1995), there exists nevertheless considerable empirical evidence to document the role of risk-taking propensity in facilitating entrepreneurial transition.

Because the decision to pursue innovative ideas internally versus externally is associated with varying degrees of risk, risk would naturally factor into choice between inside and outside venture formation. Burgelman (1983) suggests that an internal venture development involves reputational and career risk, as managers are attracted by the perceived opportunity to become a general manager of an important new business in the corporation. However, the parent company may reallocate a failed entrepreneur to another task (Scharfstein and Gromb, 2002), thereby reducing the amount of risk associated with the pursuit of ideas inside. By contrast, entrepreneurial actors are alone

responsible for identifying and accessing indispensible resources, when leaving to found external ventures; therefore, external entrepreneurship is inevitably associated with higher uncertainty and the labor market risk. Consequently, actors with a stronger preference for risk should pursue entrepreneurial opportunities outside rather than inside.

In addition to risk, the entrepreneurial choice may be influenced by the desire for autonomy. Existing work has linked the probability of a new venture formation to an individual's need for autonomy and control (Halaby 2003; Hamilton, 2000; Moskowitz and Vissing-Jørgensen, 2002), where autonomy indicates an independent action of an individual who creates an idea or a vision for a new product (Lumpkin and Dess, 1996). Because internal and external ventures are associated with varying amounts of discretion conferred upon the founder, discretion represents a relevant aspect of the choice between internal and external entrepreneurship. Internally formed ventures impose a greater constraint on the founder, as intrapreneurs share the decision-making power with their employers. By contrast, external ventures provide entrepreneurs with more discretion, since the founders often become the owners of a new venture.

An exposure to discretion and risk in the organization at early stages in one's career may affect subsequent entrepreneurship choices in several ways. First, an exposure to risk and discretion may contribute to the formation of an individual's values and beliefs. Previous literature has provided ample evidence to establish the link between individuals' beliefs and values and entry to entrepreneurship (e.g., McClelland and Winter, 1969; Van de Ven, Hudson and Schroeder, 1984). For example, numerous

studies have emphasized an actor's risk-aversion (Knight, 1921), or the need for achievement (McClelland, 1961) to explain the decision to enter entrepreneurship. Moreover, individuals exposed to risk and discretion in the organization early in their careers, are more likely to develop skills that require an ability to manage higher risk and greater discretion.

Consequently, an early career exposure to risk and discretion- which I term imprinted risk and imprinted discretion respectively – will influence one's propensity to pursue entrepreneurial opportunities externally rather than internally. Specifically, an exposure to lower amounts of risk early in the career should increase the probability of internal more than external foundings, as imprinted individuals do not learn to manage risk and/or develop risk-averse preferences. Conversely, an exposure to greater risk early in the career will increase the probability of external more than internal founding, given that imprinted risk contributes to the formation of risk-favorable beliefs and skills to manage risk. This leads to the following hypotheses:

> **Hypothesis 2:** Imprinted risk will increase the probability of an external venture founding in the future, where imprinted risk represents the risk associated with tasks performed in the organization early in the actor's career.

Similar to risk preferences, an early exposure to discretion, which I term imprinted discretion, will enhance the formation of an individual's preferences for and/or skills to manage discretion and autonomy. Thus, individuals equipped with discretionary powers early in their careers, should pursue external rather than internal ventures in the future. Conversely, individuals exposed to lower amounts of discretion at the formative

career stages, will develop weaker preferences for discretion, and be more prone to pursue internal rather than external opportunities for new ventures. Hence, I hypothesize that:

> **Hypothesis 3:** Imprinted discretion will increase the probability of an external venture founding in the future, where imprinted discretion represents the discretion associated with tasks performed in the organization early in the actor's career.

Adaptive Learning Effects

When are nascent entrepreneurs most influenced by *career imprints*? I argue that the impact of *career imprints* on entrepreneurship choices is contingent upon an individual's learning. Adaptive learning theories posit that social actors actively revise prior behaviors and adapt their future decisions to feedback (e.g., Levitt and March, 1988; March and Olsen, 1975). In response to negative feedback from the external environment, individuals engage in adaptive learning that involves both behavioral and cognitive changes (Fiol and Lyles, 1985). In the context of the entrepreneurship choices, this theory implies that nascent entrepreneurs will make revisions in their beliefs and behaviors, when presented with negative feedback regarding the activities performed. Hence, individuals who receive negative feedback on the tasks high in discretion and risk early in the career, will be less likely to pursue entrepreneurial opportunities outside. Whereas feedback may take a variety of forms, one of its direct manifestations is an employee's performance. Using the conceptual frame of adaptive learning, I therefore expect the impact of imprinted risk and discretion on the probability of external venture

formation to be mitigated for less well performing managers. This leads to the following hypotheses:

> **Hypothesis 4a:** The impact of imprinted risk on the entrepreneurship choice will be weaker for less well performing actors.
>
> **Hypothesis 4b:** The impact of imprinted discretion on the entrepreneurship choice will be weaker for less well performing actors.

Methods and Analyses

Sampling

I use a sample of all mutual funds from the CRSP US Mutual Fund. The data available via CRSP are survivor-bias free, as they include information on both live and defunct funds. This study uses data collected for the period between 1979 and 2006, since the mutual fund industry grew rapidly over that period. The entire data amount to 8,313 unique funds and 8,014 unique fund managers – for the total of 569,946 month-manger observations. For the purpose of my study, the population of interest includes solely entrepreneurial portfolio managers – those who created new ventures either internally or externally.[10] I further use the TASS Database on hedge funds to crosscheck the names of portfolio managers and identify fund managers who left to start hedge fund families. The TASS Database tracks information on live and defunct hedge funds, and is free of survivorship bias. It provides the names of managers in charge of a given fund, as well as a set of financial characteristics, including monthly net asset value, fund inception date, and investment objectives. Managers whose name appears in both databases are

[10] For robustness, I consider the entire population of fund managers including non-entrepreneurs.

identified as those who depart from the mutual fund industry to start up a hedge fund company. I merge the CRSP and TASS data sets by the unique names of portfolio managers, including the first and the last name, and the middle initial. To further ensure identification, I check if the data on manager's appearance in the TASS database coincides with the date they last appear in the CRSP data base, and the date that a new hedge fund company is created. I supplement quantitative analyses with the semi-structured and informal but relevant interviews on a convenience sample of twenty-five fund managers. The interviewees were asked about the processes of internal and external fund formation, as well as the role of the school ties in shaping entrepreneurial choices of fund managers. These interviews provide support to my argument that fund managers, indeed, face the choices described above, and that their informal ties to school colleagues play an important role in affecting those choices.

Fund Manager Data

I collect data on managerial characteristics and career histories from several different sources. Part of the data is obtained from the Morningstar Mutual Funds OnDisc database that provides a list of managers, including names of all current and past managers, the dates when their tenures began and ended, and some biographic data, including academic institutions attended and managers' dates of graduation. A possible problem with the Morningstar database is that it reports data starting 1990 and provides biographic data for less than half of the universe of mutual fund managers, raising a potential concern of sample selection bias. Therefore, I update missing values using

hand-collected data. First, I supplement the list of fund managers with data obtained via CRSP. I further consult the Nelson directories on U.S. mutual funds that report extensive data on managers, mutual funds, and fund families. Additionally, I use multiple Internet sources, including publicly available SEC filings, mutual fund websites, and on-line career search engines (i.e., Zabasearch, LinkedIn, and ZoomInfo). Combining this set of different resources, I am able to obtain an extensive list of portfolio managers, dates of their tenures in each fund, year of each manager's birth, manager's gender, undergraduate and graduate institutions attended, and the year when the manager obtained a degree at each of the institutions attended.

Dependent Variables

External vs. Internal Choice. For each portfolio manager that forms a new venture, I create a variable equal to 1 if a new venture is created externally, and 0 if internally. External venture creation is defined as a departure of the fund manager to set up an external fund family that did not exist prior to the manager's departure. By contrast, internal fund creation involves opening a new fund inside the parent fund family. To mitigate the concern that the manager could be hired to supervise an internally created fund, I focus solely on those managers who have been employed by the family prior to the creation of the new fund within that family. Funds "outsourced" to an independent management company are excluded from the sample since it is unclear whether they should be classified as internally or externally founded. The variable is observed monthly.

Explanatory Variables

Although little theoretical guidance exists to demarcate the "imprinting period," I consider the first year of an individual's career as a relevant window of his or her formative experience, based on the anecdotal and research evidence suggesting the importance of the first year in the professional development (Higgins, 2004). I further perform the sensitivity analysis and find the results to be robust up to two years since the commencement of one's career.

Coworkers' Influence. To measure the coworkers' impact on entrepreneurship choices, I aggregate the number of internal ventures created by the focal manager's coworkers within the first year of the manager's career in the mutual fund industry. Similarly, I create a measure that sums external coworker-founded ventures. Both variables are time-invariant. For robustness, I divide the count of internally and externally coworker-founded ventures by the number of total coworkers in the firm. The results are robust to the alternative specification.

Imprinted Risk. Risk is operationalized as the standard deviation of manager's performance - to account for the extent to which the manager's stock choices diverge from the typical choices in the industry. To account for imprinting, I calculate the average amount of risk present in the firm during the manager's first year in the career. The measure is time-invariant.

Imprinted Discretion. Discretion is defined as the amount of decision-making control the manager has over the funds she or he supervises. Funds managed by multiple

managers have diffused decision-making processes and provide any single manager with less control over important decisions, such as the selection of stocks to buy or to sell. I first construct a variable that is equal to 1 divided by the number of co- managers supervising the focal fund for each manager in the firm. The measure takes values from 0 to 1, where higher values indicate that the focal manager has fewer co-managers and is, therefore, endowed with greater discretion.[11] To account for imprinting, for each portfolio manager, I calculate the average amount of discretion in the parent company during the first year of the manager's career. The measure is time-invariant.

Adaptive Learning. I measure manager's performance to proxy for the feedback. I use monthly total fund returns available via CRSP. Because portfolio managers are evaluated based on their skills to pick and sell stocks, fund return serves as the most direct measure of manager's performance. To account for negative performance, I create a dummy variable equal to 1 if the manager's performance falls into the bottom quartile in a given year and 0 otherwise. To allow for the market response to come into effect, I forward the performance measure one year into the future.

Control Variables

Recent Conditions. I control for a range of the recent organizational characteristics, one year prior to entrepreneurial choice. For each "imprinting" variable, I construct a corresponding variable measured one year prior to the entrepreneur's choice. Specifically, for imprinted risk, I include a measure of risk one year prior to an

[11] For managers supervising more than one fund, the variable is averaged across all funds that the manager supervises.

entrepreneurial choice. For imprinted discretion, I include a measure of discretion in the organization one year prior to the manager's entrepreneurial decision. The measures vary monthly.

I further control for various manager-specific characteristics that may influence the choice between internal and external venture formation. To that end, I account for manager's demographics, such as gender and age. Gender is inferred from the managers' first name and coded as 1 if male and 0 if female. I use various Internet search engines, such as the Zoominfo database and the on-line SEC filings to identify the masculine ("Mr.)" or the feminine ("Ms.") prefix for names with no clear corresponding gender. To account for age, I hand-collect data on the fund manager's dates of birth using various Internet search engines (e.g., LinkedIn, Zoominfo), and the existing databases (e.g., Morningstar and Nelson Directory of Investment Managers).

I further include various measures of human capital because the decision regarding the new venture locus may be influenced by managerial skills and talent. Past research has suggested that the risk of entrepreneurial transition increases with an individual's career experience, as individuals acquire resources and skills conducive to founding a new business (e.g., Higgins, 2005; Romanelli, 1989; Sorenson and Audia, 2000). Consequently, I control for the manager's industry tenure by counting the number of months the manager appears in the database. For robustness, I include a measure of organizational tenure (unreported) and find similar results.

In addition, I account for manager's performance. Prior research has documented that high performing knowledge workers found new organizations to derive returns on their human capital (Groysberg, Nanda, and Prats, 2007). I therefore expect that, compared to their counterparts, higher performing fund managers will tend to leave in pursuit of external ventures, as opposed to creating new funds inside. I measure manager's performance using monthly total fund returns available via CRSP – a standard performance measure used in the finance literature.

Moreover, I include a variable to account for size of the fund supervised by the focal manager. For managers who supervise more than one fund, an averaged fund size is calculated. Because fund's size indicates manager's ability to attract investment, I expect that portfolio managers who supervise bigger funds are better performers more likely to leave to create new organizations, as opposed to developing new ventures internally.

Furthermore, I control for the focal manager's human capital by including a measure of her formal education. Because nascent entrepreneurs with deeper educational backgrounds should have greater human capital, they may be more likely to create independent ventures, as opposed to deploying their entrepreneurial efforts inside the parent organization. Educational attainment is coded 1 if the focal manager received a bachelor's degree (BBA, or BA/BS), 2 if the manager eared MBA, MA/MS, or JD, and 3 if the manager obtained a PhD degree. In addition, I control formally for elite school education. Because elite schools graduates have been documented to more likely advance to executive positions inside organizations (Useem and Karabel, 1986), they may be

systematically exposed to differential opportunities regarding new venture creation. To measure elite school education, I create a binary variable equal 1 if the focal manager attended an Ivy League or received a degree from a non-Ivy League but an elite institution.[12] For robustness, I create a measure of Ivy League institutions only, and obtain similar results (unreported).

Another group of control variables takes into account firm-specific context that may affect entrepreneurship choices. Specifically, I account for organizational age, size and performance. Prior literature has shown that older and bigger organizations provide exposure to fewer entrepreneurial opportunities and that they equip organizational members with limited skills to create independent ventures (Dobrev and Barnett, 2005; Gompers, Lerner and Scharfstein, 2005; Sørensen 2007a). Consequently, I expect that individuals socialized in older and larger organizations will be less likely to develop external ventures. By contrast, larger and older organizations may offer more opportunities for internal venture formation (Schumpeter, 1950). To measure firm size, I use total assets under management, which represents a commonly used measure of fund family's size. For robustness, I include a count of all managers employed by the fund family. To measure firm age, I use the CRSP database to derive the age of the oldest fund in the family.

I further account for fund family performance. On the one hand, better performing organizations may equip their entrepreneurs with resources that facilitate the

[12] Based on the Useem and Karabel's (1986) list of elite schools, I consider Stanford, Northwestern, University of Michigan, University of California- Berkeley, University of California-Los Angeles, New York University, and University of Chicago as elite schools.

formation of independent ventures. For instance, Burton, Sørensen and Beckman (2002) find that entrepreneurs benefit from reputational and informational resources provided by their prior employers. On the other hand, highly performing organizations may be able to allocate more resources towards internal venture formation and provide their members with opportunities for internal venture formation. Firm performance is calculated as the average fund return for the focal fund family using a value-weighted approach. The value-weighted approach captures the total return by multiplying each family's return by its relative size in the family, and by taking the sum across all weighted fund returns inside the firm.

Finally, I control for market uncertainty. Because creating a new venture is associated with higher risk and uncertainty (Knight, 1921; Venkataraman, 1997), the probability of external entrepreneurship should decrease with unfavorable market conditions. Compared to external, internal ventures are associated with lower degree of risk, as the company is likely to cushion potential risk of failure by reallocating the failed entrepreneur to another task (Scharfstein and Gromb, 2002). Hence, under greater market uncertainty, entrepreneurial managers should deploy their efforts to create internal rather than external funds. I create the measure of market uncertainty using a financial formula to calculate market volatility for period *t* (Campbell, Lettau, Malkiel, and Xu, 2001).[13]

Empirical Analyses

[13] I use the following formula to calculate market volatility: $MKT_t = \sigma^2_{mt} \sum (R_{ms} - \mu_m)^2$ where μ_m is defined as the mean of the market return R_{ms} over the sample.

I use logistic regression models to estimate the effect of formative experiences on the decision to exploit innovative ideas either internally or externally. To address concerns related to unobserved heterogeneity and autocorrelation, firm-random effects are used. Because the logistic model excludes time-invariant variables when models with fixed effects are estimated, I use random effects. For robustness, I include manager-random effects to control for unobserved heterogeneity at the individual level. To control for economy-wide fluctuations, I include time-fixed effects. I further try to mitigate the problem of cross-sectional correlation, by clustering standard errors by the manager or the fund family. More specifically, I estimate the following model:

$$\Pr(O_{ijt} = 1) = F(\alpha_j + \beta_i + \delta_t + \gamma X + \varepsilon_{ik}),$$

where O_{ijt} is equal to 1 if the new venture is developed outside the fund family, and 0 if it is developed inside, α_j are school-fixed effects, β_i are firm-random effects, δ_t are time-fixed effects, X is the vector of the explanatory variables, and F(.) is the logistic function.

Results

Descriptive Statistics

Table 3.1 reports the descriptive statistics for the main variables. The total sample consists of 8,014 managers, of which more than a half (56%) create a new venture either internally or externally. This suggests that out of 8,014 portfolio managers, 3501 never engage in an entrepreneurial effort. Of those who self-select to entrepreneurship, 84% percent (3,794) create internal ventures, whereas 16% (719) choose to develop new funds

outside. Overall, the average fund manager is 44.6 years old and has 5.5 years of professional experience, which suggests that most fund managers have previous work experience before they begin to supervise a fund. Fund managers have, on average, 1.7 educational degrees. Interestingly, only 15% of all fund managers are females. The average size of the fund family is $40 billion and varies between $1 million and $1106 billion, and the average fund is 29 years old.

Insert Table 3.1 about here

Career Imprints: Multivariate Analysis

Table 3.2 presents the results estimated using logistic regression models to test the hypothesized effect of coworkers' past decisions on entrepreneurial choices. Model (1) includes the measure of coworkers' choices one year prior to the choice of the focal entrepreneur; it shows that the probability of internal rather than external venture formation increases with the number of coworkers who recently started internal funds. Model (2) tests the hypothesized relation between the coworkers' choices in the imprinting period and the manager's future entrepreneurship choices. The results show no empirical support for Hypothesis 1a, indicating that the rates of internal ventures founded by coworkers in the first year of one's career do not affect the future choice between internal and external venture formation. Models (3)-(4) report the results regarding the early career influence of coworkers for externally founded ventures. Model (3) shows the

estimates for the influence of coworkers' choices made one year prior to the decision of the focal entrepreneur. A positive coefficient on the main variable indicates that potential entrepreneurs are more likely to found new ventures externally, when their coworkers pursued outside ventures last year. Model (4) adds the imprinting variable; the results provide support for Hypothesis 1b, suggesting that higher rates of coworker-founded external ventures increase an individual's propensity to found new ventures outside rather than inside the parent organization.

Insert Table 3.2 about here

Table 3.3 presents the results estimated using logistic regression models to examine the hypothesized relation between the values (i.e., risk and discretion), imprinted on individuals during formative career stages, and the entrepreneurship choices. Model (1) shows the estimates for the impact of risk experienced by the manager one year prior to the entrepreneurial decision. A positive coefficient suggests that an exposure to risk increases the probability of an external rather than internal venture formation. Model (2) tests the hypothesis that imprinted risk should influence the future entrepreneurship choice in favor of the pursuit of innovative ideas outside. A positive coefficient on the imprinting measure indicates that fund managers are more prone to found new ventures externally, when imprinted with risk. Model (3) presents the estimates for a recent exposure to discretion. The results indicate a positive relation between a discretion

exposure one year prior to the entrepreneurship choice and the manager's decision to create an external venture. Model (4) accounts for the imprinting mechanisms. The coefficient on the imprinted discretion is insignificant, suggesting that imprinted discretion does not factor into one's future decision regarding entrepreneurship.

Insert Table 3.3 about here

Together, findings presented in Tables 3.2 and 3.3 provide some support for the impact of *career imprints* on an individual's entrepreneurship choices. As suggested, formative experiences influence the choice of an entrepreneurial activity via (1) an exposure to coworkers, and (2) risk and discretion in the organizational environment. The results demonstrate that the influence of coworkers' choices, early in an actor's career, holds solely for external ventures. By contrast, coworkers who pursued their ideas internally have no impact on the direction of the actor's future entrepreneurial choices. Finally, the hypothesized influence of imprinted discretion on the entrepreneurship choices received no support.

The results presented in Table 3.4 further report the effect of adaptive learning. Model (1) examines the hypothesized mitigating role of the low manager's performance on the relation between imprinted risk and the propensity to create a new venture externally. Contrary to the prediction, the coefficient on the interaction term is insignificant. Model (2) tests the moderating role of managerial performance on the

relation between imprinted discretion and the entrepreneurship choices. The results provide support for Hypothesis 4b, indicating that performance moderates the influence of imprinted discretion on the direction in which potential entrepreneurs choose to deploy their efforts. Specifically, I find that the impact of imprinted discretion on managerial propensity to found an external venture is mitigated for worse performers. This may suggest that upon receiving negative feedback on tasks high in discretionary powers, portfolio managers less likely to strive for autonomy and control later in their careers. Overall, these results provide partial support for the hypothesized impact of adaptive learning on the relation between *career imprints* and the entrepreneurial decisions.

Insert Table 3.4 about here

Alternative Explanations: Imprinting or Selection?

Although the theoretical framework presented in this paper suggests that early career experiences affect the choice between internal and external venture formation through the imprinting mechanisms, certain challenges need to be addressed. First, one could argue that a correlation between organizational characteristics and the entrepreneurship choices is spurious. A critical view may suggest that the observed imprinting characteristics of organizations proxy for differences in individual dispositions regarding entry to entrepreneurship. This would imply that individuals with different predispositions self-select into different types of organizations. For example, risk-averse

individuals will be more likely to self-select into low-risk work environments and low-risk tasks.

Whereas accounting for sorting processes in entrepreneurship is difficult and rarely achieved (e.g., Nanda and Sørensen, 2007; Sørensen, 2007a), I try to rule out the potentially spurious correlations in several ways. First, in the empirical models, I account for the imminent characteristics of the parent organization. If the observed correlations are driven by selection, individuals with certain traits should consistently self-select to organizations that match such traits. For example, risk-averse actors should consistently perform low-risk tasks. By including a control for most recent organizational characteristics, I offer a conservative test of the imprinting theory. If selection accounts for the observed correlations, recent organizational characteristics will be perfectly correlated with the past characteristics– consistent with the claim that individuals self-select into certain types of organizations that match their time-invariant preferences and traits. In this case, the estimates would be biased against any findings. However, to further address the possibility that the estimated career imprints are biased by unobserved heterogeneity in fixed individual characteristics, I adopt a random-effects strategy. Due to a nonlinear nature of the logistic function, manager-fixed effects would lead to an exclusion from the sample of those managers who only make one entrepreneurship choice, internal or external, over the course of their careers. Because such exclusion would produce biased estimates, I choose to use random effects to control for unobserved

heterogeneity at the manager level. The results, reported in Table A1 (see Appendix), are robust to the inclusion of manager-random effects.

Discussion and Conclusion

At the core of this chapter is the claim that impressionable experiences imprint individuals with a set of beliefs, norms, and skills that carry over to the future and impact the choices individuals make regarding entry into entrepreneurship. Specifically, the theoretical framework proposed in the study posits that formative experiences will affect the direction of entrepreneurial efforts via (1) the social environment of coworkers, and (2) an exposure to discretion and risk in the organization. Although the empirical results did not provide support to all hypothesized relations, the general pattern indicates that *career imprints* are central to our understanding of the entrepreneur's decision-making model. Imprinted risk, which indicates an early career exposure to risk, increases the probability of a transition to entrepreneurship outside rather than inside. Moreover, portfolio managers exposed to higher rates of coworker-founded external ventures are more likely to form new ventures outside, consistent with the studies that document the role of peer effects in facilitating entrepreneurial transition (e.g., Nanda and Sørensen, 2008). However, the choices of coworkers are influential only with respect to externally founded ventures. A plausible explanation for this finding may be that portfolio managers are affected by their coworkers' choices only in respect to more deviant courses of action. Because external venture formation is less frequent in the profession, the knowledge and skills transferred through entrepreneurial coworkers may be more valuable and more

central to the decision to exploit a new idea externally.

One surprising finding is that the mechanisms of adaptive learning received only weak empirical support. The theories of adaptive learning (e.g., Levitt and March, 1988; March and Olsen, 1975) predict that the impact of career choices on entrepreneurship decisions should be contingent on the feedback that an actor receives in response to his or her actions. However, the empirical results provide only partial support to this hypothesis; I find that negative feedback – operationalized as low performance of the portfolio manager – does not mitigate the effect of imprinted risk on entrepreneurial decisions. By contrast, consistent with my prediction, the impact of imprinted discretion on entrepreneurship choices is weaker for lower performers.

By examining the impact of the *career imprints* on entrepreneurship choices, this chapter makes a contribution to several research streams. First, my findings contribute to a richer understanding of how career histories affect entrepreneurial process (e.g., Boeker, 1988; Brittian and Freeman, 1986; Carroll and Mosakowski, 1987; Haveman and Cohen, 1994; Higgins, 2005; Higgins and Gulati, 2003; Shane and Khurana, 2003). Whereas prior research has largely focused on most recent conditions of the parent organization to predict entrepreneurial entry (e.g., Gompers, Lerner and Scharfstein, 2005; Higgins, 2005), my study documents the understudied role of formative experiences in affecting entrepreneurial processes. Specifically, I provide evidence that formative career stages imprint on nascent entrepreneurs certain belief structures, norms, and values regarding risk and discretion - which factor into their future decision-making

models. Moreover, contributing to the emerging interest in the social environments and entrepreneurship (e.g., Nanda and Sørensen), I provide evidence that early career socialization with entrepreneurial coworkers has an enduring impact on entrepreneurial entry. Finally, whereas the existing literature has focused on understanding how career histories influence entrepreneurial transition (e.g., Higgins, 2005; Shane and Khurana, 2003), and new ventures' growth (e.g., Higgins and Gulati, 2003), the present chapter enriches our knowledge by documenting the impact of career histories on the decision to found a new venture either inside or outside the parent organization. Findings presented in this chapter indicate that, compared to their counterparts, individuals who choose to found new ventures externally were exposed early in their careers to higher risk, higher discretion, and higher rates of coworker-founded outside ventures. More broadly, by uncovering the imprinting mechanism behind an individual's choice between internal and external entrepreneurship, the present research contributes to a deeper understanding of an individual's role in shaping the boundaries of the organization. The set of current findings offers powerful evidence that individuals – through their formative histories often exogenous to the attributes of the parent organization –can redefine the boundaries around that organization.

Table 3.1. Descriptive Statistics

Variables	Mean	SD	Min	Max
External vs. Internal Choice (1if external, 0 if internal)	0.160	0.366	0	1
Internal ventures founded by coworkers early in the actor's career	0.002	0.024	0	1
External ventures founded by coworkers early in the actor's career	0.002	0.024	0	1
Imprinted Risk (first year)	0.036	0.026	0	0.192
Imprinted Discretion (first year)	0.872	0.228	0.1	1
Performance Dummy (=1 for lowest performance quartile)	0.243	0.429	0	1
Manager's Discretion (1/fund co-managers' count)	0.654	0.305	0.04	1
Manager's Compensation (Assets*Expense Ratio)	18.63	52.04	0.012	665.1
Manager's Gender (1 if male)	0.855	0.305	0	1
Manager's Age	44.6	9.9	20	86
Manager's Performance (Fund return)	0.007	0.0334	-0.297	0.359
Fund Size (Total Assets)	1090.932	3876.915	.001	121527.3
Industry Tenure (Months)	50.97	51.74	1	375
Elite School Degree (0-1)	0.389	0.487	0	1
Highest Degree Earned	1.7	0.521	1	3
Firm Size (Assets)	40,782.0	114,425.	0.036	1,097,76
Total Fund Managers (Firm)	25.7	27.8	1	145
Firm Performance (weighted family returns)	0.008	0.047	-0.891	1.623
Firm Age (Oldest fund – month count)	28.67	21.47	1	81
Market volatility	0.040	0.018	0	0.266

Table 3.2. The Effect of Career Imprints on Entrepreneurship Choices: Coworkers' Influence

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)	(3)	(4)
Internal ventures founded by coworkers (count)	-93.299***	-92.993***		
	(9.308)	(9.446)		
Internal ventures founded by coworkers early in the actor's career (count)		1.765		
		(5.423)		
External ventures founded by coworkers (count)			14.857***	13.344***
			(4.168)	(4.204)
External ventures founded by coworkers early in the actor's career (count)				11.995***
				(1.428)
Manager's Discretion	0.236	0.218	0.184	0.064
	(0.279)	(0.282)	(0.263)	(0.267)
Manager's Compensation	-0.017***	-0.017***	-0.016***	-0.015***
	(0.005)	(0.005)	(0.004)	(0.004)
Manager's Gender	0.493	0.497	0.599*	0.565*
	(0.352)	(0.353)	(0.324)	(0.329)
Manager's Age	-0.030***	-0.028***	-0.025***	-0.024**
	(0.010)	(0.010)	(0.009)	(0.010)
Manager's Performance	13.309***	14.472***	16.209***	15.488***
	(2.847)	(2.958)	(2.929)	(2.952)
Fund Size	0.000**	0.000**	0.000***	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Manager's Industry Tenure	0.001	0.001	0.003**	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)
Elite School Degree	-0.320	-0.341	-0.449	-0.450
	(0.365)	(0.368)	(0.357)	(0.358)
Highest Degree Earned	-0.192	-0.206	-0.212	-0.146
	(0.179)	(0.182)	(0.172)	(0.175)
Firm Size (Total Assets)	-0.000**	-0.000*	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Firm Performance	-0.832	-1.155	-0.327	0.311
	(2.762)	(2.813)	(2.729)	(2.753)

Table 3.2. (contd.). The Effect of Career Imprints on Entrepreneurship Choices: Coworkers' Influence

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)	(3)	(4)
Firm Age	-0.023***	-0.022***	-0.020***	-0.020***
	(0.005)	(0.005)	(0.005)	(0.005)
Total Fund Managers (Firm)	0.006	0.005	0.012***	0.011***
	(0.004)	(0.004)	(0.004)	(0.004)
Market volatility	-13.783**	-13.610*	-18.909***	-19.853***
	(6.954)	(7.055)	(6.631)	(6.697)
Firm-Random Effects	Yes	Yes	Yes	Yes
School-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes
Observations	20577	20557	20577	20577

Standard errors in parentheses* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3.3. The Effect of Career Imprints on Entrepreneurship Choices: Risk and Discretion

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)	(3)	(4)
Firm Risk (average)	25.505***	22.698***		
	(4.947)	(5.126)		
Imprinted Risk (average)		7.191*		
		(3.830)		
Firm Discretion (average)			1.904***	1.958***
			(0.479)	(0.527)
Imprinted Discretion (average)				-0.099
				(0.401)
Manager's Discretion	0.205	0.198	-0.595*	-0.586*
	(0.267)	(0.269)	(0.339)	(0.341)
Manager's Compensation	-0.015***	-0.014***	-0.015***	-0.015***
	(0.004)	(0.004)	(0.004)	(0.004)
Manager's Gender	0.576*	0.574*	0.625*	0.622*
	(0.326)	(0.328)	(0.327)	(0.328)
Manager's Age	-0.021**	-0.017*	-0.022**	-0.022**
	(0.010)	(0.010)	(0.009)	(0.009)
Manager's Performance	15.216***	15.386***	16.302***	16.289***
	(2.898)	(2.933)	(2.978)	(2.978)
Highest Degree Earned	-0.248	-0.246	-0.193	-0.193
	(0.175)	(0.177)	(0.173)	(0.173)
Elite School Degree	-0.399	-0.294	-0.397	-0.409
	(0.364)	(0.367)	(0.354)	(0.357)
Manager's Industry Tenure	0.004**	0.003*	0.003*	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)
Fund Size	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Firm Size (Total Assets)	-0.000**	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Firm's Performance	-0.650	-0.536	-1.102	-1.073
	(2.750)	(2.768)	(2.746)	(2.748)
Firm Age	-0.021***	-0.020***	-0.022***	-0.022***
	(0.005)	(0.005)	(0.005)	(0.005)
Total Fund Managers (Firm)	0.008**	0.008**	0.011***	0.012***

Table 3.3 (contd.). The Effect of Career Imprints on Entrepreneurship Choices: Risk and Discretion

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(0.004)	(0.004)	(0.004)	(0.004)
Market volatility	-21.543***	-22.297***	-19.437***	-19.390***
	(6.702)	(6.815)	(6.587)	(6.588)
Firm-Random Effects	Yes	Yes	Yes	Yes
School-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes
Observations	20693	20673	20577	20577

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3.4. The Effect of Adaptive Learning on the relation between Career Imprints and Entrepreneurship Choices

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)
Imprinted Risk * Performance Dummy	7.616	
	(7.747)	
Imprinted Risk (average)	1.380	
	(6.368)	
Firm Risk (average)	22.625***	
	(5.150)	
Imprinted Discretion * Performance Dummy		-1.333*
		(0.685)
Imprinted Discretion (average)		0.909
		(0.625)
Firm Discretion (average)		1.898***
		(0.526)
Manager's Performance Dummy	-1.029***	0.051
	(0.370)	(0.481)
Manager's Discretion	0.216	-0.572*
	(0.271)	(0.342)
Manager's Compensation	-0.014***	-0.015***
	(0.004)	(0.004)
Manager's Gender	0.582*	0.651**
	(0.329)	(0.328)
Manager's Age	-0.014	-0.018*
	(0.010)	(0.009)
Manager's Performance	14.282***	14.871***
	(2.937)	(2.967)
Highest Degree Earned	-0.215	-0.177
	(0.178)	(0.174)
Elite School Degree	-0.262	-0.342
	(0.364)	(0.353)
Manager's Industry Tenure	0.003*	0.003*
	(0.002)	(0.002)
Fund Size	0.000**	0.000**
	(0.000)	(0.000)
Firm Size (Total Assets)	-0.000**	-0.000***
	(0.000)	(0.000)

Table 3.4 (contd.). The Effect of Adaptive Learning on the relation between Career Imprints and Entrepreneurship Choices

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)
Firm's Performance	0.069	-0.005
	(2.773)	(2.758)
Firm's Age	-0.020***	-0.023***
	(0.005)	(0.005)
Total Fund Managers (Firm)	0.009**	0.012***
	(0.004)	(0.004)
Market volatility	-22.531***	-19.009***
	(6.856)	(6.643)
Firm-Random Effects	Yes	Yes
School-Fixed Effects	Yes	Yes
Time-Fixed Effects	Yes	Yes
Observations	20555	20577

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

CHAPTER IV: INFORMAL SOCIAL TIES AND ENTREPRENEURSHIP CHOICES

Abstract

In this chapter, I propose that the entrepreneur's choice between internal and external venture formation is affected by formal organizational structures (i.e., incentive systems) and informal social structure extending beyond the parent organization. Using unique data on the mutual fund industry over the period 1979-2006, I show that the parent organization induces internal venture formation by providing fund managers with higher compensation and greater discretion. However, the impact of incentives is limited by the fund manager's informal social network of preexisting ties to her school colleagues. Specifically, I find that fund managers imitate previous entrepreneurship choices of other school network members. Additional analyses show that the effect of school ties is amplified by the spatial proximity of school network members, and is greater within same-gender school ties – providing support for inter-actor influences rather than common education. Together, the study offers a structural perspective on the choice between internal and external entrepreneurship and, therefore, the boundaries of the organization.

Introduction

Extensive sociological evidence exists to document the role of a social context in shaping the likelihood of entrepreneurial entry (e.g., Aldrich and Ruef, 2007; Aldrich and Zimmer, 1986; Nanda and Sørensen, 2008; Shane, 2003; Thornton, 1999 for review). Within the sociological approaches, a body of knowledge has accumulated to explore the key role of social networks in facilitating the emergence and the development of new ventures (see Stuart and Sorenson, 2007 for review). Numerous studies have related the founders' network position to a differential exposure to opportunities and resources central to new venture formation (e.g., Aldrich and Zimmer, 1986; Burt, 1992; Burt and Raider, 2002; Renzulli, Aldrich, and Moody, 2000). Despite the progress in the study of networks and entrepreneurship, we still know relatively little about the influence of social ties on the entrepreneur's choice to found a new venture internally or leave to pursue opportunities outside. A better understanding of the theoretical link between the actor's network position and his or her decision to stay put or leave is important not only for elucidating additional mechanisms behind entrepreneurial choices, but also for understanding the role of employees' networks in shaping organizational-level phenomena, such as organizational boundaries.

The present chapter builds upon past efforts and addresses their limitations by trying to forward the understanding of the structural effects on the choice of entrepreneurial activity. The study's main focus lies in understanding how the entrepreneurship choices are affected by an informal social structure, in which nascent entrepreneurs are embedded. Specifically, I argue that organizations, through their formal

structures (i.e., incentive systems), exercise only a limited influence over their members' selection into either internal or external entrepreneurship. A core point for the argument is that individuals' decisions are embedded in the informal social structure and influenced by social ties. Specifically, the study focuses on the role of school networks – social ties based on school affiliation – in shaping entrepreneurial outcomes, and proposes that variation in the characteristics of these networks impacts whether a new venture is formed inside or outside. Alumni networks represent a unique laboratory to examine the structural antecedents of organizational boundaries and document the role of informal social ties in determining how the conflicting choice between the entrepreneurial alternatives is made. More broadly, by examining the role of social networks in shaping the entrepreneurial choices, the present chapter contributes to a body of work focused on the relation between the properties of the founder's networks and the entrepreneurship process (e.g., Aldrich and Ruef, 2006; Aldrich and Zimmer, 1986; Sorenson and Audia, 2000; Stuart and Ding, 2006). However, in contrast to the existing studies largely focused on understanding the determinants of entrepreneurial transition, I establish a theoretical and empirical relation between informal social ties and entrepreneurship choices. Moreover, the present study represents one of the few to examine the joint impact of formal organizational structures and an informal social structure on the entry to entrepreneurship. More broadly, by specifying the structural conditions pertinent to the entrepreneurship choices, I provide additional evidence towards the role of social actors in redrawing organizational boundaries.

The rest of the paper is organized as follows. The first section presents the theoretical framework that examines how entrepreneurship choices are determined by *both* formal organizational structures (i.e., incentive systems) and an informal social structure. This section is followed by a section describing the methodology, sample, and variables. The subsequent section presents the main results, and various robustness checks. Contributions and implications are discussed in the concluding section.

Theory and Hypotheses

Formal Organization and Entrepreneurship Choices

I begin by suggesting that organizational context exerts a significant influence on whether organizational members transition to internal or external entrepreneurship. The notion that organizations exercise a great deal of control over actions and behaviors of their members carries through much of the classic work in organization theory and sociology. Weber (1924), for instance, paints a vivid imagery of an iron cage – a bureaucratic and rationalized organization that serves as a powerful tool to control the actions of the humanity. Similarly, other theories of organizations emphasize the benefits of formally prescribed decision hierarchies in orchestrating the actions and behaviors of their members (e.g., Thompson, 1967; Williamson, 1975). Although multiple dimensions of organizational structures may be relevant to evaluating the firm's impact on and control over the locus of entrepreneurial activity, I focus on formal incentive systems that constitute a part of broader formal structures of the organization, and examine how such structures shape the choice between internal and external venture formation. Because a

vast body of research focuses on understanding the individuals' motives and incentives behind entrepreneurial entry, a consideration of these incentives should also be important when probing the determinants of an individual's selection into different forms of entrepreneurship.

Standard theoretical approaches consider two motives as most pertinent to explaining an individual's decision to enter entrepreneurship. First, classical economic theories posit that the pursuit of profit represents the fundamental driver behind entrepreneurial entry (Kirzner 1973; Schumpeter 1942; Scitovszky 1943). Second, as suggested by more recent accounts, entrepreneurs are motivated by the desire to gain autonomy and decision-making control (Blanchflower and Oswald 1998; Blanchflower, Oswald and Stutzer, 2001; Hamilton, 2000). Applied to the context of entrepreneurship choices, these theoretical accounts suggest that, by adjusting internal incentives organizations will be able to influence the locus of entrepreneurial activity. Specifically, by providing the would-be entrepreneurs with higher levels of compensation and greater amounts of decision-making control internally, the parent firm should induce the formation of an internal venture and decrease the probability of a new venture to be formed externally.

An alternative view would suggest that highly compensated members of the organization are more likely to pursue external opportunities to found new ventures. Consistently, the existing research has documented that a relief from financial constraints increases an individual's propensity to enter entrepreneurship (e.g., Evans and Jovanovic,

1989). Stuart and Sorenson (2003) find, for instance, that liquidity events increase the risk of entrepreneurial entry by potentially attenuating the financial constraints of high-potential entrepreneurs. However, one may also expect that an increase in the level of compensation inside the organization will strengthen an entrepreneur's *ex-ante* incentives to deploy efforts internally, if everything else, including the potential outside profits, is equal. Consistent with this argument, economic literature emphasizes the beneficial impact of compensation on managerial motivation to work towards corporate goals, as the principal's and the agent's interests become effectively aligned (e.g., Jensen and Murphy, 1990).

Similarly, entrepreneurial actors may have stronger incentives to create new ventures internally rather than externally, when provided with greater amount of discretion by the parent organization. In this respect, the property rights theory illuminates the importance of an actor's control over inputs in sustaining her engagement and motivation in the transaction with another party (Hart and Moore, 1990). Therefore, as nascent entrepreneurs become endowed with a greater amount of discretion inside the organization, they should have stronger *ex-ante* incentives to pursue entrepreneurial opportunities inside.

In sum, formal organizational structures (i.e., incentives) may play an important role in influencing an entrepreneur's decision regarding the locus of a new venture. By providing their members with higher compensation and discretion – the fundamental motivating factors behind entrepreneurial entry – organizations will be able to increase

the rates of internally developed ventures and to decrease the probability that entrepreneurial individuals seek for opportunities for new venture formation outside. Hence, when compared to their external counterparts, intrapreneurs should be provided with higher compensation and greater discretion inside the organization. More formally,

> **Hypothesis 1:** Conditional on developing a new venture, higher compensation of an organizational member will increase the likelihood of internal rather than external venture founding.
>
> **Hypothesis 2:** Conditional on developing a new venture, greater discretion of an organizational member will increase the likelihood of internal rather than external venture founding.

Beyond Formal Organization: Informal Social Structure

Consistent with the theoretical perspectives that consider organizations as powerful systems of control, one might expect formal organizational structures, such as incentives systems, to exert much influence on an individual's selection to different forms of entrepreneurship. But entrepreneurship is also a social process and entrepreneurial actors often respond to a rich set of cues from their social environment. For instance, the preponderance of the evidence suggests that entry to entrepreneurship is importantly affected by the composition of an individual's peer group (e.g., Nanda and Sørensen, 2008), family endorsement (Sørensen, 2007b), or prior conduct of close associates (e.g., Stuart and Ding, 2006). The quintessentially social nature of entrepreneurship is further evident in a vast number of theoretical and empirical studies that relate the entrepreneur's ability to create new ventures to her position in a social structure; more specifically, the central role of networks at every stage of entrepreneurial process – from opportunity identification to resource mobilization – has been well

established (see Stuart and Sorenson, 2007; Thornton, 1999 for review). Therefore, to the extent that incentives of nascent entrepreneurs are embedded in an informal social structure (e.g., Granovetter, 1974; 1985), one might expect that the consideration of formal structures of the organization offers a limited account of the determinants of internal and external venture formation. Hence, a comprehensive theoretical account of entrepreneurship choices must incorporate an understanding of how these choices are shaped by the variation in the characteristics of nascent entrepreneur's informal social ties. Hence, informal social structures in which entrepreneurial actors are embedded may represent an important challenge to the formal organization in the context of entrepreneurship choices.

If an informal social structure is consequential for the decision regarding the locus of a new venture, the question arises, what is a theoretically relevant and empirically observable manifestation of such a structure? Naturally, entrepreneurs' motives and abilities may be influenced by different kinds of social ties, ranging from "strong" friendship networks that provide socio-emotional resources (e.g., Brüderl and Preisendörfer, 1998) to "weak" or "bridging" ties that transfer information across market participants (Burt, 1992; Granovetter, 1973; 1974). Because weak ties facilitate recruitment into the organization (e.g., Fernandez, Castilla and Moore, 2000; Fernandez and Weinberg, 1997; Granovetter, 1995) and provide mobility-related advantages (De Graaf and Flap, 1988; Granovetter, 1974), they may play an equally important role on "the way out," as entrepreneurial actors decide to leave in pursuit of external ventures.

While many examples of directly observed interpersonal ties could be cited, network theorists suggest that actors' participation in a common setting provides a sufficient base for the formation of a social tie (e.g., McPherson and Smith-Lovin, 1982). In a knowledge-based economy associated with a high level of skill and human capital, academic institutions represent a context in which actors typically interact early in their careers, as universities play an increasingly important role in equipping managers with skills and repertoires for managing (DiMaggio and Powell, 1983). Hence, I choose to focus on "school networks," – or affiliation ties developed through the actors' participation in the academic context. Albeit not extensive, there is some evidence that school networks play an important role in financial markets. Cohen, Frazzini and Malloy (2007; 2008), for instance, find that analysts outperform on their stock recommendations when they are tied to the company through school networks, and that portfolio managers place larger bets and perform significantly better on firms they are connected to through their school network. In addition, whereas the majority of existing studies relate the creation of new internal ventures and internal innovation to intra-organizational networks (e.g., Kogut and Zander, 1996), the impact of external ties on internal venture formation has been less well explored. Finally, while the majority of network studies in the entrepreneurial context notoriously suffer from endogeneity, school ties are less susceptible to this concern, given that they are formed prior to an individual's entry into the labor market. By focusing on exogenous school ties, I mitigate the concern of spurious correlation – a possibility that the properties of an individual's social networks

may proxy for the characteristics of an individual's parent organization.

An overview of the fund managers' educational backgrounds further suggests that school ties may be salient in the mutual fund industry. Consider, for example, that 28% of all fund managers hold an Ivy League diploma, even though there only are eight Ivy League institutions altogether. Although, in the United States, there are over 4,000 accredited academic universities, 40% of fund managers attended an "elite school" – which, in addition to Ivy Leagues, includes a number of other prestigious universities, such as Stanford, Northwestern, University of Michigan, University of California-Berkeley, University of California-Los Angeles, New York University, and the University of Chicago (Useem and Karabel, 1986). Because a disproportionate number of fund managers obtained their training at a relatively small number of similar academic institutions, one may expect these managers to be mutually acquainted or to have come into direct contact, during or after university education. While anecdotal evidence has long suggested the importance of school ties for individual and organizational outcomes, their role has remained relatively underexplored, with an exception of a handful of studies documenting the influence of school networks on labor markets (e.g., Saloner, 1985; Simon and Warner, 1992), or on strategic alliance formation (Siegel, 2007). To date, few studies, however, have examined whether and how school ties affect entrepreneurial choices and the creation of new organizations more broadly.

Although multiple mechanisms may be operative, I suggest that school networks are most likely to impact the choices of nascent entrepreneurs by serving as conduits of

social influence exerted across network members. There is a vast literature documenting the role of social proximity in triggering processes that mold the attitudes and behaviors of social actors (e.g., Burt, 1987; Coleman, 1964, Katz and Lazersfeld, 1955; Marsden and Laumann, 1984). Because common educational background represents an important dimension of sociodemographic proximity, attendance of the same academic institution should provide a sufficient condition for the ego to view network alters as socially comparable, and to use their behaviors as a frame of reference for subjective judgments. Socio-psychological mechanisms are particularly relevant to illuminating the impact of informal school ties on the choices of the nascent entrepreneur. Specifically, based on social comparison theory (Festinger, 1954), nascent entrepreneurs may "monitor" and compare themselves to other socially relevant members of the network. The referent choice frameworks further posit that individuals select similar others – often members of their networks – as referents (Kulik and Ambrose, 1992; Shah, 1998). Similarly, as predicted by the social learning theory, nascent entrepreneurs will refer to the behaviors of socially comparable school network alters to infer appropriate courses of action (Bandura, 1986), expecting similar payoffs from engaging in similar activities (Ellison and Fudenberg, 1993). The socio-psychological mechanisms rooted in the social comparison and social learning theories provide insights that are somewhat similar to those offered by structural and role equivalence (Burt, 1987; 1990; Sailer, 1978; Winship and Mandel, 1983) –whereby the members of the school network should perceive one another as playing similar roles in the social structure, or sharing similar types of

relations with other network members.

Whereas observation-based information exchange and social comparison processes may offer a sufficient condition to trigger inter-actor influences that shape entrepreneurial choices, it may also be that at least some members of the network are connected through interpersonal ties that diffuse private information and advice (e.g., Coleman, Katz, and Menzel, 1966; Katz and Lazarsfeld, 1955). However, even if person-to-person communication underlines the effect of the school network on an individual's entrepreneurship choices, the predictions would, nonetheless, be consistent with those formulated based on social comparison and observation-based influence. Nevertheless, qualitative evidence collected as a part of the study provides additional support for observation-driven social comparison mechanisms. As one manager noted,

> "I try to get a sense of what other folks from my university do. Did they get into a hedge fund business? And I think to myself, if they can succeed, I can succeed, too. After all, we all got the same degree, and we should get similar returns from it."

Together, these arguments suggest that nascent entrepreneurs will refer to and emulate the previous entrepreneurship choices made by their socially relevant peers – the members of their school network. Thus, as the number of network alters who previously created external ventures increases, nascent entrepreneurs will be more likely to create external rather than internal ventures. Similarly, an increase in the number of school colleagues who developed new ventures internally will increase the likelihood that the

manager subsequently develops a new venture inside rather than outside. Therefore, I hypothesize that:

> **Hypothesis 3a:** Conditional on developing a new venture, the probability of external venture formation increases with a larger number of school network members who founded external ventures.
>
> **Hypothesis 3b:** Conditional on developing a new venture, the probability of internal venture formation increases with a larger number of school network members who founded internal ventures.

School Ties or Common Skills?

Whereas theories of social influence predict that previous conduct of school network members should increase the probability that the ego engages in a similar behavior, an alternative explanation would point to the role of common education, given that academic institutions foster "the development of organizational norms among professional managers and their staff" (DiMaggio and Powell, 1983: 152). To mitigate this concern, I conduct additional tests. To the extent that network mechanisms account for the similarity of entrepreneurship choices across school network alters, the school ties' effect should increase with greater proximity of school network alters. On the other hand, if common education explains similarity of entrepreneurship choices, the proximity of school network alters would be irrelevant when assessing the impact of those alters on the ego's decision. To further evaluate these predictions, I focus on two dimensions of proximity: spatial and social.

There is much evidence to suggest that observation and interaction of social actors is facilitated across smaller geographic distances (e.g., Festinger, Schachter, and Back, 1950; Hedström, 1994). For instance, diffusion studies have documented that geographic

proximity facilitates the spread of innovation (e.g., Davis and Greve, 1997), and increases the likelihood of entry into a new market position (Greve, 1998). Therefore, if social influence transmitted through network ties underlines the similarity of entrepreneurship choices across same-university graduates, the effect of school ties should be stronger for spatially proximate network members. Relatedly, social influence and role modeling have been shown to increase across socially similar actors (e.g., McPherson, and Smith-Lovin, 1986; Rogers and Kincaid, 1981). There is evidence, for example, that social similarity of previous adopters facilitates the spread of a new practice (e.g., Rogers, 1983). Because social ties are typically homophilous with respect to gender (e.g., Marsden, 1988; McPherson, and Smith-Lovin, 1986), I expect the effect of school ties on entrepreneurship choices to be stronger within same-gender school ties. For example, if social influence transmitted through network ties accounts for the similarity of entrepreneurial choices across same-school graduates, we should expect a female graduate of Michigan to be influenced by the prior conduct of other females who graduated from Michigan more than by a similar conduct of male graduates of Michigan. More formally,

> **Hypothesis 4:** The influence of school ties on the ego's choice between internal and external venture formation will increase with greater spatial proximity of school network alters.
>
> **Hypothesis 5:** The influence of school ties on the ego's choice between internal and external venture formation will be stronger within same-gender ties.

Methods and Analyses

Sampling

I use a sample of all mutual funds from the CRSP US Mutual Fund. The data available via CRSP are survivor-bias free, as they include information on both live and defunct funds. This study uses data collected for the period between 1979 and 2006, since the mutual fund industry grew rapidly over that period. The entire data amount to 8,313 unique funds and 8,014 unique fund managers – for the total of 569,946 month-manger observations. For the purpose of my study, the population of interest includes solely entrepreneurial portfolio managers – those who created new ventures either internally or externally.[14] I further use the TASS Database on hedge funds to crosscheck the names of portfolio managers and identify fund managers who left to start hedge fund families. The TASS Database tracks information on live and defunct hedge funds, and is free of survivorship bias. It provides the names of managers in charge of a given fund, as well as a set of financial characteristics, including monthly net asset value, fund inception date, and investment objectives. Managers whose name appears in both databases are identified as those who depart from the mutual fund industry to start up a hedge fund company. I merge the CRSP and TASS data sets by the unique names of portfolio managers, including the first and the last name, and the middle initial. To further ensure identification, I check if the data on manager's appearance in the TASS database coincides with the date they last appear in the CRSP data base, and the date that a new hedge fund company is created. I supplement quantitative analyses with the semi-structured and informal but relevant interviews on a convenience sample of twenty-five

[14] For robustness, I consider the entire population of fund managers including non-entrepreneurs.

fund managers. The interviewees were asked about the processes of internal and external fund formation, as well as the role of the school ties in shaping entrepreneurial choices of fund managers. These interviews provide support to my argument that fund managers, indeed, face the choices described above, and that their informal ties to school colleagues play an important role in affecting those choices.

Fund Manager Data

I collect data on managerial characteristics and career histories from several different sources. Part of the data is obtained from the Morningstar Mutual Funds OnDisc database that provides a list of managers, including names of all current and past managers, the dates when their tenures began and ended, and some biographic data, including academic institutions attended and managers' dates of graduation. A possible problem with the Morningstar database is that it reports data starting 1990 and provides biographic data for less than half of the universe of mutual fund managers, raising a potential concern of sample selection bias. Therefore, I update missing values using hand-collected data. First, I supplement the list of fund managers with data obtained via CRSP. I further consult the Nelson directories on U.S. mutual funds that report extensive data on managers, mutual funds, and fund families. Additionally, I use multiple Internet sources, including publicly available SEC filings, mutual fund websites, and on-line career search engines (i.e., Zabasearch, LinkedIn, and ZoomInfo). Combining this set of different resources, I am able to obtain an extensive list of portfolio managers, dates of their tenures in each fund, year of each manager's birth, manager's gender, undergraduate

and graduate institutions attended, and the year when the manager obtained a degree at each of the institutions attended.

Dependent Variables

External vs. Internal Choice. For each portfolio manager that forms a new venture, I create a variable equal to 1 if a new venture is created externally, and 0 if a new venture is created internally. External venture creation is defined as a departure of the fund manager to set up an external fund family that did not exist before the focal manager's departure. By contrast, internal fund creation involves opening a new fund inside the parent fund family. To mitigate the concern that the manager could be hired to supervise an internally created fund, I focus solely on those managers who have been employed by the family prior to the creation of the new fund within that family. This variable is observed monthly.

Explanatory Variables

Formal Organizational Structures: Incentive Systems

Discretion. I measure manager's discretion by accounting for the amount of decision-making control she has over the funds supervised. Funds managed by multiple managers have diffused decision-making processes and provide any single manager with less control over important decisions, such as the selection of stocks to buy or to sell. For each manager, the variable is equal 1 divided by the number of co- managers supervising the focal fund. Therefore, the variable takes values from 0 to 1, where higher values indicate that the focal manager has fewer co-managers and is, therefore, endowed with

greater discretion.[15] For robustness, I use a binary variable coded 0 if the focal manager has no co-managers and 1 otherwise. The results are qualitatively similar (unreported).

Compensation. Although data on exact managerial compensation in the mutual fund industry is simply nonexistent, the finance literature commonly uses a proxy that represents the product of assets under manager's supervision and the expense ratio, where the expense ratio indicates the total investment that shareholders pay for the fund's operating expenses, including management fees or the compensation received by the manager. The assumption here is that manager's compensation increases with higher expense ratio and the size of the fund.

Informal Social Structure: School Ties

For each set of regressions, I create different independent variables that aim to test the effect of school ties on entrepreneurship decisions. Based on the network literature suggesting that social networks are often formed via group affiliation and membership rather than direct interactions (e.g., McPherson and Smith-Lovin, 1982), I consider any two managers as belonging to the same network if they graduated from the same academic institution. Therefore, I identify a school network by grouping fund managers who attended the same university and obtained at least one of the following degrees: BBA, BA, BSc, MBA, MA, JD, or PhD. Managers who graduated from more than one academic institution are members of more than one network. For example, a graduate of Stanford and Michigan is considered to be a member of both the Stanford and the

[15] For managers supervising more than one fund, the variable is averaged across all funds that the manager supervises.

Michigan networks. For robustness, I weigh the networks by cohort (managers who overlapped in their years of education); as indicated by the results (unreported), the effect is stronger within overlapping cohorts.

Network members' entrepreneurship choices. To test the hypothesized influence of past choices of school network members on the entrepreneurial choice of the focal manager, I create two measures – one for internal and the other for external ventures. First, I count the number of school network members who created external funds over the period of 12 months. I subsequently construct an internal venture measure by counting the number of school network members who created internal ventures over the period of 12 months. I further conduct a sensitivity analysis and lag the variable by one year and six months, for robustness. Both network variables are observed monthly.

Spatial Proximity. I measure spatial proximity based on the zip code in which a fund family is headquartered. I use the CRSP database to obtain a zip code corresponding to each fund family's headquarters. For externally created funds, I aggregate the number of school network members who developed external ventures in the past year, and who operate in the same zip code as the focal manager. I further construct a similar measure for internally created funds. For robustness, I use a fax area code (since most phone numbers listed in the database begin with "1-800") as well as the city name, and obtain similar results. The two variables are observed monthly.

Same-gender ties. To test whether the effect of school ties is amplified for same-gender ties, I count the network members who created external ventures and whose

gender is the same as that of the focal manager. I further construct a similar measure for internally developed ventures.

Control Variables

I first control for various manager-specific characteristics that may influence the choice between internal and external venture formation. To that end, I account for manager's demographics, such as gender and age. Gender is inferred from the managers' first name and coded as 1 if male and 0 if female. I use various Internet search engines, such as the Zoominfo database and the on-line SEC filings to identify the masculine ("Mr.)" or the feminine ("Ms.") prefix for names with no clear corresponding gender. To account for age, I hand-collect data on the fund manager's dates of birth using various Internet search engines (e.g., LinkedIn, Zoominfo), and the existing databases (e.g., Morningstar and Nelson Directory of Investment Managers).

I further include various measures of human capital because the decision regarding the new venture locus may be influenced by managerial skills and talent. Past research has suggested that the risk of entrepreneurial transition increases with an individual's career experience, as individuals acquire resources and skills conducive to founding a new business (e.g., Higgins, 2005; Romanelli, 1989; Sorenson and Audia, 2000). Consequently, I control for the manager's industry tenure by counting the number of months the manager appears in the database. For robustness, I include a measure of organizational tenure (unreported) and find similar results.

In addition, I account for manager's performance. Prior research has documented that high performing knowledge workers found new organizations to derive returns on their human capital (Groysberg, Nanda, and Prats, 2007). I therefore expect that, compared to their counterparts, higher performing fund managers will tend to leave in pursuit of external ventures, as opposed to creating new funds inside. I measure manager's performance using monthly total fund returns available via CRSP – a standard performance measure used in the finance literature.

Moreover, I include a variable to account for size of the fund supervised by the focal manager. For managers who supervise more than one fund, an averaged fund size is calculated. Because fund's size indicates manager's ability to attract investment, I expect that portfolio managers who supervise bigger funds are better performers more likely to leave to create new organizations, as opposed to developing new ventures internally.

Furthermore, I control for the focal manager's human capital by including a measure of her formal education. Because nascent entrepreneurs with deeper educational backgrounds should have greater human capital, they may be more likely to create independent ventures, as opposed to deploying their entrepreneurial efforts inside the parent organization. Educational attainment is coded 1 if the focal manager received a bachelor's degree (BBA, or BA/BS), 2 if the manager eared MBA, MA/MS, or JD, and 3 if the manager obtained a PhD degree. In addition, I control formally for elite school education. Because elite schools graduates have been documented to more likely advance to executive positions inside organizations (Useem and Karabel, 1986), they may be

systematically exposed to differential opportunities regarding new venture creation. To measure elite school education, I create a binary variable equal 1 if the focal manager attended an Ivy League or received a degree from a non-Ivy League but an elite institution.[16] For robustness, I create a measure of Ivy League institutions only, and obtain similar results (unreported).

Finally, for each manager, I control for the focal manager's network size. A larger school network may broaden the entrepreneur's opportunity structure and thus affect the choice between internal and external fund formation. To that end, I aggregate the number of managers who graduated from the same school as the focal fund manager. This variable is observed monthly.

Another group of control variables takes into account firm-specific context that may affect entrepreneurship choices. Specifically, I account for organizational age, size and performance. Prior literature has shown that older and bigger organizations provide exposure to fewer entrepreneurial opportunities and that they equip organizational members with limited skills to create independent ventures (Dobrev and Barnett, 2005; Gompers, Lerner and Scharfstein, 2005; Sørensen 2007a). Consequently, I expect that individuals socialized in older and larger organizations will be less likely to develop external ventures. By contrast, larger and older organizations may offer more opportunities for internal venture formation (Schumpeter, 1950). To measure firm size, I use total assets under management, which represents a commonly used measure of fund

[16] Based on the Useem and Karabel's (1986) list of elite schools, I consider Stanford, Northwestern, University of Michigan, University of California- Berkeley, University of California-Los Angeles, New York University, and University of Chicago as elite schools.

family's size. For robustness, I include a count of all managers employed by the fund family. To measure firm age, I use the CRSP database to derive the age of the oldest fund in the family.

I further account for fund family performance. On the one hand, better performing organizations may equip their entrepreneurs with resources that facilitate the formation of independent ventures. For instance, Burton, Sørensen and Beckman (2002) find that entrepreneurs benefit from reputational and informational resources provided by their prior employers. On the other hand, highly performing organizations may be able to allocate more resources towards internal venture formation and provide their members with opportunities for internal venture formation. Firm performance is calculated as the average fund return for the focal fund family using a value weighted approach. The value weighted approach captures the total return by multiplying each family's return by its relative size in the family, and by taking the sum across all weighted fund returns inside the firm.

Finally, I control for market uncertainty. Because creating a new venture is associated with higher risk and uncertainty (Knight, 1921; Venkataraman, 1997), the probability of external entrepreneurship should decrease with unfavorable market conditions. Compared to external, internal ventures are associated with lower degree of risk, as the company is likely to cushion potential risk of failure by reallocating the failed entrepreneur to another task (Scharfstein and Gromb, 2002). Hence, under greater market uncertainty, entrepreneurial managers should deploy their efforts to create internal rather

than external funds. I create the measure of market uncertainty using a financial formula to calculate market volatility for period *t* (Campbell et al., 2001).[17]

Model Specification

I estimate the effect of the formal incentive systems and school networks on the choice between internal and external venture formation by using logistic regression models and cluster standard errors by manager. Compared to alternative specifications, logit model allows for a direct comparison between internal and external entrepreneurs. It further helps mitigate important concerns related to the unobserved firm, and school characteristics, as well as economy-wide effects, via firm-fixed effects, school-fixed effects, and time-fixed effects. More specifically, I estimate the following model:

$$\Pr(O_{ijt} = 1) = F(\alpha_j + \beta_i + \delta_t + \gamma X + \varepsilon_{ik}),$$

where O_{ijt} is equal to 1 if the new venture is developed outside the fund family, and 0 if it is developed inside, α_j are school-fixed effects, β_i are firm-fixed effects, δ_t are time-fixed effects, *X* is the vector of the explanatory variables, and F(.) is the logistic function. For robustness, I use two alternative model specifications: the Cox proportional hazard model (Cox, 1972) of competing risks – that allows for multiple outcomes and measures the time duration until one of the types of a new venture (internal or external) is formed –

[17] I use the following formula to calculate market volatility: $MKT_t = \sigma^2_{mt} \sum (R_{ms} - \mu_m)^2$ where μ_m is defined as the mean of the market return R_{ms} over the sample.

and the multinomial logit model that allows for several categories of new ventures to be compared.[18]

Results

Descriptive Statistics

Table 4.1 reports the descriptive statistics for the main variables. The total sample consists of 8,014 managers, of which more than a half (56%) create a new venture either internally or externally. This suggests that out of 8,014 portfolio managers, 3501 never engage in an entrepreneurial effort. Of those who self-select to entrepreneurship, 84% percent (3,794) create internal ventures, whereas 16% (719) choose to develop new funds outside. In the present study, I randomly sample entrepreneurial portfolio managers to hand-collect data on their demographics, including educational background. The final sample used in the study consists of 1,744 internally and 427 externally created ventures for the total number of 2,171 of entrepreneurial fund managers.

Insert Table 4.1 about here

Formal Organizational Structure, Informal Social Structure and Fund Managers' Entrepreneurship Choices: Multivariate Analysis

[18] While useful, the Cox proportional hazard model is somewhat limited, as compared to the conditional logit; unlike the conditional logit, an event-history framework does not allow for firm-fixed effects estimator when subjects in the firm experience no more than one event. In the present setting, however, portfolio managers typically create an external venture only once. In the Cox analysis, I present robust variance estimates that adjust for clustering at the manager level.

Table 4.2 presents the results estimated using firm-fixed effects regression models to test the hypothesized effect of formal (i.e., incentives) and informal (school ties) structures on entrepreneurial choices. The results provide support for the hypothesized relation between discretion and entrepreneurship choices, consistent with property rights theory, which suggests that greater discretion strengthens individual's *ex-ante* incentives. A negative coefficient on the variable measuring discretion indicates that, relative to their counterparts, entrepreneurial fund managers endowed with greater discretion are more likely to develop new ventures inside than outside. Similarly, a negative coefficient on compensation indicates that an increase in the pay of fund managers will make it more likely for them to invest their efforts in creating new ventures inside than outside the parent organization.

The results are significant in magnitude. One standard deviation increase in the level of discretion will decrease the odds of the focal manager founding a new fund externally rather than internally by 17% (exp(-0.621*0.305)-1). Finally, one standard deviation increase in the level of managerial compensation will decrease the odds of the focal manager founding a new fund externally rather than internally by 31% (exp(-0.007*52)-1). Overall, the results reported in model 1 show that, by providing their entrepreneurial members with greater compensation and discretion, organizations are able to induce internal fund creation, and thus decrease the probability of entrepreneurial exodus of their employees.

Models (2)-(3) further report the results regarding the influence of school ties on the fund manager's entrepreneurial choice. Model (2) provides support for Hypothesis 3a indicating that entrepreneurial managers will set up external funds when a greater number of their school network members developed new funds outside in the previous period. Similarly, Model (3) demonstrates the effect of internal ventures developed by school network members on the focal manager's future choices. As predicted (Hypothesis 3b), the probability of internal fund formation increases with the number of school colleagues who previously created new funds internally. Model (4) shows the estimates for the two network variables (internal and external funds created by school network alters) together, while Model (5) adds an additional control – the size of the school network. The results reported in Model (5) demonstrate that the impact of school ties on entrepreneurship choices is independent of the network size.

It further merits note that the results are substantial in magnitude. The coefficients in Model (5) suggest that if one more member in the focal manager's school network created an external fund in the previous period, the odds of the focal manager founding an external rather than internal fund will increase by 90% (exp(0.647*1)-1). Alternatively, if one more member in the focal manager's school network created an internal fund in the previous period, the odds of the focal manager founding an external rather than internal fund will decrease by 22% (exp(-0.253*1)-1).

Additional results presented in Table 4.2 further report the impact of individual, organizational, and macroeconomic characteristics on fund managers' entrepreneurial

choices. With respect to manager-specific characteristics, the results indicate that men are more likely than women to create external funds (Model 1 and Model 3). Moreover, Models (1) - (5) show that the probability of external, as opposed to internal, fund creation decreases with manager's age, suggesting that old managers may prefer to pursue the development of less risky ventures inside the parent firm. Consistent with the literature indicating that talented individuals are more likely to leave to set up their own businesses (Groysberg, Nanda, and Prats, 2007), I find that the probability of external fund formation increases with manager's performance, as evidenced by Models (1) - (5). Contrary to the expected relation, the probability that a fund manager starts up an external fund decreases with her industry tenure (Models 2, 4 and 5). I further find that, compared to their counterparts creating new ventures internally, managers creating external ventures are more likely to have received elite school education (Models 1, 3, 4 and 5). However, the measure of the highest degree earned does not systematically predict the fund manager's choice between external and internal fund formation.

With respect to firm-specific characteristics, the results consistently indicate (Models 1-5) that larger organizations experience higher rates of inside than outside ventures, even though the coefficients have a low economic significance. Similarly, the coefficient on the number of fund managers inside the fund family provides some support that the individual's propensity for external, as compared to internal, venture formation decreases with organization's size (Models 1-3). Additionally, the findings indicate that the probability of internal rather than external fund formation increases with firm

performance (Models 1-5), while the prediction that older organizations will have a stronger influence on entrepreneurial choices finds no empirical support.

Together, these findings have important implications for the literature examining the impact of bureaucracies on entrepreneurial rates. Whereas most extant research documents that bureaucratic organizations reduce entrepreneurial rates by providing limited exposure to entrepreneurial opportunities (e.g., Dobrev and Barnett, 2005; Gompers, Lerner and Scharfstein, 2005; Sørensen , 2007a), an alternative explanation (supported in the present study) may be that large bureaucratic organizations "spawn" fewer external ventures because they are able to foster entrepreneurial activity inside.

Finally, consistent with the hypothesized relation between market uncertainty and entrepreneurship choices, the estimates show that the probability of internal vs. external fund formation increases as markets become more uncertain (Models 1-5). This finding validates the claim that entrepreneurs may perceive external venture formation as more risky and they may be, therefore, compelled to create external funds under lower market uncertainty.

Insert Table 4.2 about here

Whereas Table 4.2 presents the main model of the study, I perform several robustness checks. First, in additional analyses, I expand the main model to account for all the determinants of entrepreneurship choices. To that end, I include both imprinting

and social structure covariates. The results, estimated in the expanded model and reported in Table A2 (see the Appendix), are consistent with the findings reported separately in the first and the second study.[19] Second, the main population "at risk" is limited to entrepreneurs. Therefore, for robustness I additionally include non-entrepreneurial fund managers in the population at risk. I use the Cox proportional hazard model to examine the competing risks, as well as the multinomial logit model to test the hypothesized relations. The main results reported in Table A3 (see the Appendix) are robust to those alternative model specifications.

Table 4.3 further presents the results estimated using firm-fixed effects to test the moderating impact of geographic propinquity. The results presented in Table 4.3 provide support for Hypothesis 4, demonstrating that the school network effect is amplified with geographic propinquity of school network members. As illustrated by Model (1), the coefficient on the count of spatially close school network alters who created external funds is positive and significant, controlling for the total number of school alters who created new funds externally. Similarly, as evidenced in Model (2), the coefficient on the number of spatially proximate network alters who created new funds internally is negative and significant, even when controlling for the total number of network members who founded new funds inside. Model 3 illustrates the results when both measures of spatial propinquity are included. Together, these results indicate that the effect of school

[19] Because the expanded model includes time-invariant imprinting variables, the use of firm-fixed effects is limited. Instead, the concern of unobserved heterogeneity is mitigated via the inclusion of random effects.

ties is, indeed, amplified by spatial propinquity of the network members – and is, therefore, less likely to be explained by the influence of common education.

Insert Table 4.3 about here

Similarly, Table 4.4 presents regression results estimated using firm-fixed effects to test the prediction that the school network effect should be stronger within same-gender ties. As illustrated in Table 4.4, this hypothesis finds empirical support. The results provide support for Hypothesis 5, showing that the school network effect is amplified within same-gender school ties. Model (1) shows that the coefficient on the count of same-gender network alters who created external funds is positive and significant, controlling for the total number of school alters who created new funds externally. Consistently, Model (2) shows that the coefficient on the number of same-sex network alters who created new funds internally is negative and significant, when controlling for the total number of network members who founded new funds inside. Model 3 reports the results for both measures included. Overall, these results indicate that the focal fund manager is more likely to imitate the prior conduct of her school network members, when those members are of the same gender as the focal manager herself. The findings provide further support to the claim that the effect of school ties is due to network mechanisms rather than common educational experience.

Insert Table 4.4 about here

Robustness Tests - Alternative Explanations

Although the present study suggests that the locus of a new venture is shaped by the social influence of school network members, it may be that school ties simply proxy for other sources of social influence. First, based on the literature that documents the influence of co-workers on entrepreneurial transition (e.g., Nanda and Sørensen, 2008; Stuart and Ding 2006), we may expect that the effect of school network members proxies for the influence of co-workers. Second, extant research has demonstrated that the launch of new ventures in geographic proximity stimulates prospective entrepreneurs to follow, as they interpret the interest of others in the market as a signal of the market's munificence (e.g., Bikchandani, Hirschleifer and Welch, 1992; Sørensen and Sorenson, 2003). Hence, the observed impact of school network members may simply proxy for the regional rates of internally or externally created ventures. To account for those two additional sources of influence, I control for previous entrepreneurship choices of the focal manager's co-workers (i.e., managers employed by the same fund family), as well as for regional rates of internally and externally created funds.[20] The results in Table A4 (see the Appendix) indicate that school ties affect the manager's choice between internal

[20] New ventures are considered as being created in the same region when they are founded by managed employed by firms headquartered in the same zip code. For robustness, I use alternative definitions of geographic proximity, based on fax number area code, and city, and obtain similar results.

and external venture formation even after controlling for the previous choices of co-workers, and for the regional founding rates.

Moreover, it may be that the observed effect of school ties on the fund manager's entrepreneurship choices is driven by the number of ties inside and outside the parent organization. Because networks facilitate the identification of opportunities and mobilization of resources (e.g., Aldrich and Zimmer, 1986; Burt 1992; Freeman, 1986), a larger external school network may broaden the manager's opportunity set and yield greater social capital benefits (Burt, 1992, 1997; Lin, 1999), thereby increasing the likelihood of external rather than internal fund formation. Similarly, if informal networks help mobilize resources and reduce uncertainty inside the organization, managers may be more inclined to create internal rather than external ventures when tied to a larger number of alters inside the organization. In both cases, we might expect that the sheer number of school ties inside and outside the organization will account for the observed similarity of entrepreneurship choices across the network alters. In additional analyses, I therefore control for the number of the focal manager's school ties both outside and inside the parent organization. The results in Table A5 (see the Appendix) show that the primary effect of the school network is separate from the effect of network size inside and outside the organization. The results further illustrate that the size of external network is positively related to the likelihood of external rather than internal fund creation.

Discussion and Conclusion

To understand the conditions under which new ventures are created inside established organizations and when they are founded externally, this study focuses on a role of an individual in determining the locus of the new venture. Specifically, it proposes that nascent entrepreneurs often face the choice between creating a new venture inside and leaving in pursuit of a new venture outside. Although their decision regarding the type of entrepreneurial activity pursued is partially influenced by the nature of the organizational context through the formal incentive systems in place, the choice is also informed by the entrepreneur's informal social ties. I find that informal social ties to school colleagues impact entrepreneurial career trajectories by transferring information and serving as a referent group to nascent entrepreneurs. The school network effect is further amplified for geographically proximate same-gender ties, indicating that the impact of school networks is not driven primarily by common education – but, instead, it arises due to inter-actor influences transmitted through an informal social structure.

The study's findings further have important implications for the long-lasting debate about the locus of entrepreneurial and innovative activity. On one hand, starting with Schumpeter, scholars have argued that large established organizations represent the driving force behind technical progress, generating a permanent gale of creative destruction (Schumpeter, 1950). In this sense, the market structure consisting of large firms with a considerable degree of market power is "the price that society must pay for rapid technological advance" (Nelson and Winter, 1982: 114). On the other hand, small entrepreneurial firms are often considered the engines of technological progress and

radical innovation (Henderson, 1993; Tripsas, 1997). This line of research relates the inability of established firms to produce innovative output to corporate failure to either identify or assimilate emerging opportunities (Henderson, 1993; Tushman and Anderson, 1986). The present study contributes to the debate by emphasizing the role of socio-structural mechanisms that underline the locus of entrepreneurial activity, while previous approaches focused primarily on technological attributes of innovation and organizations.

An additional implication of the present study is that individual-specific informal social ties may represent a non-trivial challenge to the organization that strives to regulate and control its boundaries. Although organizations exert some influence on the choices of their members by providing appropriate incentives organizational impact is largely limited by the employees' informal social ties that, as evidenced in the study, may increase the probability of entrepreneurial exodus. A natural follow-up question would therefore be whether established organizations are able to internalize or respond to the "boundary challenge" posed by the social ties of their employees. To this end, the following empirical study examines if and under what conditions organizations cede greater rewards and provide stronger incentives to managers with larger external ties or ties to other entrepreneurs. More broadly, building on the present study, the following study evaluates the implications of the value of the employee's social ties to the firm. Although employees' networks have been typically considered a valuable asset to the parent organization, the present study provides an initial step towards challenging this

assumption, by demonstrating the role of informal employees' networks to reduce the organization's control over its boundaries.

Relatedly, the current study offers other opportunities for future research. With the extensive and detailed data on mutual funds, many prevailing questions about entrepreneurial process and the emergence of new organizations could be addressed. For instance, directly extending the current findings, one could examine how the social influence transmitted through informal ties at the time of venture founding impacts new venture's future performance and survival. On the one hand, funds created under the social influence of network alters should outperform their counterparts if informal school ties signal the presence of entrepreneurial opportunities difficult to identify by network outsiders. On the other hand, nascent entrepreneurs may imitate the previous choices of their school network alters even if opportunities for profit have already been depleted. Hence, in additional analyses, I examine this question empirically by testing the effect of school ties on the new fund performance and survival. Consistent with the second hypothesis, the results (unreported) indicate that funds created under the social influence of school network members are more likely to experience negative future performance and shorter survival times.

A number of additional suggestions for further research relate directly to the limitations of the study. First, isolating the specific operative mechanisms underlying the observed network effect represents an empirical challenge. Although some qualitative data collected as a part of this study indicate that school ties trigger social comparison

processes and exert attitudinal influence on the focal manager, it remains possible that the observed effect arises due to direct social ties that carry information and resources.

To further tease out the mechanisms underlying the observed similarity of entrepreneurship choices, I conduct additional analyses. First, if the effect arises due to observation and social comparison processes, we should expect this effect to be stronger for more visible portfolio managers. An empirical test of this hypothesis requires specifying the conditions under which entrepreneurial portfolio managers belonging to the same school network vary with respect to their visibility. I consider several such conditions. First, entrepreneurial portfolio managers should be more observable when operating in visible cities. Perhaps the most visible location for individuals working in financial services is New York, where a majority of financial service organizations are headquartered. Therefore, if observation-based emulation rather than direct information exchange underlines the school network effect, we should expect that entrepreneurial choices of managers operating in New York will have a stronger effect on the conduct of their school network members than the choices of non-New-York managers. For instance, a Michigan manager located in San Francisco should be influenced by the conduct of a Michigan manager operating in New York more than by a comparable conduct of another Michigan manager operating in Dallas. To test this hypothesis, I create a measure that counts the number of managers who fulfill the following conditions: (1) they belong to the focal manager's school network, (2) they have created an either internal or external fund in the past period, and (3) they are employed by fund

families headquartered in New York. The results (unreported) indicate that the network effect is, indeed, amplified for entrepreneurial managers operating in New York; I find that portfolio managers are more likely to follow the choices of their school network members, when those members operate in New York. Hence, these results provide some support for the hypothesis suggesting that observation-based emulation, as opposed to a direct interpersonal exchange of information, underlines the influence of the school network on entrepreneurship choices.

In further analyses, I examine one additional condition under which portfolio managers should be more visible to their network alters – the size of the fund under manager's supervision. Because the size of the fund typically indicates managerial ability to attract investors, managers supervising funds with larger assets are more likely to be recognized for their talent and be therefore more salient. Hence, if social influence and social comparison underlines the impact of school ties on entrepreneurship choices, the effect should be stronger for entrepreneurial portfolio managers supervising bigger funds. An empirical test of this interaction term (unreported) provides support for the hypothesis, indicating the network effect to be amplified for managers supervising a larger portion of financial assets.

Finally, an additional question arises as to a possible influence of adaptive learning on the network effect. Specifically, based on the theories of adaptive learning, (e.g., Levitt and March, 1988; March and Olsen, 1975) one could expect nascent entrepreneurs to emulate only the successes of their network members. This would

further imply the school network effect to be mitigated for those members who failed or underperformed when founding new ventures. In additional analyses (unreported), I check for this possibility by including an interaction term. The results, however, are not significant indicating that nascent entrepreneurs are less likely to take into consideration or learn from the successes and failures of their school network members. One possibility may be that entrepreneurship choices made by the school network members are more salient to nascent entrepreneurs than the new ventures' subsequent successes or failures. An alternative explanation may be that, while school network members share experience and information regarding new venture founding, information regarding failures is less likely to be transmitted through the network of school colleagues.

Using the context of the mutual fund industry, this study takes a structural perspective to investigate the conditions under which entrepreneurial actors create internal ventures and when, by contrast, they leave in pursuit of entrepreneurial opportunities outside established organizations. I provide evidence that informal social ties to school network alters influence entrepreneurship choices by serving as the conduits of social influence. Together, findings presented in this chapter enrich our understanding of how social actors - whose interests and incentives are deeply embedded in the informal social structure – shape the boundaries around organizations.

Table 4.1 Descriptive Statistics

Variables	Mean	SD	Min	Max
External vs. Internal Choice (1if external, 0 if internal)	0.160	0.366	0	1
School network members creating external funds (count)	1.631	2.207	0	14
School network members creating internal funds (count)	3.807	5.304	0	20
Manager's Discretion (1/fund co-managers' count)	0.654	0.305	0.04	1
Manager's Compensation (Assets*Expense Ratio)	18.63	52.04	0.0122	665.1
Manager's Gender (1 if male)	0.855	0.305	0	1
Manager's Age	44.6	9.9	20	86
Manager's Performance (Fund return)	0.007	0.0334	-0.297	0.359
Fund Size (Total Assets)	1090.932	3876.915	.001	121527.3
Industry Tenure (Months)	50.97	51.74	1	375
Elite School Degree (0-1)	0.389	0.487	0	1
Highest Degree Earned	1.7	0.521	1	3
Firm Size (Assets)	40,782.02	114,425.4	0.036	1,097,765
Total Fund Managers (Firm)	25.7	27.8	1	145
Firm Performance (weighted family returns)	0.008	0.047	-0.891	1.623
Firm Age (Oldest fund – month count)	28.67	21.47	1	81
Market volatility	0.040	0.018	0	0.266

Table 4.2. The Logit Model of Internal vs. External Entrepreneurship Rates

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(2)	(3)	(4)	(5)
School network alters creating external funds (count)	0.565***		0.604***	0.647***
	(0.058)		(0.062)	(0.069)
School network alters creating internal funds (count)		-0.241***	-0.278***	-0.253***
		(0.035)	(0.038)	(0.041)
School network size				0.012*
				(0.008)
Manager's Discretion	-0.725**	-0.777**	-0.615*	-0.621*
	(0.323)	(0.311)	(0.332)	(0.333)
Manager's Compensation	-0.005*	-0.005*	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)	(0.003)
Manager's Gender (male)	0.342	0.648**	0.307	0.300
	(0.411)	(0.395)	(0.413)	(0.413)
Manager's Age	-0.018*	-0.013**	-0.013**	-0.011**
	(0.011)	(0.011)	(0.012)	(0.012)
Manager's Performance	7.806***	6.097**	6.948**	6.802**
	(2.714)	(2.474)	(2.751)	(2.761)
Fund Size	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Manager's Industry Tenure	-0.004**	-0.002	-0.003*	-0.003*
	(0.002)	(0.002)	(0.002)	(0.002)
Elite School Degree	0.374	1.085***	0.745*	0.909**
	(0.407)	(0.364)	(0.429)	(0.442)
Highest Degree Earned	0.098	0.128	0.061	0.035
	(0.188)	(0.184)	(0.198)	(0.199)
Firm Size (Total Assets)	-0.000***	-0.000**	-0.000***	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Total Fund Managers (Firm)	-0.024*	-0.023*	-0.022	-0.021
	(0.014)	(0.013)	(0.014)	(0.014)
Firm Performance	-5.066*	-4.540*	-4.921*	-4.608*
	(2.739)	(2.582)	(2.781)	(2.788)
Firm Age	0.009	0.017	0.014	0.015
	(0.016)	(0.014)	(0.016)	(0.016)
Market volatility	-20.225***	-21.004***	-20.355***	-20.224***
	(7.024)	(6.793)	(7.289)	(7.297)
Firm-Fixed Effects	Yes	Yes	Yes	Yes
School-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes
Observations	2171	2171	2171	2171
Pseudo R-squared	0.27	0.21	0.32	0.33

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4.3. The Logit Model of Internal vs. External Entrepreneurship Rates (Geographic proximity)

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)	(3)
School network alters creating external funds (count)	0.435***		0.508***
	(0.097)		(0.100)
Spatially prox. alters creating external funds (count)	4.558***		4.611***
	(0.341)		(0.372)
School network alters creating internal funds (count)		-0.334***	-0.380***
		(0.046)	(0.076)
Spatially prox. alters creating internal funds (count)		-0.003***	-0.001**
		(0.001)	(0.002)
Manager's Discretion	-0.319**	-0.902***	-0.338**
	(0.522)	(0.315)	(0.547)
Manager's Compensation	-0.004*	-0.005*	-0.005
	(0.005)	(0.003)	(0.005)
Manager's Gender (male)	-0.301	0.632	-0.277
	(0.683)	(0.394)	(0.732)
Manager's Age	-0.007**	-0.015**	-0.001*
	(0.020)	(0.011)	(0.022)
Manager's Performance	8.524**	6.471***	6.556
	(4.029)	(2.486)	(4.282)
Fund Size	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)
Manager's Industry Tenure	-0.005*	-0.003**	-0.004**
	(0.003)	(0.002)	(0.003)
Elite School Degree	0.039	0.994***	0.707
	(0.642)	(0.364)	(0.695)
Highest Degree Earned	0.086	0.155	0.183
	(0.311)	(0.185)	(0.338)
Firm Size (Total Assets)	-0.000*	-0.000**	-0.000
	(0.000)	(0.000)	(0.000)
Total Fund Managers (Firm)	-0.022	-0.023*	-0.026
	(0.021)	(0.013)	(0.022)
Firm Performance	-3.374	-5.257**	-3.519
	(4.769)	(2.646)	(4.951)
Firm Age	0.046**	0.015	0.063***
	(0.022)	(0.014)	(0.024)
Market volatility	-19.828*	-21.389***	-22.006*
	(11.393)	(6.827)	(12.309)
Firm-Fixed Effects	Yes	Yes	Yes
School-Fixed Effects	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes
Observations	2171	2171	2171
Pseudo R-squared	0.72	0.22	0.76

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4.4. The Logit Model of Internal vs. External Entrepreneurship Rates (Same-gender Ties)

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)	(3)
School network alters creating external funds (count)	0.214**		0.075**
	(0.104)		(0.116)
Same-gender alters creating external funds (count)	0.495***		0.876***
	(0.136)		(0.154)
School network alters creating internal funds (count)		-0.043**	-0.005**
		(0.041)	(0.025)
Same-gender alters creating internal funds (count)		-0.334***	-0.564***
		(0.070)	(0.068)
Manager's Discretion	-0.762**	-0.803***	-0.738**
	(0.302)	(0.292)	(0.324)
Manager's Compensation	-0.005*	-0.004	-0.006**
	(0.003)	(0.003)	(0.003)
Manager's Gender (male)	0.004	1.259***	0.506
	(0.416)	(0.426)	(0.450)
Manager's Age	-0.020*	-0.015*	-0.017*
	(0.011)	(0.011)	(0.012)
Manager's Performance	7.088***	6.300**	6.094**
	(2.712)	(2.558)	(2.885)
Fund Size	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)
Manager's Industry Tenure	-0.002	-0.000	-0.001
	(0.002)	(0.002)	(0.002)
Elite School Degree	0.063	1.031***	0.534
	(0.394)	(0.349)	(0.428)
Highest Degree Earned	0.109	0.082	0.006
	(0.183)	(0.180)	(0.201)
Firm Size (Total Assets)	-0.000***	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)
Total Employees	-0.023	-0.026*	-0.027
	(0.021)	(0.013)	(0.022)
Firm Performance	-4.147*	-4.006*	-3.687*
	(2.608)	(2.424)	(2.734)
Firm Age	0.013	0.034***	0.023
	(0.014)	(0.013)	(0.015)
Market volatility	-17.202***	-7.751*	-12.820***
	(4.671)	(4.218)	(4.971)
Firm-Fixed Effects	Yes	Yes	Yes
School-Fixed Effects	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes
Observations	2171	2171	2171
Pseudo R-squared	0.23	0.17	0.34

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

CHAPTER V: IF YOU LEAVE ME NOW… ORGANIZATIONAL RESPONSE TO ENTREPRENEURSHIP CHOICES

Abstract

In this chapter, I examine if and how entrepreneurship choices affect parent organizations. While a stream of research has contributed to the understanding of a range of outcomes pertaining to spin-offs founded via entrepreneurial departures (e.g., Brittian and Freeman, 1980; Higgins and Gulati, 2003; Phillips, 2002), how entrepreneurial defections impact, in turn, established organizations has been less well understood. Therefore, in the present study, I ask the following question: How do entrepreneurship choices impact parent organizations? Whereas prior work has documented the effect of spin-offs on firm's performance (Phillips, 2001), knowledge losses (Agarwal, Echambadi, Franco, and Sarkar, 2004), and knowledge gains (Corredoira and Rosenkopf, 2008), I examine whether and how entrepreneurial choices influence the internal structures of established organizations. Specifically, I study if organizations adapt their incentive structures in response to the risk of entrepreneurial departures. Findings suggest that employers affected by a greater risk of entrepreneurial defections are more likely to subsequently strengthen their internal incentive systems to retain potential entrepreneurs. I further find empirical support for the power-dependence mechanisms, underlying the observed relation; the results indicate that organizational performance and scope mitigate

the firm's propensity to strengthen its internal incentive structures, following an increase in the threat of entrepreneurial exits. Together, these results provide a fruitful insight into our understanding of how established organizations – and specifically, their internal structures – are determined by the entrepreneurship choices of the social actors in these organizations.

Introduction

How do entrepreneurial choices affect parent organizations? To date, there has been an increasing interest in spinoffs - their structures, life chances (e.g., growth and survival), and strategic benefits that accrue to them via parent companies (e.g., Burton, Sørensen and Beckman 2002; Higgins and Gulati, 2003; Klepper, 2001; Klepper and Thompson, 2006; Phillips, 2002; Sørensen, 1999). However, parent organizations themselves have been less well understood. Specifically, the question as to *if* and *how* spin-offs, defined as independent organizations founded via employees' departures, influence in any way existing organizations has received relatively little attention. There have been only few attempts to develop a research agenda capable of examining the impact of entrepreneurial departures on parent organizations. For example, focusing on law firms in the Silicon Valley, Phillips (2002) finds that personnel departures to start new organizations decrease parent's performance. Although previous studies offer important insights, they typically consider parent organizations as passive in response to entrepreneurial departures. This neglect is surprising because a long tradition in organizational theory suggests that organizations constantly adjust to the external

environment. For example, the open-systems perspective emphasizes the role of the external environment in framing organizational strategy, structure, and survival (Lawrence and Lorsch 1967; Meyer and Rowan 1977; Scott 1995).

Based on a well-established body of work that documents an organization's ability to change in response to the external conditions (e.g., Eccles, Nohria and Berkley, 1992; Kotter, 1996), one could expect organizations to interact with the choices of nascent entrepreneurs. There is much evidence that the loss of entrepreneurial talent poses a considerable challenge to organizations. Failure to retain talented employees in open labor markets leads, for example, to a loss of organizational investment in human capital development (e.g., Cappelli, 2008). Similarly, migration of entrepreneurial talent lowers internal corporate innovation (e.g., Covin and Slevin, 1989; Lumpkin and Dess, 1996; Zahra and Covin, 1993) that increases growth and strategic renewal (Guth and Ginsberg, 1990), and is essential to high-performing firms (e.g., Covin and Slevin, 1991; Eisenhardt and Schoonhoven, 1990). Finally, evidence can be marshaled to support the claim that entrepreneurial exits lower organizational performance (Phillips, 2002), and increase organizational inefficiencies. Because inefficiencies trigger further performance loss (Williamson and Ouchi, 1981), firms strive to adapt their "inefficient" boundaries to achieve optimal outcomes in equilibrium and to prevent the threat of being "selected out" (Williamson, 1985).

Hence, in the current chapter of the dissertation, I shift the focus from nascent entrepreneurs to study parent organizations – their ability to change and redefine internal

structures in response to entrepreneurial decisions to found a new venture either inside or outside. Specifically, I investigate whether and how organizations change their internal incentive structures in response to the threat of entrepreneurial departures. To explore these issues, I use a conceptual framework grounded in the power-dependence theory (Emerson, 1962).

By addressing the question regarding an organization's response to entrepreneurial choices, the study makes several contributions to the current research. First, my findings enrich the current sociological perspectives on entrepreneurial spawning (e.g., Burton, Sørensen and Beckman 2002; Lerner, Gompers and Scharfstein, 2005; Higgins and Gulati, 2003; Phillips, 2002); in contrast to previous studies largely focused on the progeny, I argue that a more comprehensive understanding of entrepreneurial spawning should take into consideration the possibility that established organizations dynamically respond to the choices of nascent entrepreneurs affecting, in turn, future entrepreneurial rates. To that end, I provide empirical evidence to suggest that organizations strengthen their internal incentive structures, when faced with a greater threat of entrepreneurial exits. Moreover, the present study is one of the few to uncover the theoretical mechanisms behind the parent-progeny relation. Although the classical accounts highlight the role of efficiency concerns (Williamson, 1984), the present study theorizes and shows empirically that power-dependence underlines the relation between the employer and the nascent entrepreneur. Thereby, I provide yet another piece of evidence to support the broader theoretical claim presented in the dissertation, which

suggests that social mechanisms underline the boundaries around organizations. Using the example of entrepreneurship choices, I demonstrate that individual-level decisions, determined by career histories and a social structure, exert a continuous influence on how organizations are structured and bounded in the knowledge-based economy.

This chapter is organized as follows. The first section presents a framework that theorizes about the potential influence of entrepreneurship choices on organizational response. This section is followed by a section describing the methodology, sample, and variables. The subsequent section presents the main results, and various robustness checks. Finally, I discuss the implications and contributions in the concluding section.

Theory and Hypotheses

Organizational Boundary Management

Do organizations respond to entrepreneurial choices? I argue that power-dependence mechanisms underline the relation between the entrepreneurs' decision regarding internal versus external venture formation and the parent organization. According to the power dependence perspective (Emerson, 1962; Friedkin, 1986; Piskorski and Casciaro, 2004; Thompson, 1967), an employee-employer dyad may be understood in terms of a social exchange between two mutually dependent parties; in this exchange, the employee depends on the firm's resources and rewards, while the employer relies on entrepreneurial skills and talent. Entrepreneurship choices shift the balance of power in an exchange in favor of the employee. As the opportunities for entrepreneurship outside increase, outside employment alternatives become more available to potential

entrepreneurs. Consequently, the entrepreneur's dependence on organizational resources weakens, while his or her bargaining position vis-à-vis the parent organization strengthens.

From the organization's perspective, higher risk of entrepreneurial exits reinforces an organization's dependence on entrepreneurial talent; as nascent entrepreneurs are provided with broader outside employment opportunities, organizations face a greater challenge recruiting and retaining talent. Because, in an exchange, a more powerful party appropriates a larger portion of benefits (Emerson, 1962; Thompson, 1967), the employer will be more compelled to cede rewards to a potential entrepreneur, once the dependence shifts in favor of the employee. Therefore, I expect that an increase in the threat of entrepreneurial exits will strengthen the internal incentive systems, as organizations attempt to induce intrapreneurship. This suggests that organizations would adapt their internal structures in response to the threat of their employees' departures.

As documented in the second empirical paper, organizational members are at a higher risk of entrepreneurial exit, when alters of their informal network chose to pursue external opportunities in the past. Therefore, organizations whose employees have ties to entrepreneurial alters outside, should be more compelled to strengthen their incentive systems in the future. While I am unable to test it empirically, I assume that the threat may be recognized in at least two ways. It may be that the organization observes the turnover of its employees' school network members and decides to cede greater rewards to preempt the departures of its own employees. Alternatively, employees at a higher risk

of departure may be more successful at negotiating with the organization higher benefits. Regardless of the specific theoretical mechanism, organizations will be more likely to strengthen internal incentives to counter the threat of employees' exit for external ventures.

Based on the findings presented in the two past studies, internal incentives, such as discretion and compensation, reduce the risk of entrepreneurial exit by fostering internal venture formation. Hence, I expect that employees likely to transition to entrepreneurship should receive greater compensatory and discretionary rewards from their parent organizations. This logic implies that organizations, whose employees are tied to entrepreneurial network alters, will provide nascent entrepreneurs with greater discretion and compensation. More formally:

> **Hypothesis 1a:** Higher rates of external ventures founded by the employees' school network alters will lead to higher compensation provided by the organization to its employees.
>
> **Hypothesis 1b:** Higher rates of external ventures founded by the employees' school network alters will lead to higher discretion provided by the organization to its employees.

If power dependence accounts for the hypothesized relation between entrepreneurship choices and internal organizational structures, several other conditions should further hold. Specifically, if power dependence accounts for the positive relation between the risk of entrepreneurial defections and the strength of organizational incentives - discretion and compensation - the hypothesized relation should be mitigated by an organization's bargaining power. An assumption underlying this logic is that an employer in a weaker bargaining position will be more compelled to procure internal

rewards to retain potential entrepreneurs. Thus, one may reasonably posit that the weaker the employer's bargaining position, the more likely the organization to cede financial and discretionary rewards to counter the risk of entrepreneurial departures. Conversely, an organization in a favorable bargaining position will be less compelled to cede internal rewards to nascent entrepreneurs. Consistent with this argument, organization theorists and economic sociologists have documented that employers in stronger positions of power are more prone to limit their employees' rewards. Phillips (2001), for example, finds that employers in favorable bargaining positions disadvantage their employees' career attainments. Sørensen and Kalleberg (1981) and Sørensen (1983) show that organizations turn away from internal promotions toward the external labor market to the extent that they hold greater power vis-à-vis their employees.

Organizations are in a stronger bargaining position to the extent that they posses resources that can be shared with and are desired by employees. Although numerous determinants could be named, I focus on three factors likely to influence the availability of organizational resources and to affect the organization's bargaining position: organization's performance, age, and scope. Higher performing organizations are in a more favorable bargaining position because they generate larger revenues that can be shared with and are desired by employees. Hence, I expect better performing firms to be more reluctant to procure employees with internal rewards, such as compensation and discretion, in response to a higher risk of entrepreneurial departures. This leads to the following hypotheses:

Hypothesis 2a: The rates of external ventures founded by the employees' school network alters will have a weaker impact on compensation for better performing organizations.

Hypothesis 2b: The rates of external ventures founded by the employees' school network alters will have a weaker impact on discretion for better performing organizations.

Organization's power over an employee is further contingent upon organization's age. Organizational theorists have long suggested that new organizations often fail because of the liability of newness (Stinchcombe, 1965). Compared to their counterparts, old organizations have an institutionalized external legitimacy, a developed network of resources, and an established framework of routines and processes, which mitigate the risk of mortality. Abundant resources accumulated over longer periods, low uncertainty, and strong legitimacy represent the source of organizational power vis-à-vis employees. Hence, I expect that older organizations will refrain from ceding internal rewards to employees at a higher risk of entrepreneurial departures. More formally, I hypothesize that:

Hypothesis 3a: The rates of external ventures founded by the employees' school network alters will have a weaker impact on compensation for older organizations.

Hypothesis 3b: The rates of external ventures founded by the employees' school network alters will have a weaker impact on discretion for older organizations.

Finally, organizations may be in a stronger bargaining position vis-à-vis a potential entrepreneur, when having a broader scope. Organizational ecologists have documented that firm scope, defined as the breadth of organizational practice areas, enhances life chances of the organization (Carroll, 1985). Moreover, Phillips (2001) finds

that organizations with a broader scope are more reluctant to cede internal promotions to their employees. Numerous studies in corporate strategy have provided further evidence in support of the claim that diversified organizations experience higher performance and accumulate more resources (e.g., Alchian and Demsetz, 1972; Penrose, 1959; Teece, 1980; Williamson, 1975). Conversely, a few studies in economic sociology suggest a negative relation between diversification and performance (e.g., Davis et al., 1994; Zuckerman, 1999, 2000).

While evidence that organizations broader in scope have stronger life chances remains inconclusive, one possibility is that diversified organizations should be in a more favorable bargaining position regarding employees. Therefore, I expect organizational scope to mitigate the relation between the risk of entrepreneurial departures and the amount of discretion and compensation that organizations will be willing to cede to their employees. This leads to the following hypotheses:

> **Hypothesis 4a:** The rates of external ventures founded by the employees' school network alters will have a weaker impact on compensation for organizations broader in scope.
>
> **Hypothesis 4b:** The rates of external ventures founded by the employees' school network alters will have a weaker impact on discretion for organizations broader in scope.

Methods and Analyses

Mutual Fund Data – Sampling Frame

As in the two previous studies, I use a sample of all mutual funds in the CRSP US Mutual Fund Database covering the period between 1979 and 2006. Data available via

CRSP is survivor-bias free, as it includes information on both live and defunct funds. I focus on the data on funds' characteristics, including fund name, fund family (management company) name, fund age, inception date, net asset value, quarterly return, total assets, expense ratio, and turnover ratio, including defunct funds. For the purpose of my study, the unit of analysis is defined as manager-month.

Dependent Variables

Managerial Compensation. Although data on exact managerial compensation in the mutual fund industry is simply nonexistent, the finance literature commonly uses a proxy that represents the product of assets under manager's supervision and the expense ratio, where the expense ratio indicates the total investment that shareholders pay for the fund's operating expenses, including management fees or the compensation received by the manager. I forward the measure of managerial compensation one year into the future. For robustness, I use a six-month period and obtain similar results (unreported). The measure is observed monthly.

Managerial Discretion. I measure manager's discretion by accounting for the amount of decision-making control she has over the funds supervised. Funds managed by multiple managers have diffused decision-making processes and provide any single manager with less control over important decisions, such as the selection of stocks to buy or to sell. For each manager, the variable is equal 1 divided by the number of co-managers supervising the focal fund. Therefore, the variable takes values from 0 to 1, where higher values indicate that the focal manager has fewer co-managers and is,

therefore, endowed with greater discretion. I forward the measure of organizational discretion one year into the future. For robustness, I use a six-month period and obtain similar results (unreported). The measure is observed monthly.

Explanatory Variables

Entrepreneurial Exit Risk. To proxy the threat of entrepreneurial departures, I measure the rates of external ventures founded by the entrepreneur's school network alters. As demonstrated in the second empirical study, the risk of entrepreneurial exit increases for actors tied to school network alters who had previously founded external ventures. An additional advantage of the network variable is its relative exogeneity with respect to the characteristics of the parent organization. Because external school networks are beyond the organization's control, the reverse causality concern is relatively mitigated.[21]

Organizational Performance. Firm performance is calculated as the average fund return for the focal fund family using a value-weighted approach. The value-weighted approach captures the total return by multiplying each family's return by its relative size in the family, and by taking the sum across all weighted fund returns inside the firm.

[21] An alternative operationalization of the independent variable may be organizational turnover rates. While such an operationalization is plausible, I argue that it is inferior to the current operationalization for several reasons. First, unlike the network measure, *past* departures are less likely to proxy for the threat faced by the organization *in the present.* Past departures may not predict future departures; it may be that most talented employees have already left in the past period, decreasing the probability of the future turnover. Moreover, unlike my current measure, organizational turnover rates are relatively more endogenous to the parent organization; this may, in turn raise concerns regarding the direction of causality.

Organizational Age. To measure firm age, I use the CRSP database to derive the age of the oldest fund in the family.

Organizational Scope. Firm scope is operationalized as the number of different types of funds that a management company offers. Using the CRSP data, I count the number of investment objectives across the funds in a company. For robustness, I include a percentage measure by dividing the number of different funds offered by the number of all possible investment objectives. The results (unreported) are robust to the alternative measure.

Control Variables

Organizational/Managerial Characteristics. I control for a range of organizational characteristics that may influence organizational propensity to strengthen internal incentives. To that end, I include the covariates of organizational size, performance, age, scope, and the total employee number. I further include the measures of managerial characteristics, including manager's gender, and the controls for human capital such as performance, and an elite-school degree.

Empirical Model

I use OLS regression models to estimate the effect of entrepreneurial departures' threat on the change in organizational incentives. To address concerns related to unobserved heterogeneity and autocorrelation, firm-fixed effects are used for models including time-varying independent variables. I further mitigate the problem of serial correlation by clustering standard errors at the management company level, and control

for economy wide events by including time-fixed effects. The following model is estimated:

$$Y_{ijt} = \beta_i + \delta_t + \gamma X + \varepsilon_{ik},$$

where β_i are firm-fixed effects, δ_t are time-fixed effects, *X* is the vector of the explanatory variables, and Y(.) is the OLS function.

Results

Descriptive Statistics

Table 5.1 reports the descriptive statistics for the main variables. Managerial compensation (t+12) equals to 7.0 while managerial discretion (t+12) in the firm amounts to 0.825 and has a maximum value of 1. The mean value of school network members who created external venture past year is 1.63 and varies between 0 and 14.

Insert Table 5.1 about here

Organizational Response to Entrepreneurship Choices: Multivariate Analysis

Table 5.2 presents the results estimated using firm-fixed effects regression models to test the hypothesized effect of entrepreneurial defections on organizational incentive structures. Model (1) shows the estimates for the effect of the risk of entrepreneurial exit on the average amount of discretion ceded by the organization in the following year. The results provide support for the hypothesized relation; a positive coefficient on the measure of average organizational discretion indicates that organizations facing a higher

risk of entrepreneurs' exit are prone to cede a greater amount of discretion to their employees in the following year. Model (2) shows the estimates for the effect of the risk of entrepreneurial departures on organizational compensation. Hypothesis 1b received empirical support: a positive coefficient on the network measure indicates that an increase in the rates of external ventures, founded by the entrepreneurs' school network alters, increases the probability that an organization will provide potential entrepreneurs with greater compensatory rewards next year. Together, findings demonstrated in Table 5.2 provide a strong support for the hypothesis that organizations react to boundary changes triggered by the individual-level choices.

Insert Table 5.2 about here

Table 5.3 further reports the results regarding the theoretical mechanism underlying the relation between the threat of entrepreneurial departures and the change in organizational compensation and discretion. Model (1) provides support for Hypothesis 2a indicating that better performing organizations will cede lesser compensatory rewards to potential entrepreneurs in response to the threat of entrepreneurial departures. Moreover, results presented in Models (2) provide support for Hypothesis 2b; a negative coefficient on the interaction term suggests that the probability of ceding a greater amount of discretion decreases with organizational performance.

Insert Table 5.3 about here

Table 5.4 presents the estimates for the moderating role of organizational age on the relation between the risk of entrepreneurial departures and internal incentive systems. Model (1) indicates that organizational age amplifies the probability that the firm will provide greater compensation to its employees. Consistently, Model (2) demonstrates the moderating role of organizational age. Hypothesis 3b receives no support: instead, a positive coefficient on the interaction term implies that organizational age amplifies, rather than mitigates, the observed correlation. In contrast to the prediction, older organizations are more likely to procure nascent entrepreneurs with discretion, when the risk of external entrepreneurship increases. One reason why organizational age may amplify, rather than mitigate, the probability of organizational concessions vis-à-vis nascent entrepreneurs may be related to organizational power. Existing studies have provided broad support for the proposition that older organizations are more likely to constrain individual self-direction and limit the pursuit of novel ideas. For example, Hannan and Freeman (1984) associate older organizations with greater inertia that should discourage middle managers from new product development. Numerous studies further show that older work environments constrain individual autonomy and hinder the formation of entrepreneurial skills (Dobrev and Barnett, 2005; Sørensen, 2007a; Wagner, 2004). One implication of this line of research is that older organizations may be less attractive to potential employees; this would, in turn, weaken organizational power over its employees.

Insert Table 5.4 about here

Finally, Table 5.5 shows the estimates for the moderating impact of organizational scope. As predicted in Hypothesis 4a, organizations broader in scope are less compelled to provide potential entrepreneurs with a greater amount of compensation. Model (2) shows that the probability that an organization cedes discretion to entrepreneurs at a higher risk of exit decreases with firm scope. As predicted by Hypothesis 4b, organizations with a broader scope are less compelled to increase employees' discretion, when potential entrepreneurs are at a higher risk of exit.

Insert Table 5.5 about here

Together, these findings provide evidence that power-dependence mechanisms account for organizational response to entrepreneurship choices. Consistent with the power-dependence theory, I find that organizations in stronger bargaining positions are less compelled to provide entrepreneurs with internal incentives to induce a new venture formation inside.

Discussion and Conclusion

The objective of the present chapter is to examine *whether* and *how* parent organizations respond to the changes in their boundaries triggered by the choices of nascent entrepreneurs. Whereas prior work has provided strong foundations to establish

the link between organizational characteristics and the life chances (e.g., growth, survival) of a spin-off (e.g., Burton, Sørensen and Beckman 2002; Higgins and Gulati, 2003), little attention has been devoted to understand how progeny organizations impact, in turn, their parents. Using the conceptual framework of power dependence (Emerson, 1962), I argue that parent organizations do not remain passive, when challenged by the threat of entrepreneurial departures. Instead, when the mutual employer-entrepreneur dependence shifts in favor of the employee, organizations make concessions in an effort to retain entrepreneurial talent inside. In support of this claim, I find that an increase in the rates of external ventures, founded by the entrepreneurs' informal network members, leads to an increase in the average amount of discretion and compensation procured by the organization. Power dependence perspective provides a plausible mechanism to account for the observed relation. The general pattern that emerges from the results indicates that power-dependence dynamics account for an organizational adjustment to entrepreneurship choices. I find that the probability of organizational concessions vis-à-vis potential entrepreneurs decreases with a stronger bargaining position of the parent. Better performing organizations with a larger scope of activities are less likely to confer rewards on nascent entrepreneurs.

By documenting a power-dependence-driven impact of entrepreneurship choices on parent organization, this chapter makes a contribution to several research agendas. First, my findings enrich the current sociological perspectives on the parent-progeny relation (e.g., Higgins and Gulati, 2003; Klepper, 2001; Klepper and Sleeper, 2005;

Phillips, 2002). Whereas prior research has focused almost exclusively on the progeny, the present study suggests that more attention should be devoted to the parent organization. Contrary to the prior work that provides a *passive* view on the parent organization, the present study offers a more *dynamic* perspective. I provide evidence that choices of individual entrepreneurs inside the organization determine the future incentive structures in the organization. Moreover, the present chapter is one of the few to emphasize the role of power-dependent relations in the management of an organizational boundary. While previous work has focused on understanding inefficiencies arising from organizational boundaries (e.g., Williamson, 1985), I provide evidence for an alternative mechanism of power dependence (Emerson, 1962) to understand if and how organizations manage their boundaries. Future studies should further explore the role of power in shaping the boundaries around organizations. For example, additional insights may be gained from examining the conditions under which power-dependence relations dominate organizational strive for efficient outcomes. More broadly, by establishing a theoretical and empirical link between entrepreneurship choices and the change in organizational structures, this chapter contributes to a deeper understanding of the micro-level mechanisms behind an organizational-level change (Hannan and Freeman, 1984; Kotter, 1996). Using the example of entrepreneurship choices, I demonstrate how social actors bring about, through their career trajectories and social ties, a change in organizational structures.

In the last part of the dissertation, I examined whether and how entrepreneurial

defections affect the parent firm. Using the conceptual framework of power dependence, I hypothesized and found empirical support for the claim that organizations strengthen internal incentive structures to retain prospective entrepreneurs. Together, my findings enrich several literatures, including research on organization change, entrepreneurial transition, and the boundaries of the organization.

Table 5.1. Descriptive Statistics

Variables	Mean	SD	Min	Max
Managerial Compensation (t+12)	7.012	24.1	0	893.12
Managerial Discretion (t+12)	0.825	0.26	.071	1
School network alters creating external funds	1.631	2.207	0	14
Manager's Discretion (1/fund co-managers' count)	0.654	0.305	0.04	1
Manager's Gender (1 if male)	0.855	0.305	0	1
Firm Size (Assets)	40,782.02	114,425.4	0.036	1,097,765
Total Fund Managers (Firm)	25.7	27.8	1	145
Firm Performance (weighted family returns)	0.008	0.047	-0.891	1.623
Firm Age (Oldest fund – month count)	28.67	21.47	1	81

Table 5.2. Organizational Response to the Risk of Entrepreneurial Exit

Variables	Managerial Discretion (*t*+12)	Managerial Compensation (*t*+12)
	(1)	(2)
School network alters creating external funds (mean)	0.005***	0.252**
	(0.001)	(0.105)
Manager's Gender	-0.028***	14.529***
	(0.008)	(1.056)
Manager's Performance	0.048	-10.263*
	(0.046)	(6.051)
Elite Degree	-0.030***	-6.509***
	(0.004)	(0.593)
Manager's Discretion		-8.175***
		(0.907)
Organizational Performance	-0.059	9.109*
	(0.041)	(5.460)
Organizational Size	0.000	0.000***
	(0.000)	(0.000)
Organizational Age	-0.000	0.292***
	(0.000)	(0.033)
Total Employees	-0.006***	0.476***
	(0.000)	(0.057)
Firm-Fixed Effects	Yes	Yes
Time-Fixed Effects	Yes	Yes
Observations	28461	28461
R-squared	0.62	0.40

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5.3. Power Dependence: Organizational Performance

Variables	**Managerial Compensation (*t*+12)**	**Managerial Discretion (*t*+12)**
	(1)	(2)
School network alters founding external funds (mean)	0.211**	0.005***
	(0.106)	(0.001)
Manager's Gender	13.675***	-0.028***
	(1.058)	(0.008)
Manager's Performance	-9.938	0.047
	(6.074)	(0.046)
Manager's Elite Degree	-6.476***	-0.030***
	(0.595)	(0.004)
Manager's Discretion	-7.817***	
	(0.910)	
Firm Performance	10.330*	-0.049
	(5.644)	(0.043)
Firm Age	0.289***	-0.000
	(0.033)	(0.000)
Firm Size (Total Assets)		0.000
		(0.000)
Total Employees	0.745***	-0.006***
	(0.053)	(0.000)
Firm Performance * School network alters founding external funds	-1.533*	-0.010**
	(1.263)	(0.010)
Firm-Fixed Effects	Yes	Yes
Time-Fixed Effects	Yes	Yes
Observations	28461	28461
R-squared	0.39	0.62

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5.4. Power Dependence: Organizational Age

Variables	Managerial Compensation (*t*+12)	Managerial Discretion (*t*+12)
	(1)	(2)
School network alters founding external funds (mean)	0.534***	0.005***
	(0.143)	(0.001)
Manager's Gender	13.724***	-0.027***
	(1.058)	(0.008)
Manager's Performance	-9.599	0.051
	(6.069)	(0.046)
Elite Degree	-6.533***	-0.031***
	(0.595)	(0.004)
Manager's Discretion	-8.052***	
	(0.913)	
Firm Performance	0.023***	-0.063
	(0.007)	(0.041)
Firm Age	0.264***	-0.001***
	(0.034)	(0.000)
Firm Size (Total Managers)	0.743***	0.000
	(0.053)	(0.000)
Firm Age * School network alters founding external funds	0.023***	0.001***
	(0.007)	(0.000)
Firm-Fixed Effects	Yes	Yes
Time-Fixed Effects	Yes	Yes
Observations	28461	28461
R-squared	0.39	0.62

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5.5. Power Dependence: Organizational Scope

Variables	Managerial Compensation (*t*+12)	Managerial Discretion (*t*+12)
	(1)	(2)
School network alters founding external funds (mean)	0.400**	0.007***
	(0.158)	(0.001)
Manager's Gender	14.152***	-0.029***
	(1.068)	(0.008)
Manager's Performance	-9.119	0.026
	(6.206)	(0.047)
Manager's Elite Degree	-6.147***	-0.033***
	(0.607)	(0.005)
Manager's Discretion	-8.710***	
	(0.933)	
Firm Performance	8.504	-0.041
	(5.613)	(0.042)
Firm Age	0.214***	0.000
	(0.034)	(0.000)
Firm Size (Total Assets)		0.000*
		(0.000)
Firm Size (Total Managers)	0.291***	-0.005***
	(0.080)	(0.001)
Firm Scope	2.412***	-0.003
	(0.302)	(0.002)
Firm Scope * School network alters founding external funds	-0.120*	-0.001**
	(0.073)	(0.001)
Firm-Fixed Effects	Yes	Yes
Time-Fixed Effects	Yes	Yes
Observations	27298	27298

Table 5.5 (contd.). Power Dependence: Organizational Scope

Variables	Managerial Compensation (*t*+12)	Managerial Discretion (*t*+12)
	(1)	(2)
R-squared	0.40	0.62

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

CHAPTER VI: CONCLUSION

Theoretical Contributions

Several decades ago, Schumpeter warned us that economic development would ultimately lead to the disappearance of the entrepreneur, and that large firms with a considerable degree of market power would drive technological progress (Schumpeter, 1950). As a rejoinder, the present study provides an unprecedented window into entrepreneurial rates both inside and outside large organizations. Using the empirical setting of the mutual fund industry, I find that, contrary to the Schumpeterian prophecy, within the population of entrepreneurial individuals as many as 16% leave larger organizations to found new ventures externally, even in spite of strong formal incentives (i.e., discretion and compensation) often provided by the parent organization to induce the creation of a new venture inside. However, consistent with Schumpeter's claim, I too find that innovative activity and the creation of new ventures frequently take place inside established organizations. Whereas, since Schumpeter, scholars have typically examined entrepreneurship (e.g., Aldrich, 1999; Aldrich and Widenmeyer, 1993; Sørensen and Audia, 2000) and internal venture formation (e.g., Amit, Glosten, and Mueller, 1993; Burgelman, 1983; Pinchot, 1985; Schumpeter, 1942; 1950) in separation, my dissertation proposes that much insight can be gained from a joint consideration of those separate

entrepreneurial outcomes, given their interrelated nature. Specifically, I argue that examining the conditions under which mobile knowledge workers create new ventures internally and when, by contrast, they choose to transition to entrepreneurship, largely enriches the current understanding of entrepreneurship, processes of organizational emergence, and organizational boundaries.

By examining the determinants of entrepreneurship choices, my dissertation offers a set of theoretical insights that contribute in important ways to several streams of research. First, I provide a set of theoretical mechanisms to account for a nascent entrepreneur's choice between the formation of a new venture internally versus externally. Whereas previous research has established the role of career histories in facilitating entrepreneurial entry (Brittain and Freeman, 1986; Freeman 1986; Phillips, 2002; Burton, Sørensen and Beckman 2002; Dobrev and Barnett 2005; Romanelli, 1991; Sørensen 2007a), I provide evidence that the present theoretical models should incorporate *career imprints* to predict the choice between internal and external entrepreneurship. Findings indicate that a greater exposure to risk early in the career increases the propensity of external rather than internal venture formation. As expected, the probability of external foundings further increases for actors whose coworkers founded new ventures outside during the formative career stages. Conversely, I do not find support for the hypothesized relation between an individual's transition to intrapreneurship and the rates of coworker-founded internal ventures. The effect of *career imprints* is partially mitigated by the negative feedback (i.e., low performance);

social actors are less likely to rely on their formative experiences if those experiences triggered a negative environmental response. Together, findings presented in the first empirical study contribute to the line of work that relates entrepreneurial process to career histories (e.g. Brittian and Freeman, 1986; Boeker, 1988; Carroll and Mosakowski, 1987; Higgins, 2005; Shane and Khurana, 2003). More broadly, by documenting the role of *career imprints* in shaping entrepreneurial choices, the first empirical study provides an insight into the role of individuals in shaping organizational boundaries.

The second empirical chapter extends the theoretical framework presented in the first study. I argue that, in addition to *career imprints*, entrepreneurship choices are influenced by a social structure in which individuals are embedded. Although traditional views point to the role of formal structures in shaping agency in the organization, I argue that agency is also determined by the informal social structure in which actors are embedded. Findings presented in this study indicate that entrepreneurial decisions are influenced by formal structures to the extent that the parent organization induces internal venture formation by providing fund managers with higher compensation and greater discretion. However, the impact of incentives is limited by the fund manager's informal social network of preexisting ties to her school colleagues. Specifically, I find that fund managers imitate previous entrepreneurship choices of other school network members. Additional analyses show that the effect of school ties is amplified by the spatial proximity of school network members, and is greater within same-gender school ties – providing support for inter-actor influences rather than common skills. Using the socio-

structural approach, the second empirical study complements the first paper; it expands the initial theoretical framework to account for a wider range of the social determinants of entrepreneurial choices. Taken together, the two dissertation chapters offer an extensive account of the social mechanisms and the micro-level processes that shape the macro-level phenomena of organizational boundaries.

The third study shifts the focus from entrepreneurial actors to parent organizations. Specifically, the last empirical chapter examines the impact of entrepreneurial departures on parent organizations. Whereas existing theoretical frameworks have considered established organizations as passive in response to entrepreneurial spin-offs, the results show that organizations strengthen their internal incentive structures to retain potential entrepreneurs. Specifically, organizations cede to potential entrepreneurs greater compensation and discretion that enhance internal venture formation. The results presented in the paper further suggest that power-dependence mechanisms account for an organizational response to the risk of entrepreneurial defections; I find that organizational performance and scope mitigate the firm's propensity to strengthen its internal incentive systems. Overall, the third empirical study provides a set of findings that enrich the current understanding of the parent-progeny relations (e.g., Brittian and Freeman, 1980; Phillips, 2002). The results provide powerful evidence that entrepreneurship choices affect parent organizations by reshaping their internal incentive structures.

More broadly, by examining the conditions under which new ventures are developed internally versus externally, my dissertation illuminates the role of an

individual in shaping and specifying the boundaries of the modern organization. First, there have been few attempts to link organizational boundaries and entrepreneurship. While prior work has pointed to mergers and acquisitions, outsourcing (Lounsbury, 2007), and joint ventures (e.g., Eisenhardt and Schoonhoven, 1996) as the mechanisms that redraw the boundaries of the firm, the role of entrepreneurship in this process has been largely overlooked. Yet whether new ventures are formed internally or externally plays an important role in specifying which activities are conducted inside and which take place outside the firm (Williamson, 1985).

Moreover, whereas the prevailing theories concentrate on the role of a unitary organizational actor in delimiting the boundaries of its activity (e.g., Kogut and Zander, 1996; Williamson, 1985), there is little understanding of how boundaries of the firm are redrawn by career decisions of middle managers, whose goals and interests are not always aligned with those of the organization. Indeed, my findings suggest that the variation in the characteristics of the individuals' social ties has an important impact on how the boundary of the organization is specified and which activities occur inside and which fall outside the organizational domain. Consequently, the current study opens a fruitful avenue for future research that would integrate the role of individuals into the current understanding and the existing theories of organizational boundaries.

Scope Conditions and Future Research

In considering the generalizability of this study's findings, it is necessary to take into consideration the scope conditions of my theory. Whereas the mutual fund industry

provides a unique opportunity to observe and compare entrepreneurial processes both inside and outside established organizations, the theoretical mechanisms operating in this specific setting are unlikely to be founded in every other context. Specifically, several scope conditions need to be present for the theory to apply to other contexts. I expect my entrepreneurship theory to provide most explanatory power in knowledge-based contexts, where the core technology of the organization lies in human capital rather than physical assets. In industries driven by human assets, a potential entrepreneur can more easily create a new business unit internally, or leave to start up a new organization outside. In financial services and other professional service organizations of similar type, human assets drive the creation of both internal and external ventures; by contrast, I would expect the theoretical implications of the study to be less relevant in manufacturing, where entrepreneurial processes tend to depend on the availability of raw materials rather than the choices of an entrepreneurial individual. Future research should further examine whether the theoretical framework developed in this study can be successfully applied to understand the selection of organizational members into internal and external entrepreneurship in other knowledge-intensive settings.

Moreover, a large number of entrepreneurial events in my data occur in the context of large companies that hold billions of financial assets. In this respect, the study adds and is comparable to a myriad of other entrepreneurship studies that examine the effect of organizational size on the emergence of new organizations (e.g., Dobrev and Barnett, 2005; Sørensen, 2007a). While those prior studies observe solely the creation of

external ventures, the unique advantage of the present paper is that it allows to empirically measure the creation of internal business units by entrepreneurial members of the organization. In addition to exploring other empirical contexts, future work could further apply the theoretical framework developed in this study to organizations of different size, age, or structure. Substantial benefit could be derived from gaining a deeper insight of how organizational characteristics provide additional contingencies to understand the selection to internal and external entrepreneurship.

Finally, the theory developed in the study should find an even stronger empirical support in a non-financial context. Although, by the nature of the profession, portfolio managers are most prone to be motivated by financial gains, I nevertheless find that their informal social ties exert a substantial influence on entrepreneurship choices, even when accounting for monetary incentives present inside the organization. Moreover, the impact of informal school networks is substantial in its magnitude, despite the finance-driven and money-focused research setting. Because the context of the mutual fund industry represents a conservative setting in which to document the impact of informal school networks on entrepreneurship choices, I expect the empirical support for my arguments to be even stronger in alternative non-financial settings. Future studies should therefore seek to understand whether entrepreneurial actors in financial services are idiosyncratic and how the mechanisms underlying their decisions generalize to other contexts.

Conclusion

The theoretical implications of the dissertation extend well beyond the details of entrepreneurial process. By examining the determinants of internal and external venture formation, the current paper hopes to draw the attention of organizational scholars to the ways in which individuals and the differences amongst them shape some of the most important firm-level outcomes, related to internal venturing, organizational founding, and – ultimately – the boundaries of the organization.

APPENDICES

Table A1. The Effect of Career Imprints on Entrepreneurship Choices: Coworkers' Influence (with manager-random effects)

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)	(3)	(4)
Internal ventures founded by coworkers early in the actor's career (count)	-0.327			
	(8.395)			
Internal ventures founded by coworkers (count)	-105.068***			
	(11.987)			
External ventures founded by coworkers early in the actor's career (count)		14.770***		
		(3.069)		
External ventures founded by coworkers (count)		9.526***		
		(3.436)		
Imprinted Discretion (average)				0.803
				(0.845)
Firm Discretion (average)				2.573***
				(0.862)
Imprinted Risk (average)			16.331*	
			(8.369)	
Firm Risk (average)			31.933***	
			(8.630)	
Manager's Gender	0.780	1.118*	1.128*	1.280*
	(0.502)	(0.669)	(0.679)	(0.688)
Manager's Age	-0.038**	-0.052**	-0.042**	-0.050**
	(0.015)	(0.020)	(0.021)	(0.021)
Manager's Performance	15.813***	20.103***	20.012***	20.706***
	(3.661)	(4.278)	(4.338)	(4.375)
Manager's Discretion	-0.237	-0.467	-0.354	-1.622***
	(0.383)	(0.470)	(0.477)	(0.594)
Manager's Compensation	-0.017***	-0.018***	-0.017***	-0.017***
	(0.005)	(0.006)	(0.006)	(0.006)
Elite Degree	-0.048	0.039	0.081	0.166
	(0.536)	(0.754)	(0.781)	(0.782)
Highest Degree Earned	-0.292	-0.188	-0.391	-0.344
	(0.270)	(0.374)	(0.381)	(0.381)
Manager's Industry Tenure	0.002	0.011***	0.011***	0.011***
	(0.003)	(0.004)	(0.004)	(0.004)
Fund Size	0.000	0.000	0.000	0.000

Table A1. (cont.) The Effect of Career Imprints on Entrepreneurship Choices: Coworkers' Influence (with manager-random effects)

	External vs. Internal Entrepreneurship (1)	**External vs. Internal Entrepreneurship** (2)	**External vs. Internal Entrepreneurship** (3)	**External vs. Internal Entrepreneurship** (4)
	(0.000)	(0.000)	(0.000)	(0.000)
Firm Size (Total Assets)	-0.000	-0.000**	-0.000*	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Firm Performance	-1.417	1.149	0.489	0.676
	(3.564)	(4.241)	(4.402)	(4.323)
Firm Age	-0.025***	-0.029***	-0.024***	-0.028***
	(0.007)	(0.008)	(0.008)	(0.008)
Total Fund Managers (Firm)	0.001	0.012*	0.007	0.010
	(0.006)	(0.007)	(0.007)	(0.007)
Market volatility	-19.301**	-38.047***	-43.153***	-40.463***
	(8.948)	(10.543)	(10.890)	(10.681)
Manager-Random Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes
School-Fixed Effects	Yes	Yes	Yes	Yes
Observations	20574	20594	20571	20594

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A2. The Logit Model of Internal vs. External Entrepreneurship Rates (Full Model)

Variables	**External vs. Internal Entrepreneurship**	**External vs. Internal Entrepreneurship**	**External vs. Internal Entrepreneurship**	**External vs. Internal Entrepreneurship**
	(1)	(2)	(3)	(4)
Imprinted Risk	8.639*	9.681**	9.793**	12.384**
	(4.587)	(4.887)	(4.715)	(5.163)
Imprinted Discretion	-0.013	0.002	-0.032	-0.055
	(0.483)	(0.506)	(0.492)	(0.523)
Int. ventures founded by coworkers early in the career	3.816	4.169	2.205	1.384
	(5.784)	(5.995)	(5.959)	(6.175)
Internal ventures founded by coworkers	-91.867***	-92.204***	-91.005***	-92.766***
	(9.715)	(10.338)	(9.505)	(9.947)
Ext. ventures founded by coworkers early in the career	5.266***	4.783***	5.153***	4.734***
	(1.446)	(1.476)	(1.446)	(1.471)
External ventures founded by coworkers (count)	25.702***	22.915***	26.361***	22.517***
	(5.877)	(6.011)	(5.987)	(6.079)
School network alters creating external funds (count)		0.491***		0.681***
		(0.066)		(0.084)
School network alters creating internal funds (count)			-0.146***	-0.079*
			(0.036)	(0.044)
School network size (count)				-0.033***
				(0.009)
Firm Risk	14.093**	9.965*	13.985**	8.829
	(5.829)	(6.024)	(5.933)	(6.156)
Firm Discretion	1.222*	1.207*	1.286*	1.148*
	(0.642)	(0.671)	(0.655)	(0.691)
Manager’s Discretion	-0.582	-0.373	-0.634	-0.435
	(0.381)	(0.399)	(0.388)	(0.414)
Manager’s Compensation	-0.009***	-0.010***	-0.009***	-0.011***
	(0.003)	(0.004)	(0.003)	(0.004)
Manager's Gender	0.460	0.267	0.453	0.263
	(0.365)	(0.383)	(0.368)	(0.395)
Manager's Age	-0.028***	-0.030***	-0.027**	-0.031**
	(0.011)	(0.012)	(0.011)	(0.012)
Manager’s Performance	13.862***	15.066***	13.545***	14.826***
	(3.125)	(3.248)	(3.197)	(3.377)

Table A2. (contd.). The Logit Model of Internal vs. External Entrepreneurship Rates (Full Model)

Variables	**External vs. Internal Entrepreneurship**	**External vs. Internal Entrepreneurship**	**External vs. Internal Entrepreneurship**	**External vs. Internal Entrepreneurship**
	(1)	(2)	(3)	(4)
Fund Size	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Manager's Industry Tenure	0.002	0.001	0.001	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Highest Degree Earned	-0.266	-0.386*	-0.245	-0.353
	(0.196)	(0.207)	(0.200)	(0.216)
Elite School Degree	-0.188	-0.431	0.103	0.323
	(0.398)	(0.433)	(0.412)	(0.461)
Firm Size (Total Assets)	-0.000*	-0.000**	-0.000	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Total Employees	-0.003	-0.005	-0.002	-0.005
	(0.009)	(0.009)	(0.009)	(0.010)
Firm Performance	0.949	1.160	0.623	0.988
	(3.096)	(3.213)	(3.191)	(3.334)
Firm Age	-0.021***	-0.022***	-0.021***	-0.021***
	(0.005)	(0.005)	(0.005)	(0.006)
Market volatility	-17.291**	-16.698**	-18.409**	-20.600**
	(7.604)	(8.065)	(7.746)	(8.509)
Firm-random effects	Yes	Yes	Yes	Yes
Time-fixed effects	Yes	Yes	Yes	Yes
Observations	20535	20535	20535	20535
Pseudo R-squared	0.96	0.97	0.96	0.97

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A3. The Cox Model and the Multinomial Logit Model of Internal vs. External Entrepreneurship Rates

Variables	*Competing Risks*		*Multinomial Logit*	
	Internal Venture	External Venture	Internal	External Venture
	(1)	(2)	(3)	(4)
School network alters creating external funds	-0.019	0.383***	-0.001	0.433***
	(0.028)	(0.038)	(0.017)	(0.025)
School network alters creating internal funds	0.043***	-0.003	0.034***	-0.015
	(0.005)	(0.014)	(0.003)	(0.011)
Network Size	0.013	0.024**	0.004	0.021**
	(0.002)	(0.005)	(0.002)	(0.004)
Manager's Discretion	0.613***	0.425**	0.204**	0.070*
	(0.129)	(0.205)	(0.082)	(0.166)
Manager's Compensation	0.007***	0.002	0.005***	0.002
	(0.001)	(0.003)	(0.000)	(0.001)
Manager's Gender (male)	0.005	0.439*	0.032	0.763***
	(0.130)	(0.252)	(0.090)	(0.243)
Manager's Age	0.007	-0.015*	0.008***	-0.004**
	(0.004)	(0.008)	(0.003)	(0.006)
Manager's Performance	3.462***	5.610***	4.784*	1.295***
	(1.080)	(2.063)	(0.756)	(1.563)
Fund Size	0.000***	0.000***	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Manager's Industry Tenure	-0.005***	-0.005***	-0.006***	-0.006***
	(0.001)	(0.002)	(0.000)	(0.001)
Elite School Degree	0.477**	0.071	0.164	0.296
	(0.186)	(0.284)	(0.105)	(0.203)
Highest Degree Earned	0.113	0.002	0.020	0.040
	(0.079)	(0.137)	(0.054)	(0.107)
Firm Size (Total Assets)	0.000***	-0.000***	0.000***	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Total Fund Managers (Firm)	0.008**	-0.016**	0.009***	-0.000
	(0.004)	(0.006)	(0.002)	(0.004)
Firm Performance	4.715***	-3.840*	5.118***	-0.541*
	(1.220)	(2.116)	(0.790)	(1.683)
Firm Age	0.003	-0.007*	0.005***	-0.005*
	(0.002)	(0.004)	(0.001)	(0.003)
Market volatility	-15.984***	-20.079***	-0.098*	-11.12***
	(2.246)	(3.969)	(1.217)	(2.868)
Observations	169289	122049	233876	233876
Log Likelihood	-6640.6514	-2261.7203	-12866.646	-12866.646

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: All models include dummy variables for schools (estimates not shown).

Table A4. The Logit Model of Internal vs. External Entrepreneurship Rates (Co-workers' and Regional Influences)

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)
School network alters creating external funds (count)	0.604***	0.619***
	(0.062)	(0.111)
School network alters creating internal funds (count)	-0.278***	-0.432***
	(0.038)	(0.080)
Spatially prox. managers creating ext. funds (count)		0.415***
		(0.112)
Spatially prox. managers creating internal funds (count)		-0.012
		(0.010)
Co-workers creating external funds (count)		0.348***
		(0.088)
Co-workers creating internal funds (count)		0.018
		(0.013)
Manager's Discretion	-0.615*	-1.387**
	(0.332)	(0.640)
Manager's Compensation	-0.007**	-0.002*
	(0.003)	(0.004)
Gender (male)	0.307	1.063
	(0.413)	(0.903)
Manager's Age	-0.013*	-0.027*
	(0.012)	(0.023)
Manager's Performance	6.948**	13.343**
	(2.751)	(5.583)
Fund Size	0.000**	0.000**
	(0.000)	(0.000)
Manager's Industry Tenure	-0.003*	-0.011***
	(0.002)	(0.004)
Elite School Degree	0.745*	0.507
	(0.429)	(0.899)
Highest Degree Earned	0.061	0.233
	(0.198)	(0.391)
Firm Size (Total Assets)	-0.000***	-0.000***
	(0.000)	(0.000)
Total Employees	-0.022	0.005
	(0.014)	(0.022)
Firm Performance	-4.921*	-1.216*
	(2.781)	(5.533)
Firm Age	0.014	0.047*
	(0.016)	(0.028)
Market volatility	-20.355***	-22.304*
	(7.289)	(11.822)
Firm-Fixed Effects	Yes	Yes
School-Fixed Effects	Yes	Yes
Time-Fixed Effects	Yes	Yes
Observations	2171	2171

Table A4 (contd.). The Logit Model of Internal vs. External Entrepreneurship Rates (Co-workers' and Regional Influences)

Variables	External vs. Internal Entrepreneurship	External vs. Internal Entrepreneurship
	(1)	(2)
Pseudo R-squared	0.32	0.53

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A5. The Logit Model of Internal vs. External Entrepreneurship Rates (Internal and External Network Size)

Variables	External vs. Internal Entrepreneurship (1)	External vs. Internal Entrepreneurship (2)	External vs. Internal Entrepreneurship (3)
School network alters creating internal funds (count)	-0.258***		-0.258***
	(0.036)		(0.041)
Internal School Ties (count)	0.142***		0.076
	(0.050)		(0.056)
School network alters creating external funds (count)		0.698***	0.643***
		(0.068)	(0.069)
External School Ties (count)		0.036***	0.014*
		(0.007)	(0.008)
Manager's Discretion	-0.773**	-0.718**	-0.614*
	(0.311)	(0.327)	(0.332)
Manager's Compensation	-0.005*	-0.006*	-0.007**
	(0.003)	(0.003)	(0.003)
Manager's Gender (male)	0.672*	0.292	0.320
	(0.394)	(0.407)	(0.411)
Manager's Age	-0.014*	-0.012*	-0.011*
	(0.011)	(0.012)	(0.012)
Manager's Performance	6.502***	7.501***	6.988**
	(2.515)	(2.749)	(2.793)
Fund Size	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)
Manager's Industry Tenure	-0.002	-0.004**	-0.003*
	(0.002)	(0.002)	(0.002)
Elite School Degree	1.036***	0.902**	0.928**
	(0.369)	(0.422)	(0.444)
Highest Degree Earned	0.151	0.030	0.049
	(0.184)	(0.191)	(0.199)
Firm Size (Total Assets)	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Total Employees	-0.024*	-0.021	-0.021
	(0.013)	(0.014)	(0.014)
Firm Performance	-5.039*	-4.290*	-4.697*
	(2.621)	(2.752)	(2.804)
Firm Age	0.017	0.014	0.015
	(0.014)	(0.016)	(0.016)
Market volatility	-22.052***	-20.139***	-20.726***
	(6.844)	(7.084)	(7.317)
Firm-Fixed Effects	Yes	Yes	Yes
School-Fixed Effects	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes
Observations	2171	2171	2171
Pseudo R-squared	0.22	0.29	0.33

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

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