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Essays Concerning the Entry and Survival Strategies of Entrepreneurial Firms: A Transaction Perspective

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ESSAYS CONCERNING THE ENTRY AND SURVIVAL STRATEGIES OF ENTREPRENEURIAL FIRMS: A TRANSACTION PERSPECTIVE

by

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A THESIS SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL OF THE UNIVERSITY OF COLORADO IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF DOCTOR OF PHILOSOPHY DEPARTMENT OF MANAGEMENT AND ENTREPRENEURSHIP 2013
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written by Richard A. Hunt
has been approved for the Department of Management and Entrepreneurship

Mathew L. A. Hayward (Chair)

Bret R. Fund (Committee Member)

Date

The final copy of this thesis has been examined by the signatories, and we find that both the content and the form meet acceptable presentation standards of scholarly work in the above mentioned discipline.
ABSTRACT

Hunt, Richard A. (Ph.D., Management & Entrepreneurship)

Essays Concerning the Entry and Survival Strategies of Entrepreneurial Firms: A Transaction Perspective

Thesis directed by Associate Professor Mathew L. A. Hayward

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New and small firms constitute the vast preponderance of organizations engaged in commercial transactions anywhere in the world, and yet the dominant explanatory frameworks have struggled to deduce how and why operational performance varies so widely among these businesses. Even organizations that emanate from similar founding conditions, possess identical parental lineages, or share competitive environments display startlingly high heterogeneity with respect to strategic choices, operational performance and survival prospects. Drawing on and contributing to the theoretical work in microfoundations, capabilities, and strategic entrepreneurship, my research aims to improve the intelligibility, veridicality and usefulness of the explanatory models for new and small firms by employing complete populations, transaction-based data and multi-level analysis. In the three empirical studies comprising this dissertation, I employ a transaction-based perspective that analyzes strategy, as it exists in fact, rather than strategy as it exists rhetorically or conceptually. By examining strategy through the lens of committed transactional activity, I offer fresh perspectives on the entry and survival strategies of entrepreneurial firms.
The first essay delves into the matter of strategic coherence, offering the first comprehensive evaluation of patterned operational behavior for the entire history of an entire industry, beginning from the time of each firm’s inception. The second essay studies unexpected sources of performance variance among entry cohorts and spinoff siblings, thereby elucidating the limits to the transfer of knowledge and capabilities. Finally, the third essay focuses on the development of novel strategic approaches among entrepreneurs who face incomplete markets and persistent resource uncertainties, revealing the ongoing efforts of entrepreneurs to devise and implement survival strategies. Taken in sum, this troika of empirical investigations makes a strong case for a reconceptualization of how and why strategy is formulated and implemented in new and small firms.
ACKNOWLEDGEMENTS

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CHAPTER ONE

INTRODUCTION
INTRODUCTION

The study of entrepreneurial strategy is awash in unexplained variance. As Foss and Lyngsie noted, “Many things, some of them quite important, are still dim in this emerging field” (2011:1). Two decades of work defining and refining the theories of advantage seeking through heterogeneously distributed resources (e.g. Barney 1991; Peteraf 1993) and dynamic capabilities (Helfat et al. 2007; Helfat & Peteraf 2003; Teece 2009; Zollo & Winter 2002) has generated noteworthy insights and produced a compelling foundation for the consideration of performance heterogeneity among firms. And yet, for all this progress, “the processes by which firms obtain or develop, combine, and leverage resources to create and maintain competitive advantages are not well understood,” wrote Sirmon, Hitt & Ireland (2007: 273) This is particularly true among the newest and smallest organizations.

New and small firms constitute the vast preponderance of organizations engaged in commercial transactions anywhere in the world (Aldrich & Ruef 2006), and yet the dominant explanatory frameworks have struggled to deduce how and why operational performance varies so widely among these businesses (Ketchen, Ireland & Snow 2007; Yang & Aldrich 2012). Even organizations that emanate from similar founding conditions, possess identical parental lineages, or share competitive environments; all display startlingly high heterogeneity with respect to
strategic choices, operational performance and survival prospects. What is driving this variance? Why do firms that appear to emerge from similar circumstances often experience radically dissimilar outcomes? Why do some firms reap great rewards from their respective approaches to entry and survival while others flounder from the outset and quickly fail? Are some managers simply smarter than others? Do they possess superior access to resources and factor markets? Or, are there performance and survival rewards for effective strategy formulation? Do strategically coherent participants outperform incoherent participants?

The purpose of this dissertation is to address these challenging questions while confronting key facets of the unexplained performance variance among entrepreneurial ventures. In so doing, I contribute to the nascent-stage literature devoted to examining the formation and implementation of entrepreneurial strategies in young and small firms. Drawing on and contributing to the theoretical work in microfoundations, capabilities, and strategic entrepreneurship, my research aims to improve the intelligibility, veridicality and usefulness of explanatory models by employing complete populations, transaction-based data and multi-level analysis. In an attempt to fill the unaddressed gap connecting conditions, strategies and outcomes, I proffer a transaction-based perspective that analyzes strategy, as it exists in fact, rather than strategy as it exists rhetorically or conceptually. This approach generates surprising and significant findings in each of the studies comprising this dissertation.
The first essay delves into the matter of strategic coherence, offering the first comprehensive evaluation of patterned operational behavior for the entire history of an entire industry, beginning from the time of each firm’s inception. The second essay studies unexpected sources of performance variance among entry cohorts and spinoff siblings, thereby elucidating the limits to the transfer of knowledge and capabilities. Finally, the third essay focuses on the development of novel strategic approaches among entrepreneurs who face incomplete markets and persistent resource uncertainties, revealing the ongoing efforts of entrepreneurs to devise and implement survival strategies. Taken in sum, this troika of empirical investigations makes a strong case for the reconceptualization of how and why strategy is formulated and implemented in new and small firms. This in turn clears a pathway for significant strides towards further addressing the unexplained variance associated with the heterogeneity of firm performance.

Central to my research design is a concerted focus on transactions. The use of transaction-level data allows me to examine simultaneously three inter-related elements (Figure 1): (i.) the role of institutional and environmental conditions (Baum & Oliver 1991, 1992, 1996; DiMaggio & Powell 1983; North 1990, 2005) in fluxing or inhibiting firm formation and market entry; (ii.) the micro-level development and deployment of strategy by small firms (Abell, Felin & Foss 2008); and, (iii.) the emergence of heterogeneous firm-level outcomes (Baum & Oliver 1992, 1996; Hannan & Freeman 1989; Porter 2007).
The simultaneous capture of conditions, strategies and outcomes through the use of transaction-based data creates the necessary circumstances to stress test extant theories related to entrepreneurial entry and survival strategies. Research efforts that study only one or two of these three elements in isolation are inherently handicapped when attempting to produce findings that are intelligible, veridical and useful. A hallmark of the studies comprising this dissertation is the use of transactions to capture all three elements in one set of analytical models (Table 1).
### TABLE 1: THREE DISSERTATION STUDIES – CAPSULE DESCRIPTIONS

<table>
<thead>
<tr>
<th>Study</th>
<th>Research Question(s)</th>
<th>Transaction(s)</th>
<th>Sample</th>
<th>Contribution Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What is strategic coherence? How is manifested among new and small firms?</td>
<td>Negotiated projects, Negotiated regulatory actions</td>
<td>Complete profile of 5.7 million firm-project permutations and 1726 regulatory violations</td>
<td>Offer first compelling definition and examination of strategic coherence.</td>
</tr>
<tr>
<td></td>
<td>How does institutionally sponsored legitimacy affect coherence?</td>
<td></td>
<td></td>
<td>Establish important boundary conditions on the favorable effects of institutional support and munificent operating environments on new sector growth and new firm formation.</td>
</tr>
<tr>
<td></td>
<td>Is strategic coherence an asset or a liability?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Why do so many entrepreneurial spinoffs fail?</td>
<td>Firm formations, Regulatory filings, Negotiated projects</td>
<td>Complete population of 612 firm founders, 61,255 regulatory filings, and 56,240 projects</td>
<td>Establish important boundary conditions related to the parent-progeny model of spinoffs, transferable knowledge and advantageous hereditary endowments.</td>
</tr>
<tr>
<td></td>
<td>If spinoffs possess advantages over de novo entrants, how is this made manifest?</td>
<td></td>
<td></td>
<td>Alternative explanations for performance heterogeneity</td>
</tr>
<tr>
<td></td>
<td>What explains the heterogeneity of performance among spinoffs from the same parent-firm?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>How and why do owner-entrepreneurs develop strategies in the informal economy to contend with persistent resource uncertainties?</td>
<td>Loans by owner-entrepreneurs to employees</td>
<td>459 loans to employees by 83 small business owners</td>
<td>Detailed depiction of transaction-by-transaction creation and implementation of strategy as it exist in fact in entrepreneurial firms.</td>
</tr>
<tr>
<td></td>
<td>How are these manifested in transactions?</td>
<td></td>
<td></td>
<td>The first comprehensive, transaction-based explication of informal market mechanisms</td>
</tr>
<tr>
<td></td>
<td>How is value created and appropriated?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Entrepreneurial Entry and Survival**

Nearly fifty years after Stinchcombe’s seminal work regarding the liabilities of newness and smallness (1965), persistent questions remain regarding the manner in which entrepreneurial entry and survival are determined. As Ketchen,
Ireland & Snow acknowledged, “Much remains unknown about why some firms can successfully pursue strategic entrepreneurship while others struggle” (2007: 373). Some scholars have asserted that the fate of new firms is hard wired at birth as a consequence of the prevailing environmental conditions at the time of founding (Hannan & Freeman 1984, 1989). Others have maintained that organizations can and do evolve, so that a firm’s fate is determined by the ability and willingness of managers to continually adapt to the vagaries of constantly shifting circumstances (Aldrich & Ruef 2006; Helfat et al. 2007; Nelson & Winter 1982; Teece 2009). Still others have sought to chart a middle course by concluding that early evolutionary processes determine “the initial survival fitness of new ventures,” which eventually gives way to stasis and selection (Delmar & Shane 2004: 285).

The theoretical importance of this issue is substantial because the essence of strategy research is to engage in the identification and explication of variance, as it is manifested in the conditions, strategies and outcomes among market participants. Absent intelligible, veridical and useful theories of how and why small and new firms engage in entrepreneurial entry and survival, scholars have been limited in the extent to which they can peer “inside the black box” (Sirmon, Hitt & Ireland 2007) to the inner workings of organizations, which has in turn limited the ability to credibly measure the variance in conditions, strategies and outcomes.

The problem with declaring winners and losers in the “inertia versus evolution” debate (Hannan & Freeman 1984, 1989) is that “previous research on these issues has been inconclusive” (Yang & Aldrich 2012: 477). The smallness and
newness that makes these firms essential to our understanding of entrepreneurship and strategy also insures that the access to reliable data is notoriously difficult. For this reason, the development of intelligible, veridical and useful theories stands as one of the key challenges confronting scholars engaged in entrepreneurship and strategy research. A key theme running through the three empirical studies comprising this dissertation is the assertion that the only way to produce viable frameworks regarding entry and survival strategies is to simultaneously engage conditions, strategies and outcomes at the most fine-grained unit of analysis that engages all three elements simultaneously: the transaction.

A Transaction Perspective

As John Commons famously noted, “The ultimate unit of activity...must contain in itself the three principles of conflict, mutuality, and order. This unit is the transaction” (Commons 1932: 4). In a sense, Commons was positioning transactions in the larger socio-economic context. He was, wrote Williamson, seeking to demonstrate that transactions are the primary vehicle through which to “infuse order, relieve conflict and realize mutual gain” (Williamson 2002: 439. Emphasis is Williamson's). Commons was, of course, an economist, but his guidance is broadly applicable, with great relevance to phenomena throughout the social sciences and management, including research in strategic management and entrepreneurship. A core assertion of this dissertation is that transaction-based analysis is indispensible because transactions represent the ultimate measure of a
firm’s strategy, as it exists in fact, because transactions constitute committed action in the marketplace for goods and services.

In the New Institutional Economics (NIE), transactions assume a central role through the theory of transaction cost economics (Coase (1937, 1960; Williamson 1975, 1985, 2002). Transactions as defined by Williamson (1985: 1) are the transfer of goods or services across technologically separable interfaces. This refers to the junction at which one stage of activity terminates and another begins. This definition is perfectly suitable for its intended use as a platform for the M-Corp value chain dynamics so evident in transaction cost economics (Williamson 1985), but it is unnecessarily constraining when seeking to address the broader role transactions play in the full lifecycle of an industry or firm, including early-stage opportunity identification and revenue generation.

Taking into account these wider ranging dimensions of transactions, I would instead propose that transactions be defined as: *Any agreement between two or more people that results in the exchange of something possessing value.*\(^1\) This definition opens the door to a more fruitful application of transactions to business strategies, entrepreneurship and innovation; and, the reconceptualization embraces organizations of any age or size, which is vital to insuring the applicability to entrepreneurship. It also allows for the discovery and use of the cultural, historical and symbolic information that is warehoused in transaction-level data. Through this, intelligibility, veridicality and usefulness are enhanced.

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\(^1\) Value can be manifested either in the present or the future, but since something that has the potential for future value necessarily has current value - even if that value is simply the option to exploit the future value (Trigeorgis 1993) – it is redundant to refer to current and future value.
**Intelligibility** pertains to the comprehensibility of a given theory. Since business strategy is “the pattern of decisions in a company that determines and reveals its objectives, purposes, or goals” (Andrews, 1980), the only reliable basis upon which strategic decisions are made manifest is through the occurrence or non-occurrence of a transaction. Regardless of whether a strategy is planned or emergent (Mintzberg 1979; Mintzberg & Waters 2006), it is only through its operationalization in transactions that it truly assumes the form of what Whittington termed strategy-in-practice (Whittington 1996, 2006). Transactions are the only unit of analysis that simultaneously contains the past, present and future, for the focal firm, for all competitors and even for the tangible and intangible facets of the operating environment.

**Veridicality.** “Veridical“ comes to us from the Latin veridicus, literally meaning, “to say the truth." In modern times, veridicality is commonly used to convey that which “closely coincides with reality” (OED 2012). In the three studies to follow, I argue that: (i.) serious veridicality gaps exist in strategy and entrepreneurship research; (ii.) these veridicality gaps can be shown empirically to have a significant impact on extant theories; and, (iii.) the primary impediment to veridicality stems from the inability or unwillingness to examine phenomena through a transaction perspective. Transactions have the benefit of being in-context expressions of committed action. Although transactions are obviously subject to varying interpretation, the starting point of any discussion begins with the
substantiated fact of a transition’s occurrence. This creates a more viable foundation of veridicality when theory building and theory testing.

**Usefulness.** To both scholars and practitioners, the usefulness of a theory relies upon intelligibility, veridicality and relevance. The first two have been discussed above, but relevance requires additional discussion, especially as it pertains to practitioners. “Strategic management as a field of inquiry is firmly grounded in practice and exists because of the importance of its subject,” averred Rumelt, Schendel and Teece more than two decades ago (1991: 7). “Society is served by efficient, well-adapted organizations and strategic management is concerned with delivering them through the study of their creation, success and survival, as well as with understanding their failure, its costs, and its lessons” (1991: 8).

If so, then there is ample reason to believe that there exists a relevance gap. In 2007, the *Academy of Management Journal* published a 50th Anniversary issue solely devoted to the subject of practitioner relevance. Issue editor, Sara Rynes lamented that, “The gap between science and practice is so persistent and pervasive that some have despaired of its ever being narrowed” (2007: 987). “Some believe that our failure to “matter more” (Hambrick, 1994) is approaching a crisis stage (e.g., Bartlett, 2007)” (Rynes, Giluk & Brown 2007: 999). Usefulness is undoubtedly in the eye of the beholder, but finding a pathway to increase the “relevance, usefulness, and interest to practitioners” (Rynes 2007: 1046) may be tangibly enhanced by the use of transactions as a unit of analysis.
Summary of Three Essays

My dissertation consists of three large-scale empirical studies each of which makes use of a transaction perspective to cast light upon extant theory. Each study can be thought of as a portal to strategic phenomena and relationships constituting the central tenets of three major research streams in the study of entrepreneurial strategy: institutionally driven environmental munificence and the effects of strategic incoherence; intra-industry entrepreneurial spinoffs and the emergence of performance variance even among parent-group cohorts; and, strategic activity through the innovative development and use of informal market mechanisms. Each of these three portals were specifically selected to demonstrate the extent to which transaction-based analysis provides additional dimensionality to incumbent theoretical frameworks by incorporating information that is unique to transactions, as the embodiment of committed action.

Essay One, Contagion Entrepreneurship: Institutional Support, Strategic Incoherence and the Social Costs of Over-Entry, employs transaction-level analysis to conduct the first comprehensive examination of the sources and consequences of strategic coherence among new market entrants. The specific context of the study involves a legislative action taken by Congress in 1985 to mandate the abatement of asbestos-containing materials; an act that triggered, virtually overnight, the formation of an entirely new industry.

Existing literature on the legitimizing role of institutions tilts towards a “more is better” perspective, proffering the notion that the liabilities of smallness
and newness can be mitigated through institutional policies that foster acceptance, trust and confidence. Although this may seem reasonable, even desirable, institutional munificence can trigger massive over-entry, potentially causing unintended consequences and unwanted social costs. Using a dataset of nearly six million transaction-level decisions involving all 612 companies and 56,240 permitted projects from a complete industry history, I found that unforeseen costs arise when small, early-stage firms substitute the legitimizing effects of institutional support for strategic coherence.

My findings are surprising and significant. While institutional support for new markets does in fact generate a surge in firm formations, the ill-effects of munificence are evidenced by indiscriminate, contagion-style market entry by unfit firms that perform poorly, fail quickly, and leave a long trail of regulatory violations in their collective wake. The study provides the first exhaustive measure of strategic coherence, built from a complete set of all operational activity for every firm in an entire industry. The results elucidate the intimate details of strategy, as it exists in fact, thereby allowing for the first side-by-side comparison between strategically coherent and incoherent firms. Additionally, my findings offer opportunities for scholars, practitioners and policy-makers to reassess the core assumptions related to the benefits and costs of institutional support for new industries, firms, and entrepreneurs.
The second essay, *Making Sense of Performance Heterogeneity Among Entrepreneurial Spinoffs*,\(^2\) examines the key drivers of nascent-stage variance. Through the discovery and exploitation of a complete industry population, this paper presents empirical evidence challenging widely held beliefs related to intra-industry entrepreneurial spinoffs (sometimes called “spinouts”), which occur when employees leave a parent-firm to start a new, completely independent company as an entry vehicle into the same industry as their former employer (Klepper, 2001), without support or sponsorship from the parent-firm.

In recent years, spinoff theory has coalesced around the perspective that knowledge is transferred from parent-firms to progeny in hereditary fashion, endowing spinoffs with a performance advantage over *de novo* entrants (Agarwal, Echambadi, Franco & Sarkar, 2004; Chatterji, 2009; Dick, Hussinger, Blumberg & Hagedoorn 2011; Dyck 1997; Eriksson & Kuhn 2006; Franco & Filson 2006; Gompers, Lerner & Scharfstein 2005; Ioannou 2009; Klepper 2001, 2002, 2007, 2009; Klepper & Sleeper 2005; Klepper & Thompson 2010; Phillips 2002), endowing spinoffs with performance advantages over *de novo* entrants (Brittain & Freeman, 1986; Christensen, 1993; Stuart & Sorenson, 2003; Agarwal, et al., 2004; Klepper & Sleeper, 2005; Chatterji, 2008). As Klepper and Sleeper asserted, “Firms can be thought of as giving birth to spinoffs, so that spinoffs have parents from whom they inherit specific traits, in this case knowledge” (2005: 1303).

\(^2\) Published in *Frontiers of Entrepreneurship Research (2012)*
However, the emerging orthodoxy may not properly account for the high failure rates and extreme heterogeneity of performance among entrepreneurial spinoffs. A key driver of the problems with prior studies stems from the reliance on truncated archival data. To remedy this shortcoming and address the underlying theory more forcefully, I examined a complete, non-truncated industry population that includes 448 entrepreneurial spinoffs. In the context of a complete population, I find that: (a) de novo entrants actually outperform spinoffs; (b) parent-firm quality exerts no discernible influence on spinoff quality; and, (c) founder-specific experience, not parental lineage, is the primary driver of spinoff performance heterogeneity. Each of these has implications for the study of spinoffs, knowledge transfer and firm foundings.

The final essay, *Parity, Paternalism and Peonage in the Informal Economy: An Empirical Study of Off-the-Books Loans*,3 substantiates and extends the findings in the first and second studies by examining the development and implementation of entrepreneurial survival strategies by small firms that have become substantively operational. The study provides a rare portal to strategic decision-making and behavior through the novel use of transaction-level data involving 459 illegal, off-the-books loans issued to employees by 83 small business owners. The analysis reveals that individuals will develop and implement ingenious strategies using informal economic mechanisms even when formal market alternatives exist, if the formal alternatives are judged to be unattractive or unfair. By extending key

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theoretical tenets of relational exchange and relational rents into this new context, my analysis demonstrates that a relational surplus can be created when owners and employees abandon formal markets and formal institutional protections by resorting to a complementary exchange through informal economic mechanisms. The study reveals, however, that while both parties share in the creation of a relational surplus, business owners deftly appropriate the surplus by binding employees to the firm.

The study exposes the detailed, transaction-by-transaction construction of strategy in order simultaneously assess the conditions, strategies and outcomes of entrepreneurial responses to persistent labor uncertainties. The study constitutes the first transaction-based assessment of entrepreneurial strategizing in the informal economy. It introduces numerous new lines of inquiry for scholars, new sources of insight for practitioners and a cautionary tale for policy-makers.

Summary of Contributions

My dissertation makes several noteworthy contributions. First, the studies provide important insights into the creation and survival of new and small organizations. The analysis of early-stage events is indispensable to an understanding of how and why operational performance variance occurs among firms, and yet reliable data is often simply unavailable (Yang & Aldrich 2012). This fact has had a deleterious impact on the theory-building efforts in entrepreneurship and strategy research (Hitt, Gimeno & Hoskisson 1998; Hoskisson, Hitt, Wan & Yiu
By creating a portal through which to assess strategic activity at its most atomistic level across a complete population of entrepreneurial market participants, my findings tangibly enrich the efforts to formulate better predictive models for firm survival and failure.

Second, I demonstrate a useful approach for bridging the micro – macro divide that continues to bedevil much of entrepreneurship and strategy research. Even with continuing calls for multi-level analysis, remarkably little progress has been made in applying multi-level models to empirical studies in strategy and entrepreneurship (Hitt et al. 2007). By simultaneously engaging conditions, strategies and outcomes through the use of transaction-level data, I offer a viable solution for addressing the micro – macro divide and thereby establish common ground for a more productive interchange between the microfoundations and capabilities streams.

Third, I develop and test the first comprehensive measure of strategic coherence among new and small firms. Through the use of exhaustive transaction data from a complete industry population, I deconstruct and examine the fine-grained detail of patterned and unpatterned operational activity, while demonstrating the relationship between strategic coherence, operational performance, organizational survival and the associated impacts on society. The conduit for achieving this is by providing a compelling case for the application of a transaction-based perspective to the study of entrepreneurship and strategy. Much of the extant literature, even in the realm of strategic entrepreneurship, focuses
either on pre-strategic activity at the micro-level, which runs the risk of being unintelligible due to the decontextualization that accompanies micro-analysis, or post-strategic activity at the macro-level, which runs the risk of being non-veridical due to firm-level and sector-level aggregations. In marked contrast, a transaction perspective uniquely offers a view of strategy, as it exists in fact, in the form of committed actions that are inherently associated with transactional activity.

Finally, I make significant progress towards the development of explanatory frameworks for strategy and entrepreneurship that are more intelligible, veridical and useful than the incumbent theories of entry and survival. Usefulness is an indispensible precondition to insuring that scholarly research is relevant to practitioners. As Rumelt et al. asserted, the scholarly study of strategic management has long and deep roots in practice of strategic management (1991). Cognizant of this important connection, each of the three studies comprising this dissertation presents exciting new insights and opportunities for practitioners and policy-makers, as well as scholars. Notably, this usefulness is not attained simply through the identification of main effects or average effects, but also by delving into the heterogeneity that singularly defines the study of strategic management and holds the greatest promise for continued progress in the study of entrepreneurship. And, the portal through which this usefulness is derived is built upon a transaction perspective.
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CHAPTER TWO

CONTAGION ENTREPRENEURSHIP: INSTITUTIONAL SUPPORT, STRATEGIC INCOHERENCE AND THE SOCIAL COSTS OF OVER-ENTRY
CONTAGION ENTREPRENEURSHIP: INSTITUTIONAL SUPPORT, STRATEGIC INCOHERENCE AND THE SOCIAL COSTS OF OVER-ENTRY

1. INTRODUCTION

With few exceptions, governments are highly motivated to seek out and facilitate the economic benefits accrued from the expansion of entrepreneurial activity (Acs, Desai, and Hessels 2008; Wennekers and Thurik 1999). Although actual success rates vary dramatically nation-to-nation (Acs et al. 2008; Acs and Szerb 2007; Greene, Mole, and Storey 2008; Van Stel, Storey, and Thurik 2007), an increasingly large body of evidence demonstrates that governments have the capacity to fuel increased firm formation and new market entry through incentives (Acemoglu 1995; Baumol 1990), protections (Caree and Thurik 1996; Casson 1982) and regulatory engineering (Van Stel et al. 2007). However, there is no evidence that scholars, entrepreneurs and policy-makers have come to terms with a sobering, counterpunctal reality: highly munificent conditions may not translate into stable industries, viable firms and social welfare gains.

Through the lens of a complete industry population, I investigate more thoroughly the actions taken by formal institutions to stimulate sector and firm formations by bestowing “legitimacy-by-fiat.” I present evidence showing that the munificent conditions created through institutionally endowed legitimacy result in a complicated assortment of positive and negative outcomes, many of which are related to small firm market entry strategies. Using exhaustive data from an
industry created by a 1985 Act of the U.S. Congress, my results suggest that increased support from formal institutions is associated with decreased strategic coherence on the part of new market entrants, meaning that new firms may display unpatterned operational activity, indicative of an inability or unwillingness to pursue a consistent course of action. Further, I find that strategic incoherence is associated with poor operational performance, rapid firm failure and a dangerously high occurrence of regulatory violations.

The study of institutional support and firm-level strategic coherence strikes straight to the heart of several long-running debates regarding the relationships between entrepreneurial action (Alvarez and Barney; McMullen and Shepherd 2006), strategic processes (Sarasvathy 2008; Slevin and Covin 1997), strategic content (McDougall and Robinson 1990; McDougall, et al. 1994; Schoonhoven and Romanelli 2001), firm-level outcomes (Hitt, Ireland, and Hoskisson 2007; Lumpkin and Dess 1996, 2001; Rauch, Wiklund, Lumpkin, and Frese 2009) and the role of institutions in facilitating the growth of new industries. In this context, institutional support refers to policies, practices and policing activities that result in a munificent business environment characterized by attractive opportunities for new and existing market participants. While institutional support is often understood to consist of direct government action, such as legislation, incentives and subsidies, these direct measures are often just the most formal and self-evident manifestations of support (Li, 2002; Schwartz and Clements 1999). Exclusive focus on formal support likely understates the multi-faceted and long-lived influence of
formal and informal institutions on customs, attitudes, behaviors, mores, preferences, and, of course, market activity (North 1990)

Existing literature on the legitimizing role of institutions (Baumol 1990; Brousseau and Glachant 2008; Meyer and Rowan 1977; DiMaggio and Powell 1983; North 1990; Oliver 1990; Scott 1987, 1995) has often titled towards a “more is better” perspective (Baum and Oliver 1991; Baumol 1990; Powell 1988; Rothwell and Zegveld 1982), proffering the notion that cognitive and sociopolitical resistance to emergent industries can be mitigated through a greater emphasis on institutional policies and actions that help to build acceptance, trust and confidence (Aldrich and Fiol 1994; Baum and Oliver 1991). Based on the evidence from this study, I find this perspective to be unnecessarily one-sided, particularly in the context of small, nascent-stage firms and emergent industrial sectors. Using a dataset of 5.7 million transaction-level decisions involving all 612 companies and 56,240 permitted projects from the entire history of the Colorado asbestos abatement industry, I find that firms will substitute the legitimizing effects of institutional support for strategic coherence. The ill effects of this phenomenon are evidenced by indiscriminate, contagion-style market entry by unfit firms that perform poorly and fail quickly, leaving a long trail of regulatory violations in their collective wake.

By capitalizing on the discovery of a complete industry population, this study poses a number of vital questions that are impossible to address in the context of less exhaustive data that potentially truncates numerous early failures: Why might
institutional support yield anything other than completely positive results? How does institutional support affect the formation and implementation of coherent strategies by small firms? Why might institutional support reduce patterned strategic behavior? Under what circumstances would a newly founded firm enter the market and seek to operate without a coherent strategy? What are the characteristics of in-context, small firm strategic incoherence? What is the fate of strategically incoherent firms and what is their market-level impact?

In addressing these questions, this study makes several noteworthy contributions. First, the study constitutes one of the most comprehensive and definitive demonstrations to-date of the role institutions play in increasing the rate of firm foundings (Brittain and Freeman 1980; Carroll and Hannan 1989; North 1990; Zucker 1989). To a far greater degree than prior empirical work, the micro-analytics presented in this study provide explicit measures of the extent to which formal institutions are able to directly influence rapid formation of industries and firms. On the other hand, the study also provides the important revelation that prior research was too sweeping in its generalizations regarding the positive role of institutions in reducing firm mortality (e.g. Baum and Oliver 1991) and improving operational performance (e.g. Swaminathan 1995). Through the discovery and explication of a complete industry population, I repair and redirect existing theory regarding institutional effects on mortality and performance to reflect a significantly more complex interaction that exists between institutional support, individual entry decisions and firm-level outcomes. More broadly, the paper
contributes to entrepreneurial strategy (Hitt, Ireland, and Hoskisson 2007; Hitt, Ireland, Sirmon, and Trahms 2011; Ireland, Hitt and Sirmon 2003; 2009; Ketchen, Boyd, Snow 2007; Kuratko and Audretsch 2008) and industrial organization theory (Caves and Porter 1977; Mintzberg 1978; Porter 1980; Rumelt, Schendel and Teece 1995) by empirically detailing the circumstances under which small, nascent-stage firms enter markets and conduct operations despite the absence of a coherent strategy (Mintzberg 1978). While extant scholarship has focused on the benefits of institutionally induced firm formation and market entry, the concomitant rise of contagion entrepreneurship may bring with it an unexpectedly high price tag.

In the next section, I delve into the relevant literature related to legitimacy and institutional support, exploring the ways in which scholars have related each to market entry decisions and firm performance. Applying this prior work, I identify gaps related to the under-studied domain of strategic coherence. This leads the to development of six testable hypotheses, framing the causal chain from institutional support, to excess entry, to floundering firms, to adverse social outcomes. Following this, I detail the methods used to collect and analyze a complete industry population. After presenting the major results, I discuss practical and theoretical implications of the findings and important considerations for future research.
2. THEORETICAL DEVELOPMENT AND HYPOTHESES

Legitimacy and the Effects of Institutional Support

“Legitimacy,” as defined by Suchman, “is a generalized perception of the assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values beliefs and definitions,” (1995: 574). The strategy and entrepreneurship literature has focused principally on two elements of this social construction: socio-political legitimacy and cognitive legitimacy. Consistent with Aldrich and Fiol, socio-political legitimacy is taken to be the “process by which key stakeholders, the general public, key opinion leaders or government officials accepts a venture as appropriate and right given the existing norms and laws,” while cognitive legitimacy “refers to the spread of knowledge about a new venture” to the extent that “an activity becomes so familiar and well known that it is taken for granted” (Aldrich and Fiol, 1994: 648; Hannan and Freeman, 1984, 1989). Conventional wisdom regarding the role of institutions suggests that a firm or population of firms benefits from institutional support (Aldrich and Fiol, 1994; Oliver, 1990, 1991; Powell, 1988; Zucker, 1989). Empirical studies have found that the presence of a sympathetic institutional environment accounts for meaningful improvements in performance (e.g. Baum and Oliver, 1991; Swaminathan 1995); although often this munificence forms over the course of many years, and sometimes multiple generations (Aldrich and Fiol 1994; Klepper and Graddy 1990). The asbestos abatement industry dramatically accelerated this set of conditions. From the outset, there was no institutional vacuum. Instead of a
painstaking process of building legitimacy, institutional and environmental munificence were created by-fiat through Congressional legislation. In the absence of any incumbent service providers, this Act strongly encouraged new firm formation and market entry. Therefore, this set of circumstances makes it possible to perform a direct and definitive test of the assertion:

Hypothesis 1: Institutional support is positively related to market entry.

The Stampede of Unfit Firms

Intuitively, the support generated through institutionally endowed legitimacy would seem to be a boon to new market entrants (Baum and Oliver 1991). Greater munificence should translate into broad-based market acceptance for nascent firms, removing entry barriers while driving down firm-level survival risk. Indeed, these are precisely the developments typically envisioned by proponents of institutional support (Baumol, 1990; Brousseau and Glachant, 2008; North, 1990). It comes as a great irony then that periods of institutionally sponsored munificence are often accompanied by a staggering decrease in average operational performance and a sharp increase in firm-specific survival risk. In what is tantamount to a gold rush effect, poorly equipped, relatively unfit firms enter in droves (Barnett, et al., 2003; Haveman, 1993) without proper consideration for industry dynamics (Porter, 1980, 1985) or environmental signals (Aldrich, 2008; Hambrick, 1982; Thomas, Clark, and Gioia, 1993). As is the case with all gold rushes, contagion draws out the heroes, the hopeful and the hapless. “For every miner with a sack of gold dust, there are a
thousand more who are starving and ragged,” remarked one eastern observer about the spectacle of the 1858 Colorado gold rush (NY Herald, 1859).

The gold rush parallel is not strictly metaphorical. While the failure rate for new firms seeking fortune in asbestos abatement is less staggering than the desultory results of 19th century gold prospectors, the firm failure rate is still shockingly high: Of the 612 total firm foundings during the 25-year history of the Colorado asbestos abatement industry, only 104 were operational in 2011. As Figure 1 indicates, the mortality rate at ten years is nearly 80%. Of course, high failure rates among nascent-stage firms are not unique to the abatement industry. The failure rate for all new businesses in the United States is 25% in the first year and 44% by the third year (Shane, 2008: 99) Yet, even these lofty figures pale in comparison to the attrition rates experienced by asbestos abatement market entrants (Figure 1).

**Figure 1: Attrition Comparison Abatement Firm Versus All New Firms**

<table>
<thead>
<tr>
<th>Year</th>
<th>All New Firms (U.S.)</th>
<th>Colorado Asbestos Contractors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>75%</td>
<td>65%</td>
</tr>
<tr>
<td>Year 3</td>
<td>56%</td>
<td>37%</td>
</tr>
<tr>
<td>Year 5</td>
<td>45%</td>
<td>29%</td>
</tr>
<tr>
<td>Year 10</td>
<td>29%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Note: To avoid right-side truncation effects, Figure 1 includes asbestos firms from 1986 – 2000.
As the data comparison reveals, only 37% of abatement firms survive beyond the third year, compared to 56% for the general pool of new foundings represented by Shane’s 1992 analysis. The obvious question is: Why would an industry that enjoyed cognitive and socio-political legitimacy from its inception so dramatically underperform industries that are not privy to the unequivocal support of formal institutions or the widespread market acceptance of its target customers? Prior research strongly suggests that institutional support (DiMaggio and Powell, 1983; Meyer and Rowan, 1977; Scott, 1987; Swaminathan 1995; Zucker, 1987), institutional relations (Baum and Oliver 1991; Singh, Tucker and House, 1986;) and institutional legitimacy endowments (Aldrich and Fiol, 1994; Suchman, 1995) are associated with improved operational performance (Baum and Oliver, 1991; Oliver, 1990, 1991; Powell, 1988; Swaminathan, 1995) and improved odds of survival (Baum and Oliver, 1991; DiMaggio and Powell, 1983; Hannan and Freeman, 1984; Meyer and Rowan, 1977; Scott, 1995). If so, then why aren’t these favorable effects evidenced in outcomes for firms in the abatement industry? Why would these firms actually fail more quickly than firms in other, less-advantaged industries?

Barnett, Swanson and Sorenson demonstrated the paradox of munificence in their longitudinal study of U.S. mainframe businesses, noting, “It appears that precisely those conditions that increase organizational founding end up decreasing the life spans of these new organizations” (2003: 690). Barnett et al., specifically highlighted the facilitating role of “a change in legal regimes or institutions easing foundings” (691), but data limitations prevented them from fully exploring these
important avenues. Equipped with highly granular set of non-truncated data, I predict that in the context of a complete industry population:

Hypothesis 2: *Institutional support is inversely related to firm fitness.*

**Strategic Coherence**

The empirical treatment of strategic coherence has little precedence in management literature, owing primarily to the paucity of data. In the absence of quality alternatives from the management literature, coherence is defined for this study as “a logical, orderly and consistent relationship of parts” (OED, 2011), thereby connoting identifiable similarity and consistency. There is support for this perspective in strategy studies, including Andrews’ assessment that “corporate strategy is the *pattern* of decisions in a company that determines and reveals its objectives, purposes, or goals” (Andrews, 1980: 13. Emphasis is mine.).

The revelatory component of Andrews’ definition suggests that a firm’s strategy should be evident from patterns of decisions, represented by observed behaviors. In this sense, strategic coherence is the observable presence of consistent market-based action, evidenced by business behaviors that display strong similarities in terms of time, space, scale and purpose or outcomes. Regardless of whether a strategy is planned or emergent (Mintzberg 1978; Mintzberg and Waters 2006), it is only through its operationalization in transactions that it truly assumes the form of what Whittington termed strategy-in-practice (Whittington 1996, 2006).

The notion of consistent, patterned behavior runs through the handful of prominent efforts to examine coherence in strategic management. Teece and Rumelt
(1994) took up the issue in the context of corporate coherence, asking why firms choose to diversify coherently. In their view, “firms are coherent to the extent that their constituent businesses are related to one another” (1994: 2). Exhibiting their industrial organization perspective and primary interest in the effects of diversification, Teece and Rumelt asserted that “businesses are related if there are economies to their joint operation and/or ownership” (1994: 3). Nath and Sudharshan (1994: 44) took a different approach by “measuring strategic coherence through patterns of strategic choices.” Specifically, the authors developed novel measures to test the degree to which acute care hospitals displayed internal consistency between their respective business and functional strategies. In their cross-sectional analysis of data collected between 1986-1987, Nath and Sudharshan found that performance differences were evident as a consequence of “greater or lesser strategic coherence” (Nath and Sudharshan 1994:59).

The element of time is critical to the examination of strategic coherence because firms and the market environment are continually interacting (Eisenhardt, 1989) so that the appearance of coherence at any given point may prove to be a non-recurring, non-persistent state. For this reason, coherence is not a construct that can be determined from snap-shot methodologies. Lamberg et al. (2005) sought to address the temporal considerations of strategic coherence in a longitudinal study of Finnish grocery chains, through data spanning 1945-1995. By analyzing advertising behavior across this fifty-year period, Lamberg et al. sought to relate strategic consistency to long-term organizational survival. By conjoining
evolutionary theory streams highlighting the role of adaptation (Zajac, Kraatz, and Bresser, 2000) with the role of continuity (Nelson and Winter, 1982), the authors demonstrated that successful retail firms exhibited a higher degree of strategic consistency.

A long line of strategy and IO scholars have propounded the view that the key to developing an effective business strategy is to properly match a firm’s resources and capabilities to the environmental conditions that exist in the present or are likely to exist in the future (Abell, 1980; Ansoff, 1965; Hofer and Schendel, 1978; Hofer, 1985; Porter, 1980, 1985). As noted earlier, under conditions of perceived munificence, firms may be less likely to engage in these processes (Barnett et al., 2003), such that contagion entry is driven by the generalized belief that an opportunity exists, rather than a detailed analysis of firm resources and environmental conditions. Aldrich and Fiol termed this the “fools rush in” phenomenon (1994). Brinckmann, Grichnik and Kapsa (2010) went further by performing a meta-analysis of studies on planning that asked, “Should entrepreneurs plan or just storm the castle?” These are the right questions to ask, but answers have been less apparent in determining the extent to which institutional and environmental conditions result in greater or lesser strategic coherence. Since institutional support for the asbestos abatement industry materialized through legitimacy-by-legislative-fiat, it provides an exceptional arena to simultaneously engage conditions, strategy and outcomes among small and new firms suddenly encountering a munificent environment. In extending the argument
that munificent circumstances will be characterized by contagion entry and unpatterned behavior, I expect that the strategic matching process that is a hallmark of IO economics (Abell, 1980; Hofer 1985) is weakly evidenced, or ignored altogether. More formally:

Hypothesis 3: *Institutional support is inversely related to strategic coherence.*

**Strategic Coherence and Firm-Level Performance**

Significant debate has ensued regarding the importance – or lack of importance – related to strategic behaviors. Recent studies involving bricolage (Baker and Nelson, 2005) and improvisation (Baker, Miner and Eesley, 2003) as well as effectuation (Sarasvathy, 2001), transformation (Sarasvathy and Dew, 2005) and exaptation (Dew, Sarasvathy and Venkataraman, 2004) have each sought to emphasize the extent to which strategy assumes a subordinate role to exploration and survival among nascent-stage organizations. These various frameworks posit organic, highly iterative early-stage business behaviors (e.g. Sarasvathy, 2001) on the part of entrepreneurs. Individually and collectively, these various approaches have contributed to a fuller understanding of opportunity identification and exploitation (see the review in Short, Ketchen, Shook and Ireland, 2010). However, these research streams may have over-romanticized the chaos of nascent firms and markets, while understating the potential benefits of strategic coherence. As *post hoc* studies involving surviving firms, these approaches also suffer from a selection bias that fails to properly account for circumstances faced by the many failures,
which significantly outnumber the few successes. Untested in these emerging theories of bricolage, improvisation and effectuation is the possibility that the small populations of successful individuals that form the basis of these theories are able to survive in spite of strategic incoherence, not because of it. In the context of a complete population of firms, I predict that the absence of an orderly approach to market opportunities will, on average, prove to be a significant liability. Earlier, I predicted that demonstrably unpatterned behavior will be commonplace among market entrants that are enticed by an institutionally driven legitimacy-by-fiat. Based on the findings of Barnett et al. (2003) as well as the underperformance of abatement firms captured in Figure 1, it is reasonable to expect that, on average, disjointed, unpatterned behavior may produce negative consequences for new firms. Building on the predictions that institutionally endowed legitimacy will fuel gold rush-style market entry by unfit, strategically incoherent firms, it is further predicted that the great preponderance of these nascent firms will suffer brief, ignoble existence. More formally:

Hypothesis 4a: Strategically incoherent firms are less likely to survive than strategically coherent firms.

Hypothesis 4b: Strategically incoherent firms will exhibit lower operational performance than strategically coherent firms.

Unsafe Entrants – The Social Cost of incoherence

Ultimately, the purpose of enacting asbestos abatement legislation was to institutionalize and enforce practices that promulgate more effective norms for individual and collective health and safety. The engineering controls associated
with fully compliant asbestos abatement are complex, requiring specialized training, equipment and materials. Controls are also expensive. Abatement routinely adds ten percent or more to the cost of renovation or demolition. For a large structure, abatement costs can total millions of dollars (Vitra, 2002). To the uninitiated, the asbestos abatement process may appear to be labyrinthine (Fumento, 1999). Given the regulatory complexity, high costs and specialized knowledge, the owners of structures requiring abatement confront significant hazards (Fumento, 1999) and daunting information asymmetries (Jamal and Bowie, 1995). In this context, there is a risk that contractors may be motivated to shirk their responsibilities though non-compliant work practices. When this occurs, an additional social cost is created that may be directly related to unfit firms in the context of institutional support. This would be ironic since the purpose of the institutional support for asbestos legislation ostensibly stems from a desire to reduce health risks, not escalate them. The test of this potential social cost involves examining whether or not strategically aimless firms choose to compromise service quality, despite the obvious risks associated with a hazardous material and in the context of institutionally endowed legitimacy.

Under the protective cover of socio-political legitimacy (Aldrich and Fiol 1994), strategically aimless and financially weak firms might be motivated to compromise service quality despite the obvious risks associated with a hazardous material. Shoddy work, uneven standards, weak accountability, and ill-formed
grievance procedures, might together conspire to unhinge the basic premise of the original institutional intervention: public safety. More formally:

Hypothesis 5: *Strategically incoherent firms will commit more regulatory violations.*

3. THE ASBESTOS ABATEMENT INDUSTRY

For the four thousand years leading up to 1986, the use of asbestos was synonymous with wondrous product durability, safety and aesthetic quality. More than 5,500 documented uses of asbestos were developed for products that circumscribed the entirety of human existence: asphalts, cement, resilient flooring, fire-proofing, sound proofing, children’s pajamas, bed sheets, toasters, blow dryers, pipe insulation, electrical wiring, roofing, siding, insulations, water pipes, funeral pyre shrouds, reusable napkins, pottery, ovens, and thousands of others.

*Asbestos Health Risks.* The glass-like, barbed structures emanating from asbestos crystals are a scourge to the human respiratory system (Vitra, 2002). Though highly inert in its manufactured state, disturbed ACM releases tiny asbestos fibers that can migrate past natural protective systems and become lodged in the lungs, causing irritation, inflammation, scarification and eventually, dysfunction. Sustained exposure to high doses of airborne asbestos fibers can potentially result in asbestosis, lung cancer and mesothelioma.

*Regulatory History.* Until the mid-1980s, concern regarding human exposure to asbestos in existing buildings progressed slowly, given the long latency periods for asbestos-related illnesses and the absence of definitive studies
connecting low-level asbestos exposure to potential health risks. The general concern regarding the handling of ACM in existing building materials was loosely conveyed in a number of air quality and worker safety provisions, until the passage of the Asbestos Hazards Emergency Response Act (AHERA) in 1985. Though specifically concerned with asbestos in schools, the Act formally established standards requiring the professional abatement of asbestos in existing structures. Functionally, enforcement was delegated to state-level agencies.

**State-Level Enforcement.** Many states chose to administer federal enforcement of the new asbestos regulations in a minimalist fashion, through simple reference to AHERA, while investing little or no state-level oversight over and above that dictated to the states by the EPA. However, in a limited number of instances, states elected to implement regulations that were stricter than federal law and that placed the power of enforcement in the hands of newly formed regulatory divisions devoted to monitoring compliance. Colorado was one of these “high-enforcement” states, whereby regulations were adopted that required professional certifications, company licenses and project permitting that were idiosyncratic to Colorado.

**Institutional Munificence:** The highly compressed nature of the asbestos abatement industry growth trajectory affords an unusually provocative array of insights regarding the effects of institutional changes on industry entries and exits. Three institutional shocks are evident in the 1986 – 2010 period -- 1986, 1995 and 2005 – each representing a major governmental policy change that expanded the
abatement industry’s customer base, thereby increasing the resources available to the industry population, which has the effect of increasing the carrying capacity (Figure 2). In 1986, strident legislative action substantively created a “closed” abatement industry in Colorado. In 1995 and 2005, Colorado increased the range of structures that were subject to abatement requirements by mandating that residential structures undergoing renovation or demolition must first be abated. Each one of these legislative acts increased the level of regulatory munificence for industry participants. In addition to increasing the addressable market, the actions taken in 1986, 19954 and 2005, increased public awareness of asbestos hazards and more fully legitimized the role of asbestos abatement contractors.

**Figure 2: The Colorado Asbestos Abatement Industry 1986 - 2010**

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4 The 1995 legislation did not take effect until 2000 due to state-level legislative sunset provisions.
This dynamic is evidenced by the increased number of permitted projects and the widening array of customers for abatement services. In response, the periods following these institutional developments are marked by a rapid increase in market entrants and State-certified abatement personnel. The effect of these institutional shocks can be seen in accelerated rate of entry in Figure 2. Contrary to the composite industry growth curve developed by Klepper and Graddy (1990), it is evident that the growth trajectory for the Colorado Asbestos Abatement Industry is nothing less than mercurial. This is not to suggest that the generalized Klepper and Graddy curve for industry evolution is wrong. Rather, the radically accelerated growth for the abatement industry underscores the extent to which institutional support was decisive in stimulating rapid, indiscriminate market entry.

4. METHODS AND DATA

This empirical analysis of the Colorado asbestos abatement industry involves a retrospective research design with archival data comprised of the complete population of firms having ever entered or exited the asbestos abatement market. The methodology employed in this study is an event-history analysis (Delacroix and Carroll 1983; Tuma, Hannan and Groeneveld 1979) of a comprehensive database hand-collected from more than 1 million records at the Colorado Department of Public Health and Environment, covering the entire history of the industry, and extending from the first year of regulated abatement in 1986 to the end of 2010. This 25-year period witnessed 612 firms obtaining Colorado licenses. 56,240 project
permits were issued towards for the removal of 21 million lineal feet and 234 million square feet of ACM, for revenue totaling approximately $1.8 billion. Information is likewise available for all of the annual supervisor and worker certificates issued by the state.

As a consequence of the strict monitoring and reporting requirements associated with the removal and disposal of asbestos-containing materials (ACM), an unusual level of detail is available through which I construct a more nuanced articulation of a complete industry and institutional environment (Table 1).

**TABLE 1: DATABASE COMPONENTS**

<table>
<thead>
<tr>
<th>Data Items</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State-issued company license (annually renewed) and incorporation dates</td>
</tr>
<tr>
<td></td>
<td>Owner name(s) and prior experience</td>
</tr>
<tr>
<td></td>
<td>Firm addresses (prior and current)</td>
</tr>
<tr>
<td></td>
<td>Complete operational activity</td>
</tr>
<tr>
<td></td>
<td>Annual revenue from abatement</td>
</tr>
<tr>
<td></td>
<td>Permitted projects (by contractor, by date and by customer)</td>
</tr>
<tr>
<td></td>
<td>Project contractor(s) of record and project supervisor(s)</td>
</tr>
<tr>
<td></td>
<td>Dates work performed</td>
</tr>
<tr>
<td></td>
<td>Project size and complexity (total asbestos abated – by type)</td>
</tr>
<tr>
<td></td>
<td>Project – property owner and site address</td>
</tr>
<tr>
<td></td>
<td>State-issued individual licenses for all employees (annually renewed)</td>
</tr>
<tr>
<td></td>
<td>Record of prior employment for supervisors</td>
</tr>
<tr>
<td></td>
<td>Regulatory violations – by firm and by type</td>
</tr>
<tr>
<td></td>
<td>Dates, violation details and resolution data</td>
</tr>
</tbody>
</table>

By law, the removal and disposal of any material containing more than 1% asbestos in a quantity that exceeds the diminimous threshold (i.e. 50 l.f. or 32 s.f.) must be performed by certified personnel on behalf of a licensed firm. Companies must obtain (and annually renew) a State-issued license prior to commencing any abatement work. There is no reciprocity with other states for individual certificates.
or company licenses. In this sense, every firm that seeks to potentially perform abatement in Colorado will need to possess a state license. This allows for comprehensive tracking of every firm into and out of industry-population. It also captures nascent stage firms that are contemplating commercial activity but may decide, for whatever reasons, to not pursue the business. This marks perhaps the first time that a dataset includes a statistically significant population of organizational forms that fail prior to becoming substantively operational.

**Variables and Model Analysis**

**Dependent Variables.** Reflecting the highly granular, multi-dimensionality of this complete population, five separate dependent variables were used to test the seven hypotheses that form the basis of this study: Industry Entry, Firm Survival, Firm Fitness, Regulatory Violations and Strategic Coherence.

Of these, **Strategic Coherence** deserves special elaboration. The purpose of this study was to examine the consequences of massive, unequivocal support by institutions of a nascent industry; the kind of support that often occurs when governmental institutions are compelled by circumstances or popular mandate to grant legitimacy-by-fiat in order to protect an existing sector or jump-start a new one. The central argument of the paper is that while institutional support of this magnitude is often well intended, it may invite contagion entry of aimless, unfit firms that create unforeseen social costs. The cornerstone of this inquiry rests on the examination of each firm’s **Strategic Coherence**, which is calculated through a summation of the observed effects associated with patterned operational behavior.
The variable is a scaled value ranging between 0 and 1. It is calculated in a two-step process: (1) evaluating the extent of each firm’s patterned operational behavior, and then (2) using the patterned behavior evaluation to calculate a scaled strategic coherence score in the context of all industry activity. First, each firm’s degree of patterned operational activity is calculated as a function of six elements:

(1) *Project Location Variance.* The standard deviation of the project distance from each firm’s headquarters as a function of the total distance for all the firm’s projects.

(2) *Project Size Variance.* The standard deviation of project size by each firm as a function of the total size of all the firm’s projects.

(3) *Project Complexity Variance.* Asbestos abatement always involves some measure of engineering control, including containment of the workspace, establishment of negative pressure and extensive protection of workers and occupants. There are, however, certain kinds of asbestos abatement involving the removal of highly friable (i.e. easily pulverized) asbestos-containing material that require extraordinarily sophisticated controls. Abatement of this nature is demonstrably more complex and more expensive than removal of non-friable materials. A firm that primarily does non-friable abatement is likely to encounter financial and logistical complications in attempting to complete an abatement project involving the removal of friable material. For each of the 56,240 projects comprising this study, a project
complexity value was calculated, ranging from 0 to 1, based on the specific engineering controls required to legally complete the abatement.

(4) Project Simultaneity. This measures the extent to which firms simultaneously pursued proximal versus distant projects, large versus small projects, complex versus less-complex engineering controls. The value, calculated as a proportion between 0 and 1, represents the days in a given year that a firm is simultaneously engaged in all six project characteristics.

(5) Project Switching. This measures the frequency in a given year that a firm significantly alters its operational activity. A switch is counted each time a firm changes from having more than 75% of their operations oriented in a specific project category to having 75% in a different category. For instance, if a firm has 75% of its operations engaged in large projects, then switches to having 75% of its operations in small projects, this would count as a “switch.” The variable is intended to identify firms that are not operationalizing a strategic approach to the deployment of their respective resources.

(6) Activity-Inactivity Ratio. This measure is designed to identify firms that experience a prolonged period of inactivity, indicative of an inability to operationalize the firm’s resources towards the generation of business activity. For each firm, the total days of inactivity is subtracted from active days, divided by 365. Many successful firms will have no inactive days, generating a value of 1. Meanwhile, other firms may have prolonged periods
of inactivity, generating values at or near zero. Start-stop data for all 56,240 projects makes it possible to ascertain when each firm is active or inactive.

In step two, after calculating the extent to which each of the 612 firms exhibit patterned operational behavior, Strategic Coherence is determined by evaluating each firm’s operational activity in the context of all projects completed throughout the entire industry during each firm’s lifespan. For example, consider an abatement firm, AAA Abatement, which entered the industry at the beginning of 2000, and exited through a cessation of operations at the end of 2001. During this two-year period the firm completed 17 projects of varying location, size and complexity, while 4,939 total projects were completed industry-wide. Since there were 107 firms in the abatement industry from 2000 – 2001, there are 528,473 combinations of potential firms and potential projects. Therefore, the 17 projects AAA completed and the 4,922 projects AAA did not complete can be placed in context of more than one-half million permutations involving all the possible decisions that ultimately paired each project to a specific abatement firm. The ability or inability of AAA to remain active while pitted against the competition of 106 other firms is a function of many factors for which the analytical model will control: firm size, age and location; macroeconomic conditions; owner-specific capabilities; and, industry-specific features. But, it is also hypothesized that if AAA has a very low level of patterned behavior (captured by the six criteria above), then it will exhibit strategic incoherence in the context of all the pairing decisions, representing all the industry activity. In this fashion, the opportunity for consistency for a given period is
compared to firm’s actual consistency. The resulting ratio is the degree of Strategic Coherence, represented by a scaled value between 0 and 1. As a specific test, Hypothesis 3 predicts that high levels of institutionally endowed legitimacy will be inversely related to strategic coherence.

The other dependent variables are defined as follows:

**Firm Formation.** This continuous variable indicates the annual number of new asbestos abatement firms. It is used to test the predictions that institutional support is positively related to the industry entry rate. Entry rates for the three years following favorable legislative developments in 1986, 1995\(^5\) and 2005, are compared to all the other rolling three-year periods.

**Firm Fitness.** This continuous variable consists of the average annual number of abatement projects completed by a given firm.

**Firm Survival.** This variable is a dummy coded dichotomous variable with an indication of “1” if a firm was still operational in 2010 and “0” if a firm had discontinued operations. Firms that were acquired were excluded from the analysis so that only failed firms were coded as “0.”

**Regulatory Violations.** This is a continuous variable measuring the annual number of citations issued by the CDPH&E Asbestos Control Division. In accordance with Colorado Regulation 8, the CDPH&E has authority to cite asbestos contractors for non-compliant activity, resulting in fines, license revocation and

\(^5\) Since the 1995 legislation did not take effect until 2000, the three-year window associated with the 1995 legislation was coded for the period 2000 to 2002.
possible criminal charges. Violation details are a matter of public record and are available by firm and year.

**Independent Variables.** In addition to serving as dependent variables in the manner described above, three variables are also employed as predictors in testing selected hypotheses: *Strategic Coherence, Firm Fitness* and *Firm Survival*. Additional independent variables consist of the following:

*Institutionally Endowed Legitimacy.* This is a dummy coded variable distinguishing between periods of heightened institutional support and periods of normalized environmental conditions. The three years that involved significant policy changes (1986, 1995 and 2005) are coded as “1” and all other years are coded as “0.” This serves as a proxy for the infusion of additional institutionally endowed legitimacy for the industry and its participants.

*Total Industry Projects.* This variable represents the annual number of projects completed by the entire Colorado abatement industry. Several of the dependent variables in the study would be expected to vary with the total industry activity, such as regulatory violations.

*State Inspection Resources.* This variable is the number of full-time Asbestos Division inspectors. Regulatory violations would be expected to vary with the compliance-related resources available to the State.

**Control Variables.** Three vectors were developed for the model to control for macroeconomic, industry-specific and firm-specific effects. The macroeconomic
vector contains measures for construction, unemployment and economic activity. Industry-specific measures are comprised of controls for cohort size, population at entry and cohort size relative to population at entry (Hannan and Carroll, 1992; Hannan and Freeman, 1984, 1989). Firm-specific controls are included for size (total employees), age and entry year when testing selected hypotheses.

**Model Specifications.** Logistic regression, OLS regression and significant mean differences were employed to derive and explicate the focal effects. The generalized OLS Models are represented by:

\[
\text{Firm Formation} = \beta_0 + \beta_1 \text{CON}_{\text{industry}} + \beta_2 \text{CON}_{\text{macro}} + \beta_3 \text{CON}_{\text{firm}} + \beta_4 \text{InstLegit} \tag{1}
\]

\[
\text{Firm Fitness} = \beta_0 + \beta_1 \text{CON}_{\text{industry}} + \beta_2 \text{CON}_{\text{macro}} + \beta_3 \text{CON}_{\text{firm}} + \beta_4 \text{Size} + \beta_5 \text{Age} + \beta_6 \text{InstLegit} \tag{2}
\]

\[
\text{Strategic Coherence} = \beta_0 + \beta_1 \text{CON}_{\text{industry}} + \beta_2 \text{CON}_{\text{macro}} + \beta_3 \text{CON}_{\text{firm}} + \beta_4 \text{Size} + \beta_5 \text{Age} + \beta_6 \text{InstLegit} \tag{3}
\]

\[
\text{Firm Fitness} = \beta_0 + \beta_1 \text{CON}_{\text{industry}} + \beta_2 \text{CON}_{\text{macro}} + \beta_3 \text{CON}_{\text{firm}} + \beta_4 \text{Size} + \beta_5 \text{Age} + \beta_6 \text{Strat Coher} \tag{4}
\]

\[
\text{Regulatory Violations} = \beta_0 + \beta_1 \text{CON}_{\text{industry}} + \beta_2 \text{CON}_{\text{macro}} + \beta_3 \text{CON}_{\text{firm}} + \beta_4 \text{TotalProjsIndus} + \beta_5 \text{StateInspectors} + \beta_6 \text{AvgProjsFirm} + \beta_7 \text{Strategic Coherence} \tag{5}
\]

In addressing Hypothesis 4a, firm survival is modeled using both a logistic regression and a Cox Proportional Hazard (PH) regression. The former assesses the significance of strategic coherence from birth as a function of founding conditions, while the latter examines the instantaneous probability of failure based on evolving conditions. The basic structure of the Logistic Regression Model is represented by:
Firm Survival = $\beta_0 + \beta_1 CON_{industry} + \beta_2 CON_{macro} + \beta_3 CON_{firmo} + \beta_4 Size + \beta_5 Age + \beta_6 FirmFinesst + \beta_7 Strategic Coherence$  

The survival analysis approach employs the classic hazard rate model for use in Cox PH regressions, where each variable is exponentiated to provide the hazard ratio for a one-unit increase in the predictor:

$$h(t) = h_0(t) \exp(\beta; X + \beta_0)$$

The equation states that the hazard of the focal event occurring at a future time $t$ is the derivative of the probability that the event will occur in time $t$. Using SPSS and the R commander survival plug-in, coefficients were determined through the maximum likelihood function.

5. Results

The six hypotheses that were examined in this study comprised three interrelated lines of inquiry: Does institutional support drive industry and firm formation? If so, do munificent conditions result in high-quality firms that are strategically coherent? And finally, do less-strategically coherent firms exhibit adverse characteristics and do they promulgate adverse outcomes? These questions are addressed through an analysis of a complete industry. Descriptive statistics and a correlation matrix are presented in Tables 2 and 3, respectively.
TABLE 2: DESCRIPTIVE STATISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Metric</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Coherence</td>
<td>Scaled Value (Range: 0 - 1)</td>
<td>0</td>
<td>0.99</td>
<td>0.15</td>
<td>0.25</td>
</tr>
<tr>
<td>Firm Formation Rate</td>
<td>Annual Firm Formations</td>
<td>14</td>
<td>41</td>
<td>24.48</td>
<td>7.15</td>
</tr>
<tr>
<td>Firm Survival</td>
<td>(1 = Operational, Excl M&amp;A)</td>
<td>0</td>
<td>1</td>
<td>0.17</td>
<td>0.37</td>
</tr>
<tr>
<td>Firm Fitness</td>
<td>Average Annual Projects Completed</td>
<td>0</td>
<td>166</td>
<td>9.22</td>
<td>20.66</td>
</tr>
<tr>
<td>Regulatory Violations</td>
<td>Annual CDPH&amp;E Citations</td>
<td>25</td>
<td>112</td>
<td>69.04</td>
<td>15.42</td>
</tr>
<tr>
<td>Institutional Legitimacy</td>
<td>(1 = Favorable Legislative Change)</td>
<td>0</td>
<td>1</td>
<td>0.12</td>
<td>0.33</td>
</tr>
<tr>
<td>Firm Size</td>
<td>State Licensed Employees</td>
<td>1</td>
<td>134</td>
<td>8.33</td>
<td>10.43</td>
</tr>
<tr>
<td>Firm Age</td>
<td>Years as Licensed Firm</td>
<td>1</td>
<td>25</td>
<td>3.73</td>
<td>4.45</td>
</tr>
<tr>
<td>State Inspectors</td>
<td>Full Time Equivalents</td>
<td>3</td>
<td>11</td>
<td>7.14</td>
<td>2.07</td>
</tr>
<tr>
<td>Total Projects</td>
<td>Lifetime Projects - By Firm</td>
<td>0</td>
<td>2817</td>
<td>88.71</td>
<td>286.72</td>
</tr>
</tbody>
</table>

Note: Italicized values are significant at p < 0.01.

TABLE 3: CORRELATIONS

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Strategic Coherence</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Firm Formation Rate</td>
<td>(0.31)</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Firm Survival</td>
<td>0.34</td>
<td>(0.21)</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Firm Fitness</td>
<td>0.42</td>
<td>(0.35)</td>
<td>0.40</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Regulatory Violations</td>
<td>0.07</td>
<td>0.28</td>
<td>0.18</td>
<td>(0.27)</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Institutional Legitimacy</td>
<td>0.11</td>
<td>0.48</td>
<td>(0.23)</td>
<td>0.32</td>
<td>0.22</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Firm Size</td>
<td>0.40</td>
<td>(0.13)</td>
<td>0.33</td>
<td>0.35</td>
<td>(0.08)</td>
<td>(0.16)</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Firm Age</td>
<td>0.37</td>
<td>(0.22)</td>
<td>0.30</td>
<td>0.25</td>
<td>(0.11)</td>
<td>(0.24)</td>
<td>0.45</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 State Inspectors</td>
<td>(0.03)</td>
<td>0.05</td>
<td>(0.03)</td>
<td>0.02</td>
<td>0.04</td>
<td>(0.01)</td>
<td>0.02</td>
<td>0.01</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Total Projects</td>
<td>0.39</td>
<td>(0.14)</td>
<td>0.45</td>
<td>0.28</td>
<td>0.35</td>
<td>(0.32)</td>
<td>0.62</td>
<td>0.31</td>
<td>0.29</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Macro Controls</td>
<td>0.04</td>
<td>0.05</td>
<td>0.05</td>
<td>0.03</td>
<td>0.04</td>
<td>(0.02)</td>
<td>0.03</td>
<td>0.03</td>
<td>0.04</td>
<td>0.05</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>12 Indus Controls</td>
<td>(0.02)</td>
<td>0.01</td>
<td>(0.01)</td>
<td>0.02</td>
<td>0.06</td>
<td>0.02</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
<td>0.03</td>
<td>-</td>
</tr>
<tr>
<td>13 Firm Controls</td>
<td>(0.03)</td>
<td>0.03</td>
<td>0.01</td>
<td>0.02</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.01</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Note: Italicized values are significant at p < 0.01.

The directionality and magnitude of the correlations are consistent with the anticipated relationships between the various dependent and independent
variables. From the descriptive statistics it is apparent that the average abatement firm displays low strategic coherence (mean value: 0.15, on a 0 to 1 scale). Meanwhile, firm fitness and firm survival is highly correlated with strategic coherence. In order to draw significance from these correlations, two things must be demonstrated in the statistical models: (1) institutional support, in the form of institutionally-endowed legitimacy, must be significantly related to market entry decisions and each firm’s level of strategic coherence; and, (2) strategic coherence must be a significant driver of firm performance over and above the control variables. Without support for both of these elements, the tripartite relationship between institutions, strategic coherence and outcomes, is not tenable.

As noted at the outset, extant theory related to the legitimizing influence of institutional support (Powell, 1988; Zucker, 1989; Oliver, 1990, 1991; Aldrich and Fiol, 1994; Swaminathan, 1995) suggests that nascent firms will benefit from the enhanced munificence accompanying institutionally endowed legitimacy (Baum and Oliver, 1991; Baumol, 1990; North, 1990). Because of this, potential entrants are likely to interpret munificence as a strong signal that market entry is unusually propitious (Barnett et al., 2003). As an explicit test of the extent to which legitimacy-by-legislative-fiats drives market entry, Hypothesis 1 predicted that the three periods of pronounced institutional support (1986, 1995 and 2005) would be marked by increased market entry. Model 1 confirms this hypothesis ($F^* = 38.8, p < .001, \Delta R^2 = 0.25$).
The increased market entry that accompanied legislative changes related to asbestos abatement appears to indicate that the public policy aims of were achieved. However, there is also evidence that the industry population following each legislative act dramatically exceeded the carrying capacity (Carroll and Hannan, 1989; Hannan and Freeman, 1977, 1985) of the Colorado market for asbestos abatement. Gold rush-style excess entry is evidenced in Table 2 by the heightened rate of firm failure in the years subsequent to legislative changes.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Form</td>
<td>Firm Formation</td>
<td>Firm Fitness</td>
<td>Strategic Coherence</td>
</tr>
<tr>
<td>(New Licensed Firms)</td>
<td>is Positively Related to Institutional Legitimacy</td>
<td>is Inversely Related to Institutional Support</td>
<td>is Inversely Related to Institutional Support</td>
</tr>
<tr>
<td>Controls</td>
<td>Incl</td>
<td>Incl</td>
<td>Incl</td>
</tr>
<tr>
<td>Constant</td>
<td>3.7*</td>
<td>2.5*</td>
<td>0.05*</td>
</tr>
<tr>
<td>(1.7)</td>
<td>(0.8)</td>
<td>(0.03)</td>
<td></td>
</tr>
<tr>
<td>Controls - Macro</td>
<td>6.2**</td>
<td>2.1*</td>
<td>0.02</td>
</tr>
<tr>
<td>(4.3)</td>
<td>(1.1)</td>
<td>(0.01)</td>
<td></td>
</tr>
<tr>
<td>Controls - Firm Level</td>
<td>1.30</td>
<td>1.3</td>
<td>0.01</td>
</tr>
<tr>
<td>(0.7)</td>
<td>(0.7)</td>
<td>(0.01)</td>
<td></td>
</tr>
<tr>
<td>Firm Size (# employees)</td>
<td>-</td>
<td>3.3*</td>
<td>0.21**</td>
</tr>
<tr>
<td></td>
<td>(2.1)</td>
<td>(0.17)</td>
<td></td>
</tr>
<tr>
<td>Firm Age (years)</td>
<td>-</td>
<td>7.3**</td>
<td>0.24**</td>
</tr>
<tr>
<td></td>
<td>(5.2)</td>
<td>(0.13)</td>
<td></td>
</tr>
<tr>
<td>Institutionally Endowed Legitimacy</td>
<td>8.9***</td>
<td>-11.8***</td>
<td>-0.31***</td>
</tr>
<tr>
<td></td>
<td>(3.6)</td>
<td>(7.0)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.32</td>
<td>0.43</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td>0.27</td>
<td>0.81</td>
<td></td>
</tr>
<tr>
<td>F-value</td>
<td>11.2</td>
<td>38.8</td>
<td>47.6</td>
</tr>
<tr>
<td></td>
<td>9.6</td>
<td>63.9</td>
<td></td>
</tr>
<tr>
<td>Δ Adjusted R²</td>
<td>0.25</td>
<td>0.31</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Non-Standardized Coefficients. Units are expressed in Terms of Each Model’s Dependent Variable

*** p < 0.001, ** p < .01, * p < .05
Heightened firm failure, despite formal institutional acts that were intended to sponsor growth of an emergent sector, runs counter to the expectation that a rising tide should lift all the boats. Hypothesis 2 tested the possibility that the desultory performance of new entrants in times of increased munificence may be a function of mass entry by unfit firms. Model 2 in Table 4 reveals that this is exactly what happened. The negative coefficient associated with institutional support demonstrates that in the context of a complete population of firms institutional support results in lower average firm fitness ($F^* = 47.6, p < .001, \Delta R^2 = 0.31$).

In similar fashion, institutional support is also inversely related to strategic coherence. *Institutionally Endowed Legitimacy* was found to be a significant predictor of strategic incoherence. The three-year periods associated with supportive institutional activity (dummy coded for legislative changes in 1986, 1995\(^6\) and 2005) exhibited significantly less strategic coherence among the new market entrants than during all other periods. As a first step towards relating institutional action, firm performance and strategic coherence, Hypothesis 3 predicted that periods of pronounced institutional support would display evidence of lower strategic coherence. In support of Hypothesis 4, Model 3 in Table 4 shows a significant negative coefficient for institutional support in the predictive model for strategic coherence ($F^* = 63.9, p < .001, \Delta R^2 = 0.54$). This means that institutional support invited a sharp increase in market entrants, thereby increasing access to licensed abatement services and at least ostensibly reducing asbestos-related health

\(^{6}\) The 1995 legislation took effect in 2000.
risks. However, the munificent, open-door circumstances created by legislative action also contributed to lower firm fitness and lower strategic coherence.

The direct relationship between strategic coherence and firm fitness is tested by Hypothesis 4a, which examines survival as an outcome, and Hypothesis 4b, which examines operational performance as an outcome. It is predicted that strategic incoherence will have a deleterious effect on both survival and operational performance. As indicated in the correlation matrix (Table 3), these two measures are strongly and positively related to one another. Nonetheless, it is important to test both measures of fitness, since, as Gimeno, Folta, Cooper and Woo demonstrated, “survival is not strictly a function of performance” (1997: 750) since lower performing firms may persist for non-financial reasons related to each business owner’s unique utility function. In order to insure a comprehensive assessment of the potential effects of incoherence, both outcomes are modeled.

Strategic Coherence was found to be a significant predictor of firm survival and operational performance. Model 4a in Table 5 is a logistic regression testing the impact of strategic incoherence on survival prospects. To test the relationship, the strategic coherence values were mean-centered so that Model 4a displays the effect of being strategically incoherent in the context of the entire industry. In order to avoid the potential impact of right-side truncation, only founding events prior to 2007 were included in the analysis. Even after controlling for firm resources and age, strategically incoherent firms were almost 4 times more likely to fail than strategically coherent firms (Odds ratio: -3.85, p < 0.001, $\chi^2 = 78.2$). Operationally,
incoherent firms also significantly underperformed their strategically coherent counterparts.

**Table 5: Analytical Models for Hypotheses 4A, 4B and 5**

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Model 4a (Logistic)</th>
<th>Model 4b (OLS)</th>
<th>Model 5 (OLS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Firm Survival</td>
<td>Firm Fitness</td>
<td>Regulatory Violations</td>
</tr>
<tr>
<td></td>
<td>(1 = Still Operational)</td>
<td>(Avg Annual Projects)</td>
<td>(CDPH&amp;E Citations)</td>
</tr>
<tr>
<td></td>
<td>(Odds Rations)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td>Strategically Incoherent Firms Have Lower Survival Rates.</td>
<td>Controls</td>
<td>Strategically Incoherent Firms Exhibit Lower Firm Fitness</td>
</tr>
<tr>
<td>Constant</td>
<td>Incl</td>
<td>Incl</td>
<td>Incl</td>
</tr>
<tr>
<td>Controls - Macro</td>
<td>1.04* (0.22)</td>
<td>1.01* (0.22)</td>
<td>2.5* (0.8)</td>
</tr>
<tr>
<td>Controls - Industry</td>
<td>1.15* (0.23)</td>
<td>1.11* (0.21)</td>
<td>2.1* (1.1)</td>
</tr>
<tr>
<td>Controls - Firm Level</td>
<td>1.03* (0.18)</td>
<td>1.0 (0.17)</td>
<td>1.3 (0.7)</td>
</tr>
<tr>
<td>Firm Size (# employees)</td>
<td>3.18** (1.32)</td>
<td>3.8** (2.4)</td>
<td>-1.4 (0.7)</td>
</tr>
<tr>
<td>Firm Age (years)</td>
<td>3.94*** (2.02)</td>
<td>9.2*** (4.8)</td>
<td>-1.9* (1.1)</td>
</tr>
<tr>
<td>Total Projects</td>
<td>-</td>
<td>-</td>
<td>-1.6* (0.9)</td>
</tr>
<tr>
<td>State Inspectors</td>
<td>-</td>
<td>-</td>
<td>0.3 (0.1)</td>
</tr>
<tr>
<td>Strategic Incoherence (i.e., Higher Values = Less Coherence)</td>
<td>-3.85*** (1.89)</td>
<td>-8.8*** (4.2)</td>
<td>4.3*** (5.1)</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>-</td>
<td>0.43</td>
<td>0.69</td>
</tr>
<tr>
<td>F-value</td>
<td>-</td>
<td>14.1</td>
<td>31.3</td>
</tr>
<tr>
<td>Δ Adjusted R²</td>
<td></td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>χ²</td>
<td>17.8</td>
<td>78.2</td>
<td>-</td>
</tr>
<tr>
<td>Predictive Accuracy</td>
<td>75.90%</td>
<td>96.1%</td>
<td>-</td>
</tr>
</tbody>
</table>

*N = 612

*Non-Standardized Coefficients. Units are expressed in Terms of Each Model's Dependent Variable

*** p < 0.001, ** p < .01, * p < .05*
Although the logistic regression Model 4a clearly demonstrates the significance of strategic coherence as a predictor of firm survival, even in the context of controls and other known predictors of survival, the model is calculating the probability of survival from birth. This is interesting from the standpoint of assessing the relationship between firm survival and institutional support at birth, but this analysis does not provide any insights regarding survival prospects as conditions continue to evolve. That is, the survival odds of a firm making it to ten years old are not the same as the survival odds at birth. In order to examine the ongoing survival prospects, I used a Cox Proportional Hazard (PH) model. For ease of interpretability, the hazard rates have been converted to the probability of failure. The results are summarized in Table 6.

**Table 6: Results from Cox Proportional Hazard Model (N = 612)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 4a (Cox PH)</th>
<th>Model 4a (Cox PH) - Detailed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Probability of Failure (95% CI)</td>
<td>Std dev.</td>
<td>P Value</td>
</tr>
<tr>
<td>Institutional Support</td>
<td>2.43 (0.15)</td>
<td>0.18</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Entry Cohort Size</td>
<td>1.01 (0.06)</td>
<td>0.07</td>
<td>0.11</td>
</tr>
<tr>
<td>Colorado GDP Growth</td>
<td>0.93 (0.04)</td>
<td>0.30</td>
<td>0.05</td>
</tr>
<tr>
<td>Total Projects - Industry</td>
<td>0.98 (0.11)</td>
<td>0.30</td>
<td>0.05</td>
</tr>
<tr>
<td>Firm Age (# employees)</td>
<td>0.99 (0.05)</td>
<td>0.30</td>
<td>0.05</td>
</tr>
<tr>
<td>Firm Age (years)</td>
<td>0.98 (0.02)</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Average Annual Projects</td>
<td>0.99 (0.04)</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td>Strategic Incoherence</td>
<td>1.03 (0.02)</td>
<td>&lt; 0.001</td>
<td>-</td>
</tr>
<tr>
<td>1. Location Variance</td>
<td>-</td>
<td>-</td>
<td>1.008</td>
</tr>
<tr>
<td>2. Size Variance</td>
<td>-</td>
<td>-</td>
<td>1.002</td>
</tr>
<tr>
<td>3. Complexity Variance</td>
<td>-</td>
<td>-</td>
<td>1.014</td>
</tr>
<tr>
<td>4. Simulaneity</td>
<td>-</td>
<td>-</td>
<td>1.001</td>
</tr>
<tr>
<td>5. Switching</td>
<td>-</td>
<td>-</td>
<td>1.005</td>
</tr>
<tr>
<td>6. Activity-Inactivity</td>
<td>-</td>
<td>-</td>
<td>1.001</td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td>94.4</td>
<td></td>
<td>94.4</td>
</tr>
<tr>
<td>P Value</td>
<td>&lt; 0.001</td>
<td></td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>
State GDP growth and firm characteristics such as size, experience and productivity all reduce the hazard. Cohort size, institutional support and strategic incoherence all increase the hazard of failure. For each variable, the probability of survival indicates the relative likelihood of failure for a one-unit change in that variable. For instance, a one-unit change in age would mean that each additional year of experience decreases the relative risk of failure by 2%. For the strategic incoherence hazard rate, the units are expressed in percentage-points: for each additional percentage point that a firm exhibits strategic incoherence, that firm increases the relative risk of firm failure by 3%, indicated in Table 6 by the 1.03 hazard rate.

**Figure 3: Kaplan–Meier Estimate of the Survival Function by Strategic Coherence Quartile (N = 612)**
The relationship between strategic coherence and survival probability is also evident in Figure 3, a Kaplan-Meier estimate separated by quartile. The first quartile consists of the top 25% of firms with respect to strategic coherence, which is a function of the six facets discussed in the methods section and analyzed by part in Table 6. As the four curves demonstrate, industry participants exhibiting low levels of strategic coherence face a precipitous drop in survival prospects soon after entering the market.

The hazard rate analysis also reinforces the extent to which institutional support is a significant predictor of survival (Table 6). Firms entering the market under highly munificent conditions during times of renewed institutional support are 2.43 times more likely to fail than a firm entering the market in other years. This provides strong support for the assertion that institutionally fueled contagion entrepreneurship attracts unfit firms that fail quickly.

Since the Cox PH assumes constant proportionality across the observation window, robustness checks must be performed to insure that the model is not misspecified by virtue of proportionality violations (Lin and Wei, 1989). Robustness tests revealed an absence of evidence contradicting the proportionality assumption. Therefore, the Cox PH results can be considered reliable.

The interplay between coherence and survival that was underscored through the hazard rate model can be extended to the analysis of Hypothesis 4b, which predicted that lower strategic coherence would be associated with lower firm fitness. Predictably, this too finds support. The OLS Model 4b in Table 5, displays a
significant negative coefficient for strategic incoherence (F-test = 31.3, p < .001, ΔR² = 0.26), indicating that strategically incoherent firms will, on average, complete far fewer projects than firms that exhibit coherence.

Overall, the weight of this evidence strongly suggests that strategic coherence plays a significant role in predicting firm survival. As indicated in Tables 7a and 7b below, inclusion of strategic coherence as a predictor of survival improves the predictive success rate of the logistic regression model from 75.9% to 96.1%.

**Table 7A: Logistic Regression Matrix for Survival – Excluding Strategic Coherence Predictor**

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survived</td>
<td>Failed</td>
<td></td>
</tr>
<tr>
<td>Survived</td>
<td>33</td>
<td>70</td>
<td>31.7%</td>
</tr>
<tr>
<td>Failed</td>
<td>77</td>
<td>432</td>
<td>85.0%</td>
</tr>
<tr>
<td></td>
<td>110</td>
<td>502</td>
<td>75.9%</td>
</tr>
</tbody>
</table>

**Table 7B: Logistic Regression Matrix for Survival – Including Strategic Coherence Predictor**

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survived</td>
<td>Failed</td>
<td></td>
</tr>
<tr>
<td>Survived</td>
<td>91</td>
<td>13</td>
<td>87.5%</td>
</tr>
<tr>
<td>Failed</td>
<td>11</td>
<td>497</td>
<td>97.8%</td>
</tr>
<tr>
<td></td>
<td>102</td>
<td>510</td>
<td><strong>96.1%</strong></td>
</tr>
</tbody>
</table>

Lastly, Hypothesis 5 predicted that the costs related to strategic incoherence would not be borne solely by unfit firms and their founders. As a proxy for social costs, regulatory violations were used to measure the broader deleterious effects of unfit firms that operated in a strategically incoherent fashion. Model 5 in Table 5
confirms this prediction (F-test = 30.8, p < .001, \( \Delta R^2 = 0.29 \)). After controlling for an array of macroeconomic, industry-specific and firm-specific factors, as well as regulatory resources under the command of the CDPH&E, strategic incoherence was positively related to regulatory violations, meaning that firms exhibiting strategic incoherence are associated with a higher relative frequency of non-compliant work practices. Since more than 90% of the 1,726 violations that have been prosecuted by the CDPH&E consist of failures to properly perform asbestos abatement in a safe, healthful fashion, an increase in violations represents an increase in asbestos-related health risks. Concomitantly, this represents an increase in social cost.

6. DISCUSSION

Governments are often empowered with a mandate to jump-start emergent sectors by activating formal institutional mechanisms to produce high-velocity results (North, 1990; Baumol, 1990). Indeed it often appears as though formal institutions are uniquely well equipped to accomplish this aim. In reality, this study demonstrates that forceful sponsorship and the munificent conditions it aims to create may be highly problematic. My argument in this essay is that institutionally driven legitimacy-by-fiat reduces the propensity of new market entrants to develop coherent entry strategies. Instead, indiscriminate, contagion-style market entry by unfit firms is marked by unplanned, strategically incoherent activity, causing firms
to perform poorly and fail quickly, all while creating unwanted social costs from regulatory non-compliance.

Limitations and Alternative Explanations

Given the implications of the findings from this study and the cross-theoretical formulation of methods, alternative explanations could reasonably be launched. Three potential alternatives are particularly germane, one resting on practical grounds and the other two grounded in theory; namely, resource dependence theory (Pfeffer and Salancik 1977) and industrial organizational theory (e.g. Porter 1980).

Addressing the practical grounds first, it could reasonably be asserted that the failure of new, small abatement firms represents the same failure that most new, small firms experience. The liabilities of smallness and newness are well-established premises in the strategic management literature (Aldrich and Auster, 1986; Bruderl and Schussler, 1990; Freeman, Carroll and Hannan, 1983; Schoonhoven, 2005). In this case, however, all the firms were small at entrance. Diversifying incumbents constituted a small proportion of the industry entrants and, as can be seen in Table 8, *de alio* firms exhibited the worst performance. Entrepreneurial spinoffs, involving firm formations by employees who have departed a previous employer, performed slightly better than *de alio* firms, but significantly worse than *de novo* firms.
In the context of a complete population in a nascent-stage industry it is apparent that newness and smallness are much less of a liability, especially with institutionally endowed legitimacy. Attrition is clearly high. Of the 612 firms that were formed for asbestos abatement in Colorado, only 104 still survived in 2010. However, the distinguishing feature of the surviving firms is not that they were older or bigger than the firm failures, but rather that they possessed strategic coherence. The U.S. Government and the State of Colorado insured that there would be customers by rule of law. The foregoing data has demonstrated that those firms that approached formation and market entrance by developing a coherent approach to market opportunities survived in large numbers. Those that entered solely on the coattails of institutional legitimation did not survive. For this reason, the story is more potent and complex than can be subsumed by reference to the liability of newness (Aldrich and Auster, 1986; Bruderl and Schussler, 1990; Freeman, Carroll and Hannan, 1983; Schoonhoven, 2005) or the liability of

### Table 8: Industry Entrants – By Mode

<table>
<thead>
<tr>
<th>Entry Mode</th>
<th># Firms</th>
<th>% Firms</th>
<th>Average Lifespan (Years)</th>
<th>Operational Performance (Projects per Firm-Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>De novo</td>
<td>110</td>
<td>18%</td>
<td>5.6</td>
<td>37.3</td>
</tr>
<tr>
<td>Diversifying Incumbents (de alio)</td>
<td>54</td>
<td>9%</td>
<td>3.1</td>
<td>12.0</td>
</tr>
<tr>
<td>Entrepreneurial Spinoffs (unsponsored)</td>
<td>448</td>
<td>73%</td>
<td>3.1</td>
<td>18.1</td>
</tr>
<tr>
<td>Total Entrants</td>
<td>612</td>
<td>100%</td>
<td>3.7</td>
<td>23.8</td>
</tr>
</tbody>
</table>
smallness (Aldrich, 1990; Aldrich and Auster, 1986; Freeman, Carroll and Hannan, 1983; Hannan and Freeman, 1984; Hannan and Freeman, 1989; Singh and Lumsden, 1990).

Other alternative explanations could be grounded in resource dependence theory (Pfeffer and Salancik 1978), by asserting that the failure of firms is not based on strategic incoherence, but rather their respective inability to marshal and deploy the resources and relationships essential to firm survival; the argument perhaps being that a firm’s strategy could be coherent but its ability to operationalize it is flawed. Without question, resource deprivation constitutes the tipping point for abatement firms. However, while resource dependence tools might provide information about the immediate cause of death, it does not elucidate the factors that delivered selected firms to the precipice of that fate. The fact that a firm died of “malnutrition” does not explain why the firm never learned how to recognize food. High mortality rates in the context of full-throated institutional support is a function of a firm’s inability to establish a pattern of business behaviors that is favorably selected by the environment for survival. That is, resource deprivation is the result of strategic incoherence, not the cause of it.

Addressing the findings from this study through the competitive strategy framework of industry-level analysis (Porter 1980) is also attractive at first since there appear to be dynamics at play in the Colorado asbestos abatement industry that reflect the advantages of increasing economies to scale and the barriers that accompany such advantages. Based on this perspective, the attrition rates
experienced by less-fit firms could be viewed as the natural consequence of the inability to deploy one of several generic strategies (Porter, 1980, 1985). However, in a fashion similar to the RDT perspective, the IO approach has a limited ability to assess the complex array of developments that accompanied strong institutional support. While the IO perspective certainly contemplates the potential role of government policy changes, the role they propound (Andrews 1971; Carlton and Perloff, 2000; Caves and Porter 1977; Porter 1980, Spence 1977) does not address the consequences of legitimation-by-legislative-fiat in a fledgling industry, particularly one in which there are no incumbent firms. IO would be accurate in predicting that there are a highly finite number of strategic options available to abatement firms, but the perspective does not explain the preponderance of seemingly rudderless firms that are strategically incoherent. IO does not explain why firms would substitute perceived legitimacy for strategic coherence.

**Key Findings and Contributions**

By developing and conducting the first detailed test of strategic coherence for an entire industry across its entire history, this study offers a number of compelling findings and makes a number of noteworthy contributions. The results of this empirical investigation strongly suggest that performance and survival vary with patterned operational activity. Firms occupying the lower quadrant of strategic coherence were generally destined for speedy extinction. This is a finding that has broad and deep implications for strategy and entrepreneurship scholars. The
paucity of work in strategic coherence owes to weak construct development and few transaction-based datasets that allow for a comprehensive treatment of the subject. Although the context for this study involved new and small firms in a niche service sector, my findings are relevant to the study of strategic coherence across all industries and across firms of any age or scale. As the hazard rate analyses demonstrated, incoherent firms face dim prospects for survival at any time and under any environmental conditions, even those that are comparatively munificent.

The results also provide an engaging portal to the puzzling machinations of contagion entrepreneurship. In no small part, the demise of strategically incoherent firms is closely tied to the contagion-style entry of unfit firms. Of course, contagions are not unique to the asbestos abatement industry; they occur with great frequency in rapidly unfolding melodramas (Kindelberger & Aliber 2011). Despite the frequency of contagions and manias; much is still unknown about how and why they occur, and at what social cost they transpire, particularly among new and small firms that form and fail with great speed. To that end, this study offers an exhaustive explication of how conditions, strategies and outcomes can be simultaneously modeled through the use of a transaction perspective. Importantly, the 5.7 million transaction-level permutations are traced from firm formations all the way to both successful, vibrant firms and those that generate steep social costs through regulatory violations.

In this regard, my study also offers a more thorough understanding of the ways in which strong institutional support can generate unintended, deleterious
consequences. Prevailing theoretical views suggest that institutions function as a vital source of legitimacy for nascent firms and industry-populations (Baum and Oliver 1991, 1992; Baum and Powell 1995; Hannan and Freeman, 1989; Hannan and Carroll, 1992; Zucker 1989). Institutional relations are seen as a source of support and credibility that decreases firm mortality rates (Baum and Oliver 1991). However, using a complete population I show that the reality is far more complex. Unintended consequences from strong institutional support can include increased mortality, increased public ills such as regulatory violations, and decreased levels of strategic coherence.

My study also contributes surprising and significant results detailing the ways in which strong institutional support circumvents strategy formation. Not only do new firms look to legitimation-by-legislative-fiat as a justification for entry, but also as a replacement for strategic planning. At all stages of the abatement industry history it is apparent that legislatively fueled market expansion invites the entry of firms that display significantly lower levels of strategic coherence. This lends considerable support to recent revisionist efforts to better articulate the potential benefits of strategic planning (e.g. Brinckmann, Grichnik, and Kapsa, 2010), some facets of which have been upended through the development of alternative frameworks that posit a central role for mechanisms such as bricolage and improvisation (Baker, Miner and Eesley, 2003; Baker and Nelson, 2005), effectuation (Sarasvathy, 2001, 2008), and exaptation (Dew, Sarasvathy and Venkataraman, 2004).
By elucidating these important dynamics, I contribute the first comprehensive study of which I am aware that shows how strategic incoherence arises as a consequence of strong institutional support. The study results strongly suggest that nascent-stage entrants substitute institutionally derived legitimacy for strategy development. While full-throated institutional support for a nascent industry does in fact result in a J-curve growth trajectory (Aldrich, 1990; Hannan and Freeman, 1977, 1984; Zucker 1989), this surge in market entrants causes the population to exceed the carrying capacity of the environment for the organizational forms contained in the industry-population. In clear terms, I demonstrate that this effect is the contagion entry of unfit firms (Barnett et al., 2003).

For scholars, practitioners and policy-makers, these findings are highly material because strategic incoherence is shown through these results to be wasteful and potentially dangerous. As the Cox PH plainly revealed, strategically incoherent firms must either develop patterned operational behavior that will be selected for survival or else they will fail. In eschewing coherent strategy and misapplying institutional legitimacy as a substitute for strategy development and implementation, early-stage firms fail to develop utilizable, reproducible patterns, or what Nelson and Winter refer to as “organizational routines” (1982). The inability of firms to establish a strategically coherent set of routines results in significantly weaker operational performance and shorter lifespans. Even more, I find that strategically incoherent firms exhibit a significantly higher propensity to sacrifice quality, resulting in more frequent regulatory violations.
Finally, my study contributes a panoramic, multi-level perspective through longitudinal analysis that demonstrates the ways in which the patterns of institutional support, contagion entrepreneurship, strategic incoherence and unwanted social costs repeat themselves. The recurring steps taken by formal governmental institutions to address the asbestos crisis in 1986, 1995 and 2005, ignited fresh waves of firm foundings by strategically incoherent organizations. This strategic incoherence invariably led to high rates of firm mortality, suggesting that institutional legitimacy derived through legislative fiat is very much a double-edged sword, with recurrent effects.

Conclusion

“The wide gap throughout history,” wrote Douglass North, “between intentions and outcomes reflects the persistent tension between the scaffolds that humans erect to understand the human landscape and the ever changing “reality” of that landscape” (North, 2005: ix). When formal institutions endeavor to alter “the rules of the game” (Baumol, 1990; North, 1990, 2005), in order to protect existing systems or to create new systems, the gap between intentions and outcomes has the potential to cause unintended consequences and unforeseen social costs. In particular, this empirical study of the asbestos abatement industry suggests that forceful government-led advocacy of a nascent sector may invite aimless entry of strategically incoherent firms, which at least partially undermines the original public health intentions underlying institutional support.
Heretofore, strategic coherence has been weakly defined and thinly studied. The absence of thorough data has weakened the ability to draw conclusions about patterned operational activity and firm-level outcomes. Recent efforts to theoretically critique strict causation-oriented models of entrepreneurial behavior (Baker, Miner and Eesley, 2003; Baker and Nelson, 2005; Dew, Sarasvathy and Venkataraman, 2004; Sarasvathy, 2001, 2008) represent an emerging trend to devise a more dynamic, organic, iterative conception of early-stage business behaviors. These alternate conceptions have contributed texture and sophistication to the subject, but may prove to be limited in their capacity to find empirical support. In the context of a complete population that borne of institutionally sponsored legitimacy, it appears that only through the combination of institutional munificence and strategic coherence can the gap between “intentions and outcomes” (North, 2005) be minimized.
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CHAPTER THREE

MAKING SENSE OF PERFORMANCE HETEROGENEITY AMONG ENTREPRENEURIAL SPINOFFS
1. Introduction

Intra-industry entrepreneurial spinoffs (sometimes called “spinouts”) occur when employees leave a parent-firm to start a new, completely independent company as an entry vehicle into the same industry as their former employer (Klepper, 2001), without support or sponsorship from the parent-firm. Entrepreneurial spinoffs are richly in evidence during periods of new industry formation, appearing as both a driver of new industry opportunities and a primary beneficiary of emerging industry opportunities (Garvin, 1983). It has become popular in recent years for scholars studying intra-industry spinoffs to invoke the language of procreation and genetics as an explanatory model for spinoff creation and performance. An expanding set of studies supporting a progeny model (Phillips, 2002) variously refer to the parent-child ties (Klepper, 2001) as “spawning” (Chatterji, 2009; Gompers et al., 2005), “inheritance” (Agarwal, Echambadi, Franco & Sarkar, 2004; Nelson, 1991), “organizational births” “children” and “offspring” (Dyck, 1997), “parenting” (Klepper & Sleeper, 2005), and “heredity” (Dick et al., 2011). The increasing use of proto-biological speak closely parallels the accumulating empirical support for a widening set of “stylized facts” (Klepper 2009).
that together form the theoretical foundation for the study of spinoffs, namely: that spinoff founders learn lessons from their parents that are advantageously deployed towards an improved likelihood of survival and the achievement of superior performance. As Klepper and Sleeper asserted, “Firms can be thought of as giving birth to spinoffs, so that spinoffs have parents from whom they inherit specific traits, in this case knowledge” (2005: 1303).

Central among these “stylized facts” is the widely held belief that entrepreneurial spinoffs tend to live longer and perform better than de novo entrants (Agarwal, et al., 2004; Brittain & Freeman, 1986; Chatterji, 2008; Christensen, 1993; Klepper & Sleeper, 2005; Stuart & Sorenson, 2003). “Spin-outs have a survival edge in the market over other entrants as the result of a combination of entrepreneurial flexibility and inherited knowledge,” noted Agarwal and colleagues (2004: 519). It is also widely propounded that high-performing parent-firms serve as a wellspring for high-performing spinoffs (Elfenbein, Hamilton & Zenger, 2010; Eriksson & Kuhn, 2006; Gompers, Lerner & Sharfstein, 2005; Klepper, 2009). Simply put, the common wisdom has become: “Better-performing firms have better-performing intra-industry spinoffs” (Klepper & Thompson, 2010: 5).

On the face of it, these increasingly formalized assertions present a formidable case in support of a hereditary theory of entrepreneurial spinoffs. And yet, this general acclamation of spinoff superiority is vexed by a very simple, very perplexing fact: most spinoffs fail to become substantively operational. In fact,
spinoff failure rates often exceed those exhibited by the general population of firms (Garvin, 1983; Klepper, 2001; 2007). The sheer number of spinoff failures raises two important research questions. First, if spinoff performance can be portrayed most aptly as involving advantageous hereditary linkages between parent-firms and their spawn, then why do so many spinoffs suffer early deaths? Second, if high-performing parent-firms are generally thought to produce high-performing spinoffs, then why do many low-performing spinoffs come from high-performing parents and many high-performing spinoffs come from low-performing parents?

The heterogeneity in spinoff performance constitutes a theoretical fissure that can only be resolved through the use of fine-grained, comprehensive data that allows for close examination of spinoff successes and failures. Using data from a complete population of firms that arose through legislative action related to the regulation of asbestos abatement, my study breaks new ground in several important respects. First, I contribute to the emerging tenets of spinoff theory by providing the first substantive head-to-head comparison between a complete population of spinoff entrants and de novo entrants. Further, my study provides the context and data necessary to test the foundational assumption that market entrants emanating from high-quality industry incumbents outperform those that do not. In the absence of a clear spinoff performance advantage, existing theories are unable to explain the high failure rates, especially the existence failed spinoffs spawned from better-performing parent-firms (Eriksson & Kuhn, 2006; Klepper, 2009). My analysis
materially enriches spinoff theory by addressing the many failures as well as the few successes.

Secondly, I contribute to the knowledge-transfer literature (e.g. Agarwal et al. 2004; Agarwal, Audretsch & Sarkar 2007, 2010; Connor & Prahalad, 1996; Franco & Filson, 2006; Kogut & Zander, 1992, 1996; Teece & Pisano, 1994) by addressing the data gaps and effect-conflation issues that have bedeviled prior studies of nascent industries (Aldrich & Fiol, 1994; Yang & Aldrich 2012), including those examining spinoffs. By dissecting the drivers of spinoff performance heterogeneity, I offer a more detailed evaluation of parent knowledge transfers to spinoffs. In particular, prior studies have often erred in using data that is insufficiently fine-grained to capture detailed performance heterogeneity among the spawned entities of a shared parent. Without the ability to perform within-parent-cohort analyses on all of the parent-firms for a complete industry, prior studies have inadvertently overstated the strength of the linkage between parent performance and spinoff performance. Through the discovery and exploitation of a complete industry population that is rich in entrepreneurial spinoffs, I offer the first comprehensive test comparing parent-cohort performance heterogeneity to industry-wide performance heterogeneity. In so doing, my research provides a significant reframing of the governing assumptions that parental performance and transferrable knowledge are highly instrumental to spinoff outcomes. My drive to address this issue more decisively results in the first comprehensive resolution of the caution by Agarwal and colleagues that “past authors have assumed an
underlying process of knowledge inheritance by a progeny firm, without explicitly
testing whether inheritance from an incumbent parent actually occurs” (2004: 502).

Thirdly, I provide important insights for research methods through a sensible
explication of unobservable non-linear relationships (Daniels & Hogan, 2008) by
using a complete population, rather significantly truncated data or simulated data.
Much of the prior literature in the realm of nascent-stage firms and industries has
come to rely upon a patchwork of explanations that are functionally disengaged
from the challenges of assessing left-side truncation effects (Yang & Aldrich 2012).
Through the discovery and innovative analysis of an industry population that is
entirely complete from its inception, I provide a compelling means to address
forcefully the dilemma of left-side truncation, which has confounded prior studies by
seriously understating spinoff occurrence and overstating spinoff survival and
performance.

In the following section, I review extant spinoff theory while developing a set
of six hypotheses. After detailing the context, dataset and methods used in the
study, I present the results and conclude by reflecting on the implications for spinoff
theory development and the opportunities for future study.

2. THEORETICAL DEVELOPMENT AND HYPOTHESIS

Spinoff Theory and Data Truncation

The inter-generational features of entrepreneurial spinoffs offer a tantalizing
domain for scholars to test theories related to the transfer of advantageous
knowledge and capabilities (e.g. Agarwal et al., 2004; Klepper & Sleeper, 2005). Scholars have been highly motivated to link the spinoff phenomenon to an assortment of seminal management theories, including: evolutionary theory (Nelson & Winter, 1982), organizational learning (Cyert & March, 1963; Fiol & Lyles, 1985; Leavitt & March 1988), tacit and explicit knowledge transfer (Franco & Filson, 2006; Kogut & Zander, 1992; Teece & Pisano, 1994), and a variety of economic-based (Geroski 1995) and sociology-based (Aldrich & Fiol, 1994; Hannan & Freeman, 1977; 1989) explanations for market entry. However, credible linkage to these broad frameworks is only valid to the extent that a hereditary-based theory of spinoff performance can be supported through the analysis of comprehensive spinoff data. Given the challenges associated with the acquisition of exhaustive data for early-stage events (Yang & Aldrich 2012), methodological solutions have proved to be elusive, thereby confounding attempts to establish credible linkage to theories grounded in transferrable endowments. The principal cause of this empirical shortfall involves left-side data truncation, meaning that observations on both the dependent variable and regressors are missing (Cameron & Trivedi, 2005). Recent work by Yang and Aldrich (2012) has taken steps to increase the awareness of both the pitfalls of left-side truncation, but the problem remains acute, particularly in the study of nascent-stage phenomena such as organizing events.

Figure 1 displays a stylized representation of the truncation problem. The collection of individual data points represents the complete population of firms entering a hypothetical market. The truncation threshold represents the beginning
of the observation window. This means that studies that are modeled to define the observation window through the use of trade catalogues (Klepper, 2001), venture capital financing (Chatterji, 2008) or industry journals (Agarwal et al., 2004) may exclude early spinoff failures from the analysis.

**Figure 1 - Stylized Schematic of the Data Truncation Effect**

In compiling data related to new market entry by nascent-stage firms, an unobserved, non-linear relationship results when there is a truncation of early-stage failures, dramatically changing the empirical and theoretical implications of the data.

In Figure 1, the mean performance ($Y_0$), comprised of only the observed values of $y$ ($y_o$), overstates the operational performance and understates the entry
rate of the complete population. This is because there exists an unobservable non-linear relationship in the complete population of observations. Since the unobserved values of y (y_u) do not share a linear relationship with the population of observed values comprising Y_O, conventional efforts to relate Y_O and Y_U will be impaired by the inability to apply the distributional assumptions underlying parametric correction tools, such as the Tobit Model. Corrections that relax distributional assumptions such as maximum-likelihood estimation and the Heckman two-step estimator are marginally more robust, but suffer from the notable liability of being “fragile to even very minor misspecification of error distributions” (Cameron & Trivedi, 2005; Paarsch, 1982). When the boundaries of possible solutions are so broad as to include the parametric estimators that are assuredly wrong and the non-parametric estimators that are assuredly uninformative, then these features render the estimators difficult to interpret (Tsiatis, 2006) and unsatisfying to apply to strategy research. This is particularly true in the study of core strategic management concerns, such as the formation of firms and industries, which inherently involve the analysis of events that are subject to truncation effects. Absent a complete, non-truncated population, there is no clear basis to determine the validity of conclusions pertaining to early-stage events when relying exclusively on the observed values.

Using Figure 1 as an illustrative template, spinoff analysis conducted in the context of left-side truncation will overstate spinoff performance by implicitly assigning mean values for unobservable failures. In addition to obfuscating overall
spinoff performance, a reliance on predictive models generated from only the observable, surviving spinoffs limits the ability to make comparative claims regarding spinoff performance. This would be particularly true if truncation affects spinoff entrants more so than de novo entrants. A condition in which there are proportionally more unobserved early failures by spinoff entrants would result in proportionally more spinoff truncations, which in turn would cause proportionally greater inflation of the mean performance that is calculated for all spinoffs. This is an important premise to test because spinoff performance superiority (Klepper, 2009) is the single most important source of empirical support underlying the conception of hereditary capabilities transferred from parent-firms to spinoffs (Agarwal et al., 2004; Klepper 2001; Klepper & Sleeper 2005; Klepper & Thompson 2010). As Klepper and Sleeper asserted, “Spinoffs inherit technical and market-based knowledge from their parents that shapes their nature at birth” (2005:1303). Simply put, the common wisdom has become: “Intra-industry spinoffs perform better than de novo entrants” (Klepper & Thompson, 2010: 5). This is an important claim. For if spinoffs actually perform no better than de novo entrants (Franco & Filson, 2006), then it is difficult to make a credible case that inherited knowledge provides demonstrable survival and performance advantages. Unless it is true that spinoffs inherit valuable knowledge from parent-firms (Elfenbein, Hamilton & Zenger, 2010; Eriksson & Kuhn, 2006; Gompers, Lerner & Sharfstein, 2005; Klepper, 2009), then there would be no clear benefits associated with a spinoff’s lineage.
A direct test of the purported linkages between parent and spinoff performance requires the availability of a complete, non-truncated population of industry actors. The exogenous events that gave birth to the Colorado asbestos abatement industry provide the data necessary to test this foundational claim. Therefore, in the context of a complete, non-truncated population, I challenge the assertion that there exists a hereditary-based spinoff performance advantage by advancing two arguments (Figure 2):

Hypothesis 1a: \textit{De novo entrants live longer than spinoff entrants.}

Hypothesis 1b: \textit{De novo entrants perform better than spinoff entrants.}

\textbf{Figure 2 - Hypothesized Model of Spinoff Performance}

In the context of a complete population, spinoffs are predicted to underperform \textit{de novo} entrants. Spinoff founders possessing only technical knowledge will exacerbate this effect, while founders possessing general business knowledge will reduce the negative effect of being a spinoff. If correct, these predictions shift the attention away from parental lineage to individual spinoff founder attributes.
Spinoff Performance Heterogeneity

Prior studies have largely attributed any observed heterogeneity of performance among entrepreneurial spinoffs to hereditary linkages between parent-firms and their respective spawn, saying in essence that good parents produce good kids and bad parents produce bad kids. “Spinoffs will initially have the same expected profits and survival prospects as their parents, thus more innovative and long-lived parents will have more innovative and long-lived spinoffs” (Klepper, 2001:646; and, Franco & Filson, 2006). Given the effects of left-side truncation, in which a large number of failed firms are never included in the analysis (Figure 1), this assertion is based more on conjecture than empirical observation.Absent from previous spinoff studies is an industry-wide, fine-grained analysis of cohort variance, consisting of the variance within the group of spinoffs spawned from a shared parent-firm. If the performance variance is greater within the cohort of spinoffs for a parent-firm than for the population of spinoffs, then this would cast doubt upon the conclusion that better-performing parents spawn better-performing spinoffs.

Data limitations have hindered scholars’ ability to address questions regarding nascent-stage events (Yang & Aldrich 2012). While the methods used in prior studies have identified successful spinoffs across multiple industries, these same methods have produced a spinoff theory that does not explain the high spinoff failure rate. Because of this, there is reason to question the extent to which existing research has accurately captured the heterogeneous performance outcomes of
spinoffs, particularly those emanating from the same parent-cohort. Instead, by linking the spinoff story primarily to technological know-how (Agarwal et al., 2004) and knowledge appropriation (Eriksson & Kuhn 2006; Klepper & Thompson, 2010), existing theory explains the few success stories, without fully accounting for the far-larger legion of failed firms. The knowledge spillover view of strategic entrepreneurship (KSSE), developed by Agarwal, Audretsch and Sarkar (2007) is emblematic of frameworks that seek to establish the manner in which the source of an entrepreneurial venture exerts significant influence on an entrant’s capabilities, which are in turn thought to be predictive of a given venture’s survival chances. “The genesis of firm capabilities, at least to some extent, has its roots in the capabilities and knowledge of a parent organizations” (Agarwal, Audretsch and Sarkar 2007: 275). Though this view is consistent with hereditary conceptions of parent-progeny linkages of operational performance and survival, the Yang and Aldrich work on left-side truncation (2012) creates difficult questions for the hereditary claims related to KSSE, and similar hereditary-based conceptions of spinoff performance.

The only meaningful way to directly test the purported linkages between parent-firm quality and spinoff quality is by examining the extent to which high-quality parents produce high-quality spinoffs, and low-quality parents produce low-quality spinoffs. Doing so requires the availability of a complete, non-truncated population of industry actors, including exceptionally high data fidelity related to the prior industry experience of spinoff founders. The complete population of firms
and founders comprising the Colorado asbestos abatement industry provides such data. From its inception in 1986, through 2010, 100 parent-firms spawned 448 spinoffs. Among these, 35 parent-firms produced five or more spinoffs, and thirteen of those firms produced ten or more spinoffs. The presence of several dozen parent-firms, each producing an adequately large spinoff cohort group, provides an unprecedented opportunity to scrutinize spinoff performance heterogeneity.

If the transfer of knowledge and capabilities from parents to spinoffs is a critical source of performance advantage, then the variance in performance for the cohort of spinoffs spawned by any given parent should be less than the overall performance variance. That is, there should exist a relatively tight grouping of spawned entities in the same proximity of the performance level achieved by the parent-firms. For the hereditary-based conception of knowledge transfer from parents to spinoffs to be efficacious, then high-achieving entrepreneurial spinoffs should be grouped around high-achieving parents, and low-achieving parents spinoffs should group around low-achieving parents. Equipped with a complete population of spinoffs that includes early-stage failures that are often truncated, a decisive test of spinoff performance heterogeneity is clearly warranted. In posing a challenge to the association between parent quality and spinoff quality, I predict that cohort group heterogeneity will exhibit variance exceeding the variance for the entire population of spinoffs (Figure 3). Articulated more formally, I assert:

Hypothesis 2: Variation in performance within a parent-firm’s cohort of spinoffs will, on average, exceed the variation in performance for the population of all spinoffs, regardless of parent-firm quality.
Founder-Specific Experience

If it can be demonstrated that spinoffs exhibit extreme performance heterogeneity, then one must ask: What is the driver of this variance, particularly in light of a hereditary-based theory of spinoffs? Prior research has clearly focused on parent-firm quality: “Apparently the key to the performance of the spinoffs is the quality of the environment in which founders worked and not the positions held by the founders,” wrote Klepper (2002: 660). Others have agreed, noting that “prior employment affiliations may influence not only new venture formation, but also product-market strategies and firm survival” (Agarwal et al., 2004: 501). Knowledge creation, replication and transfer (Connor & Prahalad, 1996; Kogut & Zander, 1992) are basic to the belief that parent-firms with large stocks of knowledge will be a wellspring of successful spinoffs (Agarwal et al., 2004; Klepper, 2009). “Pre-entry experience,” argued Klepper, “including experience in incumbent
firms, impart(s) an enduring advantage” (2002: 662). And yet, as noted earlier, Agarwal and colleagues (2004) presciently foresaw the peril in these blanket assertions by cautioning that knowledge inheritance has been more of a working assumption than an empirical finding. Nonetheless, on the weight of evidence derived from the disk drive industry, the authors concluded that “knowledge is in fact inherited, and a firm’s founder is a potentially more effective agent of transfer than a hired employee” (Agarwal et al., 2004: 519). Importantly, data limitations have restricted the extent to which truncation and within-cohort performance heterogeneity could be fully addressed in these prior studies. As a consequence, the presence of unobserved failures and immeasurable performance heterogeneity may undermine assertions that lineage influences performance outcomes, particularly when the heterogeneity stems from within-cohort variance.

Absent a clear linkage between parent-firm performance and spinoff performance, alternative explanations of performance heterogeneity may need to focus on elements of founder-specific experience (Bruderl, Preisendorfer & Ziegler 1992; Delmar & Shane 2006). Heterogeneity of performance and the absence of demonstrable hereditary linkages would suggest that founders vary in their respective abilities to read market signals, identify mission critical resources and deploy resources in a successful fashion (Alvarez & Barney 2002; Colombo & Grilli 2005; Lee, Lee & Pennings 2001; Winter 1987). In precisely this vein, Chatterji (2008) tested the bifurcation between technical specialists and management generalists among spinoff founders in the medical device industry, finding that
generalists displayed superior acumen in obtaining key resources, particularly venture financing (Chatterji 2008). In some respects, this hearkens back to the work of Lazear (2004, 2005) and Wagner (2003), which identified the value-generating capacity of well-rounded, jack-of-all-trades entrepreneurs. Lazear’s studies (2005) reveal the extent to which multi-faceted business experiences and general market awareness have a favorable impact on firm-level outcomes. Chatterji finds that generalists outperform technical specialists in their ability to mobilize critical resources in support of early-stage ventures. Of particular importance in his work is the relative success generalists exhibit in developing and exploiting networks that facilitate capital-raising activities (Chatterji 2008).

In this sense, I find compelling Chatterji’s argument that founder-specific differences play a material role in driving spinoff performance heterogeneity. Overall, however, I am skeptical of Chatterji’s final conclusions that founder differences emanate from “silver spooned” hereditary linkages between parents and spinoffs, especially in the absence of within-cohort evidence. Therefore, in extending and adjusting the founder-centric findings of Chatterji’s study (2008), I predict that spinoffs founded by technical experts will perform demonstrably worse than spinoffs founded by non-technical experts. And in respects that run contrary to Chatterji’s conclusions, I predict that the founder-centric effect is independent of parent-firm quality. By dissecting the foundings data, I predict that founder experience will be a significant moderator of spinoff performance (Figure 2), regardless of parental lineage:
Hypothesis 3a: Spinoffs by founders possessing only technical knowledge will exhibit survival rates and performance levels that are lower than spinoffs led by founders possessing non-technical, general market knowledge.

Hypothesis 3b: Spinoffs by founders possessing non-technical, general market knowledge will exhibit survival rates and performance levels comparable to de novo firms.

Hypothesis 3c: Spinoffs by founders possessing both technical and non-technical, general market knowledge will exhibit survival rates and performance levels that are higher than spinoffs led by founders possessing either just non-technical, general market knowledge, or just technical knowledge.

3. THE ASBESTOS ABATEMENT INDUSTRY

Asbestos Risks and Public Policy

For the four thousand years leading up to 1986, the use of asbestos was synonymous with wondrous product durability, safety and aesthetic quality. Unfortunately, the glass-like, barbed structures emanating from asbestos crystals are a scourge to the human respiratory system. Though highly inert in its manufactured state, disturbed asbestos-containing material (ACM) releases tiny fibers that become lodged in the lungs, potentially causing asbestosis, lung cancer and mesothelioma. Until the mid-1980s, concern regarding human exposure to asbestos in existing buildings progressed slowly, until the passage of the Asbestos Hazards Emergency Response Act (AHERA) in 1985. Originally devised to address the removal of asbestos from aging public schools, the Act broadly established standards for the professional abatement of asbestos in all existing structures. Functionally, the enforcement of AHERA was delegated to state-level agencies.
Colorado adopted a stance of strict monitoring and enforcement through the Colorado Department of Public Health & Environment (CDPH&E).

**Technical Demands.** Asbestos-containing building materials can be separated into two broad categories: friable and non-friable. Regulations define friable ACM as that which can be pulverized with hand pressure, while non-friable has a tight, crystalline structure that makes pulverization by hand impossible. Friable ACM is found in surfacing and texturing materials, spray-applied soundproofing (i.e. “popcorn ceilings”), fire-proofing and thermal insulation for ducts and pipes. These types of ACM are highly prone to significant fiber release if they are disturbed, thereby creating the need for sophisticated removal techniques, including a fully enclosed workspace that is kept under continuous negative air pressure. These engineering controls are costly to construct and maintain and require experienced supervisory oversight to design and implement. Non-friable ACM is found in resilient flooring, cementitious siding and various asphalts. Though still tightly regulated, non-friable abatement requires somewhat less sophisticated, and considerably less costly, engineering controls than those associated with the abatement of friable ACM.

**Industry Characteristics.** Technically and commercially, asbestos abatement is highly specialized, with relatively few profitable cross-applications to other commercial domains. Although the work practices simply involve the methodical demolition of pre-existing structures under highly prescribed conditions, the engineering controls associated with asbestos abatement are extensive and the
monitoring by the regulatory authorities is intense. So, while the service itself is a
routinized commodity service, the skill sets necessary to perform fully compliant
abatement are highly specialized and, for successful firms, highly profitable.

Spinoffs are by far the predominant mode of entry for firms in the asbestos
abatement industry, constituting 73% of the total market entrants. The widespread
occurrence of spinoffs in the context of highly granular data makes it an ideal
platform test the hereditary theory of spinoffs. The relatively small number of
diversifying incumbents (just 9%) is also fortuitous because it allows for a more
direct comparison of spinoffs and de novo entrants.

With only rare exception, the companies participating in Colorado’s asbestos
abatement industry started as “pure-plays,” with a singular focus on asbestos
abatement. In time, many firms branched out with limited success into areas such
as lead-based paint removal, mold remediation and the decontamination of
clandestine methamphetamine labs; however, most firms were solely involved with
asbestos abatement at the time of firm formation and entry into the asbestos
abatement market. Few resources and capabilities were readily transferrable from
extant industries to the removal and disposal ACM. Accordingly, few firms were
diversifying entrants who were migrating from other industries, such as general
contracting, specialty trades or environmental waste handlers. Rather, the
abatement industry was formed through an initial group of de novo specialists and,
soon after, spinoffs from existing firms. Through this, there ensued a series of
spinoffs begetting spinoffs in successive fashion. An actual example of this
phenomenon is illustrated in Figure 4, exhibiting the genealogy of the most prolific parent-firm in the Colorado abatement industry history, Dominion Services.

**FIGURE 4 - DOMINION SERVICES FAMILY TREE**

Dominion was one of the most successful firms in the history of the industry, ranking #8 (out of 612 total firms) in projects completed per firm-year and #4 in number of directly spawned entities (16). Though Dominion itself discontinued operations in 1998, its progeny continued to spawn. By 2010, the Dominion family tree spanned five generations and 43 separate spinoffs, virtually all of which were failed firms. Only six firms from the Dominion tree were operational in 2011, representing 13% of the extended family. The average lifespan in the Dominion family is 3.4 years and the average number of projects per firm-year is 8.8. There is little to distinguish Dominion’s spawn. Most were abject failures that died young.
without achieving a commercial presence. Of the firms comprising the Dominion Services family tree, at least 19 firms (43%) would be truncated from typical spinoff studies for having had no operational activity. Yet, in the context of this complete population and given the highly compressed nature of successive generations, the Colorado asbestos abatement data generally and prolific parents such as Dominion specifically, offer an unprecedented analytical portal.

4. METHODS AND DATA

Data

This empirical analysis of the Colorado asbestos abatement industry involves a retrospective research design with archival data comprised of the complete population of firms and founders having ever entered or exited the market. The methodology employed in this study is an event-history analysis (Delacroix & Carroll 1983; Tuma, Hannan & Groeneveld 1979) of a comprehensive database hand-collected from records at the CDPH&E, covering the industry from its inception in 1986 through 2010. This 25-year period witnessed the entry of 612 firms, objectively documented through licensing data. At the project level, 56,465 permits were issued towards for the removal of 350 million square feet of asbestos-containing material, for revenue exceeding $2 billion.

The use of registration data is not without controversy. Yang and Aldrich (2012) proffer several important caveats related to the use of “registration data” in the study of new ventures. However, the stringent regulatory regime governing the
asbestos abatement industry substantively mitigates these concerns. First, an Act of Congress created the entire industry in 1986. As an exogenous event, the creation of the industry and all subsequent operational activity can be traced to a precise time, with well-understood founding conditions. Second, as a consequence of the strict monitoring and reporting requirements associated with the removal and disposal of ACM in Colorado, an unusual level of detail is obtained by governmental agencies, which is closely tracked and exhaustively available to the public. By law, companies must obtain (and annually renew) a State-issued license prior to commencing any abatement work. This allows for comprehensive tracking of every firm into and out of the industry. It also allows the extraordinarily unusual ability to capture the existence of those firms that fail to complete even one project or that fail to survive beyond even their first annual license. This marks perhaps the first time that a dataset includes complete accounting of organizational forms that fail prior to becoming substantively operational.

Finally, the asbestos abatement data set is markedly different from other attempts to use registration data by virtue of the specific requirements implemented by the State of Colorado. As a state that adopted a regulatory regime more stringent than that required by AHERA, Colorado situated itself as a domain in which every abatement-related “footprint” was clearly recorded. Many states chose to administer federal enforcement of the new asbestos regulations in a minimalist fashion, through simple reference to AHERA, while investing in little or no state-level oversight over and above that dictated to the states by the EPA.
However, in a limited number of instances, states elected to implement regulations that were stricter than federal law and that placed the power of enforcement in the hands of newly formed regulatory divisions devoted to monitoring compliance. Colorado was one of these “high-enforcement” states. In the wake of AHERA, the Colorado legislature commissioned in 1986 an Asbestos Enforcement Group through the Air Quality Division of the CDPH&E, whereby regulations were adopted that required professional certifications, company licenses, specialized training, annual exams and project permitting that were specific to Colorado. In the absence of any reciprocity with other states (i.e. Colorado neither recognized nor honored certificates and licenses obtained in any other state), a tightly specified, closed-system of regulatory compliance was created in Colorado. Coincidentally, this regulatory ardor created a well-structured, well-defined boundary for an exhaustive “natural experiment” stemming from the exogenous “legislative shock” and involving the complete population of firms associated with abatement in Colorado.

**Dependent Variables**

Three separate dependent variables were used to test the dominant premises posited by existing spinoff theory: Lifespan, Operational Performance and Performance Variance. *Firm Lifespan* refers to the total duration of operational existence measured in years. *Operational Performance* refers to the average number of projects completed per firm-year for each market entrant. For instance, a firm completing 1,300 projects in 25 years of operation would have completed 52 projects per firm-year. A firm completing just six projects in three years would have
completed two projects per firm-year. This metric creates a standardized basis for comparison regardless of how long a firm has been in business. Each of these two measures provides a useful portal to the conditions and outcomes of left-side truncation. Although operational performance is positively correlated with lifespan, “survival is not strictly a function of performance” (Gimeno, Folta, Cooper & Woo, 1997: 750). In order to insure a comprehensive assessment of potential truncation effects, both outcomes are modeled.

*Spinoff Population Performance Variance* measures performance heterogeneity. It refers to the spinoff population performance standard deviation, recalculated for the exclusion of each parent-firm’s finite population of spinoffs.

**Independent Variables**

*Entry Mode* is a dichotomous variable with “1” indicating a spinoff, and “0” indicating *de novo* entrants. Due to the annual licensing requirements and detailed tracking of individual abatement workers and firms by Colorado agencies, spinoff foundings can be objectively and comprehensively identified when a licensed individual from an existing firm starts a new abatement firm. Colorado has no licensing reciprocity with other states and an annual exam must be passed in order to obtain the annual license. This allows for complete tracking of all individuals and firms, as well as all entries and exits for the entire industry.

*Founder Experience* - This is a categorical variable that identifies whether a firm founder has technical experience, indicated by prior certification as a Colorado-
licensed abatement supervisor (coded as “1”). Spinoff founders without prior certification as a Colorado-licensed abatement supervisor and all de novo founders are deemed to be non-technical (coded as “0”).

**Parent-Firm Spinoff Performance Variance** – This variable is the variance in the performance of spinoffs emanating from the same parent. This is represented by the standard deviation of cohort performance and is calculated separately for each parent-firm with five or more spinoffs. Parent-firms with fewer than five spawned firms were excluded since the variance is not meaningful for such small cohorts.

**Differences in Variation** - The difference between the standard deviation in the performance of all spinoffs and the standard deviation in performance of each parent-firm’s cohort of spinoffs.

**Weighted Average Parent-Firm Spinoff Variation** – This is a sum of the variance in performance for each parent-firm’s finite population of spinoffs (“cohort”), divided by N firms. The parent-firm variances are weighted based on the total number of spinoffs spawned by each parent, so that the spinoff cohort performance variance is proportional to each cohort’s size.

**Controls & Model Analysis**

*Controls*: Separate vectors were used to control for macroeconomic, industry-specific and firm-specific variables at entry. The macroeconomic vector \( (CON_{macro}) \) contains Colorado-specific measures for construction, unemployment and economic activity. Industry-specific measures \( (CON_{ind}) \) consist of the number of firms that
entered the industry in a given year (i.e. entry cohort), the industry population for each year, the entry group size relative to the population (Hannan & Carroll 1992) and the total projects completed. Dummy codes were used to control for unobservable year-specific effects \((CON_{year})\).

**Model Specifications:** OLS regression analysis and significant mean differences are employed to derive and explicate the focal effects. Prior studies in support of a spinoff performance advantage primarily have used lifespan as the determinant. For the sake of robustness, both *Lifespan* and *Operational Performance* were used to compare spinoffs and *de novo* firms in testing Hypotheses 1a and 1b. The generalized OLS equation for the population is represented by:

\[
Lifespan_{pop} = \beta_0 + \beta_1 CON_{ind} + \beta_2 CON_{macro} + \beta_3 CON_{YEAR} + \beta_4 FounderExper + \beta_5 EntryMode
\]  
\[
Oper Perf_{pop} = \beta_0 + \beta_1 CON_{ind} + \beta_2 CON_{macro} + \beta_3 CON_{YEAR} + \beta_4 FounderExper + \beta_5 EntryMode
\]  

Hypothesis 2 predicts that the average variance in spinoff performance for each cohort of sibling firms spawned from the same parent will exceed the performance variance for the entire population of spinoffs in this industry. Each parent-firm cohort performance variance was subtracted from spinoff population variance through which I derived a function predicting that the resultant difference from the population variance will be greater than zero (Figure 3):

\[
H_{null}: \quad VAR_{avg} = VAR_{pop} \\
H_{2}: \quad VAR_{avg} > VAR_{pop}
\]
Hypotheses 3a, 3b and 3c assert that Spinoff Founder Experience will be a significant predictor of Firm Lifespan and Operational Performance (Figure 2). The relationships are formulated as:

\[
\begin{align*}
\text{Perform}_{\text{Tech+GeneralExperience}} & > \text{Perform}_{\text{GeneralExperience}} > \text{Perform}_{\text{TechExperience}} \\
\text{Lifespan}_{\text{Tech+GeneralExperience}} & > \text{Lifespan}_{\text{GeneralExperience}} > \text{Lifespan}_{\text{TechExperience}}
\end{align*}
\] (3a) (3b)

5. Results

In light of extant theory, my analysis of this complete population produced findings that are surprising and significant, while bearing a high degree of reliability. Table 1 shows the number industry entrants by entry mode, with comparisons of average lifespans and annual projects completed. It is evident in even in this aggregate snapshot of the industry that entrepreneurial spinoffs are the predominate entry mode, and that they underperform de novo entrants by a sizable margin.

**Table 1 - Survival and Performance Comparisons by Entry Mode**

<table>
<thead>
<tr>
<th>Entry Mode</th>
<th># Firms</th>
<th>% of Firms</th>
<th>Average Lifespan</th>
<th>Average Projects Completed Per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>De novo</td>
<td>110</td>
<td>18%</td>
<td>6.6***</td>
<td>37.3***</td>
</tr>
<tr>
<td>Spinoffs</td>
<td>448</td>
<td>73%</td>
<td>3.1***</td>
<td>18.1***</td>
</tr>
<tr>
<td>De alio</td>
<td>54</td>
<td>9%</td>
<td>3.1</td>
<td>12.0</td>
</tr>
<tr>
<td>All Firms</td>
<td>612</td>
<td>100%</td>
<td>3.7</td>
<td>23.8</td>
</tr>
</tbody>
</table>

*** Focal mean differences (spinoff vs. de novo) were highly significant, \( p < .001 \).
Bivariate correlations and descriptive statistics are provided in Tables 2 and 3. The directionality of the correlations is consistent with the hypothesized relationships.

**Table 2 - Descriptive Statistics**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>s.d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Foundings (Year)</td>
<td>612</td>
<td>1986</td>
<td>2010</td>
<td>1997</td>
<td>7.38</td>
</tr>
<tr>
<td>Firm Failures (Year)</td>
<td>508</td>
<td>1987</td>
<td>2010</td>
<td>2001</td>
<td>7.77</td>
</tr>
<tr>
<td>Currently Operating (Yes = 1)</td>
<td>612</td>
<td>0</td>
<td>1</td>
<td>0.17</td>
<td>0.37</td>
</tr>
<tr>
<td>Firm Lifespan (Years)</td>
<td>612</td>
<td>0</td>
<td>25</td>
<td>3.73</td>
<td>4.45</td>
</tr>
<tr>
<td>Entry Mode (Spinoff = 1)</td>
<td>612</td>
<td>0</td>
<td>1</td>
<td>0.73</td>
<td>0.78</td>
</tr>
<tr>
<td>Total Completed Projects</td>
<td>612</td>
<td>0</td>
<td>2817</td>
<td>89</td>
<td>287</td>
</tr>
<tr>
<td>Average Annual Projects</td>
<td>612</td>
<td>0</td>
<td>166</td>
<td>9</td>
<td>21</td>
</tr>
<tr>
<td>Spinoff Frequency by Parent</td>
<td>100</td>
<td>1</td>
<td>20</td>
<td>4.48</td>
<td>4.41</td>
</tr>
<tr>
<td>Cohort Size</td>
<td>612</td>
<td>14</td>
<td>41</td>
<td>26.49</td>
<td>7.41</td>
</tr>
<tr>
<td>Spinoff Cohort Performance</td>
<td>100</td>
<td>0</td>
<td>23.5</td>
<td>11.8</td>
<td>22.8</td>
</tr>
<tr>
<td>(Average Annual Projects)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population at Entry</td>
<td>612</td>
<td>0</td>
<td>134</td>
<td>91</td>
<td>24.41</td>
</tr>
<tr>
<td>Cohort as Percent of Pop.</td>
<td>612</td>
<td>13%</td>
<td>100%</td>
<td>33%</td>
<td>19%</td>
</tr>
<tr>
<td>Cohort Average Lifespan</td>
<td>612</td>
<td>1</td>
<td>15</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

**Table 3 - Key Correlations**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Avg. Annual Projects</td>
<td>.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Lifespan</td>
<td>.317</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Entry Mode - Spinoff</td>
<td>.366</td>
<td>.292</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Founder – Tech, Exper.</td>
<td>.312</td>
<td>.284</td>
<td>.380</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Entry Cohort Size</td>
<td>-.148</td>
<td>-.015</td>
<td>-.017</td>
<td>.383</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Entry Cohort – Pct. Pop.</td>
<td>-.132</td>
<td>-.177</td>
<td>.184</td>
<td>.245</td>
<td>.115</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Entry Cohort Lifespan</td>
<td>.220</td>
<td>.269</td>
<td>-.280</td>
<td>-.146</td>
<td>-.182</td>
<td>-.120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Completed Projs - Total</td>
<td>.415</td>
<td>.724</td>
<td>-.235</td>
<td>-.381</td>
<td>-.206</td>
<td>-.143</td>
<td>.458</td>
<td></td>
</tr>
<tr>
<td>9 Indus Pop. at Entry</td>
<td>-.187</td>
<td>-.235</td>
<td>.158</td>
<td>.012</td>
<td>.043</td>
<td>.007</td>
<td>.119</td>
<td>-.138</td>
</tr>
</tbody>
</table>

Italicized correlations are significant at p < 0.01 level (2-tailed).
Spinoff and De Novo Performance and Survival

As Tables 4 and 5 reveal, there is ample evidence that the early failure of spinoffs is a common occurrence. Of the 448 spinoffs that entered the abatement industry, 178 exited by the end of their first year (Table 4) and 126 exited without ever performing a single project (Table 5). The notion of a survival advantage hereditarily conferred to spawned entities appears to be inconsistent with the widespread failure to become substantively operational. These results beg the question: If early failure is endemic to spinoffs, how does this affect the superiority claims?

**Table 4 - Spinoff & De Novo Longevity - Lifespan in Years**

<table>
<thead>
<tr>
<th>Firm Lifespan</th>
<th>Spinoff Firms</th>
<th>De Novo Firms</th>
<th>Spinoff Firms</th>
<th>De Novo Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of Spinoff</td>
<td>% of Spinoff</td>
<td># of De Novo</td>
<td>% of De Novo</td>
</tr>
<tr>
<td></td>
<td>Firms</td>
<td>Firms</td>
<td>Firms</td>
<td>Firms</td>
</tr>
<tr>
<td>Up to 1 Year</td>
<td>178</td>
<td>39.7%</td>
<td>35</td>
<td>31.8%</td>
</tr>
<tr>
<td>2 years</td>
<td>101</td>
<td>22.5%</td>
<td>11</td>
<td>10.0%</td>
</tr>
<tr>
<td>3 years</td>
<td>72</td>
<td>16.1%</td>
<td>8</td>
<td>7.3%</td>
</tr>
<tr>
<td>4 years</td>
<td>22</td>
<td>4.9%</td>
<td>8</td>
<td>7.3%</td>
</tr>
<tr>
<td>5 years</td>
<td>15</td>
<td>3.3%</td>
<td>5</td>
<td>4.5%</td>
</tr>
<tr>
<td>6 to 10 years</td>
<td>34</td>
<td>7.6%</td>
<td>16</td>
<td>14.5%</td>
</tr>
<tr>
<td>11 to 15 years</td>
<td>21</td>
<td>4.7%</td>
<td>12</td>
<td>10.9%</td>
</tr>
<tr>
<td>16 years or greater</td>
<td>5</td>
<td>1.1%</td>
<td>15</td>
<td>13.6%</td>
</tr>
<tr>
<td>Total</td>
<td>448</td>
<td>100%</td>
<td>110</td>
<td>100%</td>
</tr>
<tr>
<td>Firms Surviving 5 or Fewer Years</td>
<td>388</td>
<td>86.5%***</td>
<td>67</td>
<td>60.9%***</td>
</tr>
<tr>
<td>Firms Surviving 6 or More Years</td>
<td>60</td>
<td>13.5%***</td>
<td>43</td>
<td>39.1%***</td>
</tr>
</tbody>
</table>

*** Mean differences for spinoffs versus de novo firms significant at p < .001
Comparison does not include 544 diversifying incumbents (de alio firms)
**Table 5 - Spinoff & De Novo Performance - Lifetime Projects Completed**

<table>
<thead>
<tr>
<th>Total Projects Completed</th>
<th>Spinoff Firms</th>
<th></th>
<th>De Novo Firms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of</td>
<td>% of</td>
<td># of</td>
<td>% of</td>
</tr>
<tr>
<td></td>
<td>Spinoff</td>
<td>Spinoff</td>
<td>De Novo</td>
<td>De Novo</td>
</tr>
<tr>
<td>0</td>
<td>126</td>
<td>28.1%</td>
<td>16</td>
<td>14.6%</td>
</tr>
<tr>
<td>1</td>
<td>63</td>
<td>14.1%</td>
<td>14</td>
<td>12.7%</td>
</tr>
<tr>
<td>2</td>
<td>41</td>
<td>9.2%</td>
<td>4</td>
<td>3.6%</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>5.6%</td>
<td>6</td>
<td>5.6%</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
<td>4.0%</td>
<td>3</td>
<td>2.7%</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>2.0%</td>
<td>2</td>
<td>1.8%</td>
</tr>
<tr>
<td>6 - 10</td>
<td>40</td>
<td>8.9%</td>
<td>5</td>
<td>4.5%</td>
</tr>
<tr>
<td>11 - 20</td>
<td>22</td>
<td>4.9%</td>
<td>11</td>
<td>10.0%</td>
</tr>
<tr>
<td>21 - 50</td>
<td>29</td>
<td>6.5%</td>
<td>10</td>
<td>9.1%</td>
</tr>
<tr>
<td>51 - 100</td>
<td>18</td>
<td>4.0%</td>
<td>9</td>
<td>8.2%</td>
</tr>
<tr>
<td>101 - 250</td>
<td>29</td>
<td>6.5%</td>
<td>7</td>
<td>6.4%</td>
</tr>
<tr>
<td>251 - 500</td>
<td>16</td>
<td>3.6%</td>
<td>5</td>
<td>4.5%</td>
</tr>
<tr>
<td>501 - 999</td>
<td>6</td>
<td>1.3%</td>
<td>9</td>
<td>8.2%</td>
</tr>
<tr>
<td>1000+</td>
<td>6</td>
<td>1.3%</td>
<td>9</td>
<td>8.2%</td>
</tr>
<tr>
<td>Total</td>
<td>448</td>
<td>100%</td>
<td>110</td>
<td>100%</td>
</tr>
<tr>
<td>Firms Completing 10 or Fewer Total Projects</td>
<td>322</td>
<td>71.9%***</td>
<td>53</td>
<td>45.6%***</td>
</tr>
<tr>
<td>Firms Completing 11 or More Total Projects</td>
<td>126</td>
<td>28.1%***</td>
<td>57</td>
<td>54.4%***</td>
</tr>
</tbody>
</table>

*** Mean differences for spinoffs versus de novo firms significant at p < .001
Comparison does not include 544 diversifying incumbents (de alio firms)

In support of Hypothesis 1a and 1b, I found that after accounting for a complete, non-truncated population of industry entrants, there is no spinoff performance advantage. On the contrary, a comparison between spinoffs and de novo entrants (Table 4) shows that the average lifespan for entrepreneurial spinoffs was less than half that of de novo entrants (t1,558= 15.03, p < .001). On average,
spinoffs completed fewer than half the number projects as *de novo* firms (t_{1,558}=9.66, p < .001), a fact that certainly contributed to the lower average lifespan.

The absence of a spinoff performance advantage in this study clearly runs counter to the great majority of prior empirical findings (e.g. Agarwal et al. 2004; Chatterji 2008; Dick et al. 2011; Dyck 1997; Gompers et al. 2005; Klepper 2001; Klepper & Sleeper 2005). To explore the causes of this important difference, I follow Yang and Aldrich (2012) in examining the potential effects of left-side truncation due to the exclusion of early failures. Tables 6 and 7 present the results of OLS regression models designed to compare two scenarios: (1) a complete, non-truncated population with all 558 spinoff and *de novo* entrants (note: *de alio* firms were not included in this comparison); and, (2) a truncated population that excludes spinoff and *de novo* firms having never completed even one abatement project.

The rationale for applying this truncation criterion is grounded in the observation that prior studies have inadvertently truncated firms failing to become substantively operational (Yang & Aldrich 2012). This happens because the studies have been based on data drawn from milestones that occurred long after the firms were founded, namely: the appearance in catalogues and trade journals, or attainment of venture financing. Therefore, I adopted the relatively conservative threshold that abatement firms failing to complete any projects whatsoever lacked sufficient operational presence to be included ordinarily in the population of observable firms. Applying this criterion, a total of 142 spinoff and *de novo* firms were truncated from Models 2a, 2b and 2c in Table 6 and Models 4a, 4b and 4c in
Table 7, leaving a truncated population of 416 firms. Table 6 displays the effects of truncation on survival in years, while Table 7 displays the effects on operational performance in annual projects completed. A total of 54 de alio firms were excluded from all of the models in Tables 6 and 7 in order to preserve the direct comparison between spinoffs and de novo firms. If included, the de alio firms would display effects substantially the same as those exhibited by entrepreneurial spinoffs.

In comparing the truncated Models 2c (Table 6) and 4c (Table 7) with the non-truncated Models 1c and 3c, respectively, it is evident from the sign reversals that the truncation effects are significant. First, the truncated Model 2c (Table 6) shows a slight spinoff survival advantage of 0.204 years, which is entirely consistent with the directionality and magnitude of prior empirical studies touting some evidence of hereditary endowments. However, the non-truncated Model 1c shows a spinoff disadvantage of -0.894 years. These findings are mirrored in the operational performance comparison (Table 7). Here, the truncated Model 4c shows a spinoff performance advantage of 3.4 average annual projects completed. However, the non-truncated Model 3c (Table 7) shows a spinoff disadvantage of -9.2 projects. These findings suggest that the truncation of early-stage failures in Models 2c and 4c create the illusion of spinoff superiority; an artifact that is corrected in the context of a complete industry population.
These findings raise the specter that the ill effects of truncation may confound the analysis of a spinoff population significantly more than they impact the analysis of de novo firms. As Table 5 shows, 28.1% of spinoffs and 14.6% of de novo entrants completed no projects whatsoever. This sizable difference causes the mean performance for the truncated population of spinoffs to be inflated proportionately more than the truncated mean value for de novo firms. In large measure, this explains the sign changes for the Entry Mode variable when comparing survival Models 1c and 2c in Table 6 and operational performance Models 3c and 4c in Table 7.
### Table 7 - Effect of Entry Mode on Operational Performance - OLS Regression Estimation

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Non-Truncated (n = 558) Units: Average Annual Projects</th>
<th>Truncated Data (n = 420)‡ Units: Average Annual Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>43.4*** (27.8)</td>
<td>35.2** (26.2)</td>
</tr>
<tr>
<td></td>
<td>43.6*** (33.4)</td>
<td>35.1*** (25.8)</td>
</tr>
<tr>
<td></td>
<td>47.7*** (24.7)</td>
<td>32.4** (26.3)</td>
</tr>
<tr>
<td>Macro Effects</td>
<td>-3.2 (2.9)</td>
<td>-2.6* (2.2)</td>
</tr>
<tr>
<td></td>
<td>-3.0 (2.8)</td>
<td>-2.6 (2.7)</td>
</tr>
<tr>
<td></td>
<td>-3.0 (2.9)</td>
<td>-2.4 (2.4)</td>
</tr>
<tr>
<td>Industry Effects</td>
<td>-7.8** (5.4)</td>
<td>-5.7* (4.6)</td>
</tr>
<tr>
<td></td>
<td>-4.3* (3.9)</td>
<td>-2.4* (2.2)</td>
</tr>
<tr>
<td></td>
<td>-3.0* (2.9)</td>
<td>-2.1* (2.1)</td>
</tr>
<tr>
<td>Year Effects</td>
<td>-10.6* (11.4)</td>
<td>1.7* (1.3)</td>
</tr>
<tr>
<td></td>
<td>-4.8* (4.9)</td>
<td>1.7* (1.5)</td>
</tr>
<tr>
<td></td>
<td>-3.1* (3.8)</td>
<td>1.1* (1.0)</td>
</tr>
<tr>
<td>Founder Exper. (Tech = 1)</td>
<td>-8.3*** (7.6)</td>
<td>-3.3*** (2.5)</td>
</tr>
<tr>
<td></td>
<td>-5.4** (4.9)</td>
<td>-2.8** (3.1)</td>
</tr>
<tr>
<td>Entry Mode (Spinoff =1)</td>
<td>-9.2*** (9.5)</td>
<td>-3.4*** (3.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.374 (21.2***</td>
<td>0.401 (41.4***</td>
</tr>
<tr>
<td></td>
<td>0.552 (47.8***</td>
<td>0.613 (68.5***</td>
</tr>
<tr>
<td></td>
<td>0.799 (72.6***</td>
<td>0.718 (70.8***</td>
</tr>
</tbody>
</table>

‡ - Truncation of firms failing to complete at least one project.
The 54 de alio firms are not included in order to conduct a focused comparison of spinoffs and de novo firms.
Standard errors in parentheses. * p < .05, ** p < .01, *** p < 0.001.

The foregoing regression models present a strong case that in the context of a complete population spinoffs fail to display hereditarily endowed performance and survival advantages. When evaluated from birth, entry mode clearly has a significant impact on the average number of years and projects competed. However, it is also important to ask whether entry mode persists as significant determinant of survival after an initial purge of unfit firms. In order to examine the ongoing survival prospects as a function of entry mode, I used a Cox Proportional Hazard (PH) model. For ease of interpretability, the hazard rates have been converted into the probability of failure. The results are summarized in Model 5 (Table 8).
State GDP growth, industry health and firm characteristics such as size, experience and productivity all reduce the hazard. Cohort size, technical experience and entry mode all increase the hazard of failure. For each variable, the probability of survival indicates the relative likelihood of failure associated with a one-unit change in that variable. For instance, a one-unit change in age would mean that each additional year of experience decreases the relative risk of failure by 2%. Since entry mode is a dichotomous variable, there is only a state of “0”, indicating a de novo entrant, or “1”, indicating a spinoff entrant. Accordingly, spinoff entrants face an 83% greater hazard of instantaneous failure than a de novo entrant.

The relationship between entry mode and survival probability is presented in Figure 3, a Kaplan-Meier estimate. As the figure reveals, entry mode plays a pronounced role in dictating the disadvantaged fate of spinoff entrants.
Since the Cox PH assumes constant proportionality across the observation window, robustness checks must be performed to insure that the model is not misspecified by virtue of proportionality violations (Lin and Wei, 1989). Robustness tests revealed an absence of evidence contradicting the proportionality assumption. Therefore, the Cox PH results can be considered reliable.

**Heterogeneity Among Spinoff Cohorts**

Hypothesis 2 predicted that the average performance variance for spinoff cohorts (i.e. the cohort of siblings sharing the same parent-firm) would exceed the performance variance for the complete population of all spinoffs. If correct, this prediction would suggest that both low-achieving and high-achieving parent-firms produce spinoffs of varying quality. The data in Table 8 shows that spinoff performance is highly heterogeneous.
Table 9 - Heterogeneity of Performance – Cohort Variance vs. Population Variance

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>20</td>
<td>112.7</td>
<td>13.1</td>
<td>0 – 89.4</td>
<td>24.23</td>
<td>6.72</td>
</tr>
<tr>
<td>RRI</td>
<td>17</td>
<td>90.0</td>
<td>17.6</td>
<td>0 – 116.9</td>
<td>34.72</td>
<td>17.21</td>
</tr>
<tr>
<td>LVI</td>
<td>17</td>
<td>166.3</td>
<td>12.5</td>
<td>0 – 97.9</td>
<td>24.51</td>
<td>7.00</td>
</tr>
<tr>
<td>Dominion</td>
<td>16</td>
<td>97.2</td>
<td>14.8</td>
<td>0 – 53.5</td>
<td>25.57</td>
<td>8.06</td>
</tr>
<tr>
<td>Great Plains</td>
<td>15</td>
<td>5.4</td>
<td>10.7</td>
<td>0 – 77.2</td>
<td>21.43</td>
<td>3.92</td>
</tr>
<tr>
<td>ACM Removal</td>
<td>14</td>
<td>88.3</td>
<td>11.7</td>
<td>0 – 58.7</td>
<td>19.68</td>
<td>2.17</td>
</tr>
<tr>
<td>Mac-Bestos</td>
<td>10</td>
<td>57.1</td>
<td>10.5</td>
<td>0 – 60.6</td>
<td>18.85</td>
<td>1.34</td>
</tr>
<tr>
<td>MDR</td>
<td>10</td>
<td>53.5</td>
<td>11.5</td>
<td>0 – 47.4</td>
<td>16.59</td>
<td>(1.08)</td>
</tr>
<tr>
<td>Schauer</td>
<td>10</td>
<td>51.0</td>
<td>12.3</td>
<td>0 – 28.9</td>
<td>21.51</td>
<td>4.00</td>
</tr>
<tr>
<td>Asbestos Tech</td>
<td>10</td>
<td>16.5</td>
<td>10.4</td>
<td>0 – 86.5</td>
<td>26.76</td>
<td>9.25</td>
</tr>
<tr>
<td>Onyx</td>
<td>10</td>
<td>33.3</td>
<td>23.5</td>
<td>0 – 133.1</td>
<td>20.38</td>
<td>2.87</td>
</tr>
<tr>
<td>Misers</td>
<td>10</td>
<td>52.6</td>
<td>14.3</td>
<td>0 – 87.9</td>
<td>27.53</td>
<td>10.02</td>
</tr>
<tr>
<td>A.R.C.</td>
<td>10</td>
<td>14.4</td>
<td>13.6</td>
<td>0 – 52.8</td>
<td>17.79</td>
<td>0.28</td>
</tr>
<tr>
<td><strong>13 Largest Cohorts (avg.)</strong></td>
<td><strong>169</strong></td>
<td><strong>64.5</strong></td>
<td><strong>12.6</strong></td>
<td><strong>0 – 133.1</strong></td>
<td><strong>24.26</strong>*</td>
<td><strong>6.75</strong>*</td>
</tr>
<tr>
<td><strong>All Spinoff Cohorts (avg.)</strong></td>
<td><strong>448</strong></td>
<td><strong>30.3</strong></td>
<td><strong>11.8</strong></td>
<td><strong>0 – 133.1</strong></td>
<td><strong>22.78</strong>*</td>
<td><strong>5.27</strong>*</td>
</tr>
</tbody>
</table>

‡ The standard deviation in projects completed per firm-year for all 448 spinoffs is 17.5
*** Mean differences (Average Cohorts Variance versus Population Variance) were highly significant, p < .001.

The standard deviation for projects annually completed by the entire population of spinoffs is 17.5. This is significantly lower than the weighted average standard deviation for all spinoff cohorts, which is 22.8 (t1,448= 9.25, p < 0.001). The thirteen parent-firms that spawned ten or more spinoffs are listed in Table 8, as well. The weighted average standard deviation for cohorts from this group of highly prolific
parents is 24.3, also exceeding the population variance of 17.5 projects per firm-year ($t_{1,168} = 7.48, p < 0.001$). Therefore, Hypothesis 2 finds strong support.

Given the finding that performance variance within spinoff cohorts is greater than the variance between spinoff cohorts, the question arises: What is driving this variance? Hypotheses 3a, 3b and 3c examined this question through the lens of founder-specific experience. Mean comparisons indicate that spinoffs founded by non-technical managers have double the lifespan of spinoffs founded by technical managers.

**TABLE 10 - SPINOFF FOUNDER COMPARISON – TECHNICAL VS. NON-TECHNICAL KNOWLEDGE**

<table>
<thead>
<tr>
<th>Founder Type</th>
<th>Average Lifespan</th>
<th>Average Projects Per Firm-Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Founder with Only Non-Technical Experience</td>
<td>5.3***</td>
<td>32.1***</td>
</tr>
<tr>
<td>Founders with Only Technical Experience</td>
<td>2.3***</td>
<td>6.8***</td>
</tr>
<tr>
<td>Founders with Both Tech &amp; Non-Tech Experience</td>
<td>5.1</td>
<td>30.8</td>
</tr>
<tr>
<td>All Spinoffs</td>
<td>3.1</td>
<td>18.1</td>
</tr>
</tbody>
</table>

*** Mean differences (Technical vs Non-Technical) were highly significant, $p < .001$.

$N = 612$ firms

The mean difference of three years is highly significant ($t_{1,448} = 18.82, p < 0.001$), as is the mean difference for firm performance, measured by completed projects per firm-year, which is nearly 400% higher for firms with non-technical founders ($t_{1,448} = 8.99, p < 0.001$). The OLS regression Models 1c (Table 6) and 4c (Table 7) reflect the same findings in the context of controls and other known predictors of operational performance and lifespan ($p < 0.01$). Further, the Cox PH Model 5 (Table 8) indicates that founders with technical experience face a 30% higher hazard of instantaneous failure than a founder with general management experience. A
comparison between spinoff founders with general management experience, spinoff founders with technical experience, and spinoff founders with both technical and general experience is provided in Figure 6. De novo survival probabilities are also included for reference.

**Figure 6: Kaplan-Meier Estimate of the Survival Function by Founder Experience**

These findings provide confirmation for Hypothesis 1b, which predicted that no form of intra-industry entrepreneurial spinoffs possesses a survival advantage over *de novo* entrants. The Kaplan-Meier also provides strong support for Hypothesis 3a, which predicted that founders with general experience face significantly less survival hazard than founders possessing only technical experience; and, Hypothesis 3b, which predicted GM spinoff founders would face a hazard rate statistically similar to that faced by *de novo* founders. On the other hand, it appears that founders possessing both technical and non-technical experience performed
equivalently to founders possessing only non-technical management experience. This result requires the rejection of Hypothesis 3c, but confirms Chatterji’s (2008) finding that general business acumen is the decisive component in spinoff performance, not technical knowledge.

6. DISCUSSION

The cornerstone of dominant spinoff theory is that spawned firms live longer and perform better than other entry modes due to knowledge acquired from parent-firms (e.g. Agarwal et al. 2004; Klepper 2009; Klepper & Sleeper 2005). Further, top-quality parents, possessing larger stocks of capabilities, are presumed to spawn more and better spinoffs than low-quality parents (Agarwal et al., 2004; Brittain & Freeman, 1986; Christensen, 1993; Klepper & Sleeper, 2005). My examination of a complete population of firms contradicts each of these foundational assumptions. In fact, the only way to find support for the emerging tenets of spinoff theory with my comprehensive data set is through the truncation of the early spinoff failures (Model 2 in Table 6, and Model 4 in Table 7). Contrary to the stylized facts that predominate in spinoff research (Klepper 2009; Klepper & Thompson, 2010), the asbestos industry data provides evidence that hereditary-based conceptions of entrepreneurial spinoffs significantly overstate the relationship between parent-firm performance and spinoff performance. Taking into account a complete, non-truncated population of firms, average spinoff performance is less than half that of de novo’s. Specifically, the average lifespan for entrepreneurial spinoffs is 3.1 years.
versus 6.6 years for de novo firms; also on average, spinoffs completed 18.2 projects per firm-year versus 37.3 projects per firm-year for de novo entrants (Table 1).

Limitations and Alternative Explanations

As is always the case, there are limitations to this study, some of which may foster concerns about alternative explanations. A review of these potential issues reinforces the central claims of this paper. First, the generalizability of asbestos abatement data might be questioned on the basis of the industry’s relative anonymity. Despite its low-profile status, however, the industry represents an untapped, well-bounded, well-defined population, constituting a richly detailed data set that provides a full spectrum of organizational forms and near-perfect optics regarding the operational activity. Generalizability might also be questioned due to the modest technical demands associated with abatement versus prior empirical studies which have focused on capital intensive, technologically complex manufacturing industries, such as autos, disk drives, lasers and medical devices. Intuitively, capital intensive, technologically complex products would seem to involve more knowledge that may be relevant to the survival and comparative performance of entrepreneurial spinoffs. However, the sheer size and complexity of these industries create substantial research challenges, especially in the analysis of nascent-stage events related to new firms, industries and markets. Highly regulated service-sector industries with relatively low barriers to entry are more likely to provide access to more complete populations, including, as was shown here,
early stage events. In the end, generalizability is a function of the research question under investigation. My challenge in this inquiry was to investigate the efficacy of a hereditary approach within the context of a complete industry population. Boundary conditions that specify high-tech manufacturing sectors (e.g. Klepper 2009) and complex parental knowledge stocks may produce results that appear to be more supportive of hereditary transfers, but with the concomitant pricetag of truncation and the potential for unobserved non-linear relationships. Either way, spinoff research is materially enriched by an open exploration of various industries, especially when it is possible to apprehend a complete population.

Another important characteristic of abatement industry data involves diversifying incumbents. Few successful and absolutely no dominant incumbent firms have entered the abatement industry through diversifying market entry. The limited presence of these *de alio* firms is likely to be less common in other industries. For the sake of this study, however, the limited presence of *de alio* firms provides an unusually good opportunity to directly compare spinoffs and *de novo* firms without the pervasive shadow of dominant incumbents that often characterize capital-intensive industries. Future studies can perhaps conduct similar analyses in the context of an industry that has more incumbent activity.

It is also worth noting the presence right-side truncation in this study by virtue of the fact that just 104 of the 612 industry entrants were still operational at the end of 2010. Additionally, there were 14 new entrants – 9 spinoffs and 5 *de novo* firms – in 2011 and early 2012. Although the details of this influx are not directly
relevant to my central research questions, as a robustness check, I performed right-side truncation tests at three years and five years. Neither of these right-side truncation tests materially altered the effect size or the significance levels.

Finally, concerns might be raised that the 126 spinoff entrants failing to complete even one permitted project simply acquired an abatement license to create the option to become operational without possessing serious intent to compete. Several factors make this explanation implausible. First, the issuance of the $2,000 license is a matter of public record. Every license holder is listed on the CDPH&E web site. For a spinoff founder still working for an employer, this constitutes a signal of direct competitive intent, especially because all project permits are also a matter of public record. With approximately 100 current firms, mandatory project permitting, and a limited array of marketing options, the Colorado abatement milieu is, by any reasonable standard, an intimate universe. Second, abatement license issuance requires the submission of federal and state tax identification numbers as well as the registration with Secretary of the State of Colorado as a formal operating entity. The latter stipulation involves incorporation, publication of by-laws, and annual reports to the State. Thus, the administrative burden is not a cursory matter. Finally, if abatement licenses are conceptualized as being tantamount to an operational or strategic option, then the option would hold the most significant value for diversifying incumbents, such as specialty contractors, restoration experts or general contractors. Yet, there have only been 54 de alio
license-holders, constituting just 9% of industry entrants and an even smaller percentage of industry-wide completed projects.

**Conclusion**

The evidence from this study shows that spinoff performance is highly heterogeneous, even among spinoffs emanating from the same parent-firm. In sharp contrast to prior studies using truncated data, I find that spinoffs do not hold a performance advantage over *de novo* firms and that performance heterogeneity is uncorrelated with parent-firm quality. If hereditary endowments were sources of a performance advantage, then one would largely expect to see high-performing parents spawning high-performing spinoffs and low-performing parents spawning low-performing spinoffs. In fact, however, there is no discernible relationship. Rather, the performance variance among cohorts from shared parent-firms is significantly larger than the population variance, indicating that high-performing parents spawn many low-performing spinoffs and low-performing parent-firms produce many high-performing spinoffs. If hereditary knowledge had been a vital source of performance advantage, then on average there would be less variation in the performance of spawned entities emanating from the same parent. In fact, however, variation within parent-cohorts is enormous.

Disaggregation of the spinoff data reveals an even fuller story. As demonstrated above, spinoff performance within the asbestos abatement industry is clearly bifurcated between technical founders and generalist founders. The average lifespan for firms founded by technical supervisors is less than half that of
generalists, with technical founders completing seven projects per firm-year, versus thirty-two projects per firm-year for generalist-founders (Table 9). These results suggest that contrary to extant theory, the key driver of spinoff performance is less a function of parental knowledge transfers (Agarwal et al., 2004; Gompers et al., 2005; Klepper, 2001; Klepper & Thompson, 2010) than it is a function of differential outcomes based on founder-specific experience. It is beyond the scope of this study to state definitively why generalists outperform technical experts by such a wide margin, but I believe that future research may discover fruitful answers in the startling similarities between generalist spinoff founders and de novo founders. It seems likely that these two groups of founders possess similar aptitudes and outlooks in two respects. First, I believe that generalist spinoff founders and de novo founders may identify and interpret market opportunities (Casson 1982; Heil & Robertson 2006; Leibenstein 1968; Stevenson & Jarillo 1990) in a similar fashion, partially evidenced by the relative immunity to the effects of contagion-style entry (Greve 1998) that is commonplace among technical spinoff founders. As Table 3 shows, the entry-year cohort size is positively and significantly correlated (.383) with founders possessing technical experience, suggesting that this group may be more prone to contagion entry patterns than are the generalist and de novo founders. Second, generalist and de novo founders may possess similar marketing and sales acumen, particularly in the sourcing of new customers. Conversely, the accurate interpretation of market signals and successful implementation of marketing initiatives may prove to be elusive for technical supervisors.
(Leonard-Barton 2007), who possess more of a project-execution orientation and may therefore lack the ability to conceptualize and operationalize a viable sales strategy. Future opportunities abound to assess and extend these findings and the work of Chatterji (2008) in further scrutinizing the multi-level relationships between founder-specific attributes, entry mode and firm performance.

Overall, these results pose significant challenges to the dominant, hereditary-focused conceptions of intra-industry entrepreneurial spinoffs. Through the lens of this complete population, my evidence suggests that the purported spinoff performance advantage is worthy of reassessment and further refinement. At a minimum, my findings suggest that the hereditary transfer of parental success may be subject to more restrictive boundary conditions.
REFERENCES


CHAPTER FOUR

PARITY, PATERNALISM AND PEO NAGE IN THE INFORMAL ECONOMY:
AN EMPIRICAL STUDY OF OFF-THE-BOOKS LOANS
PARITY, PATERNALISM AND PEONAGE IN THE INFORMAL ECONOMY: 
AN EMPIRICAL STUDY OF OFF-THE-BOOKS LOANS

“There is one piece of advice that I give to business owners every time I speak: 
Do not ever lend money to your employees. It’s bad business. It’s bad management. 
And, it’s usually done illegally.” (Huston, 1987)

1. INTRODUCTION

Financially and operationally, there seems to be no incentive to lend money 
to an employee. If interest is charged, it almost certainly falls below the owner’s cost 
of capital. If default occurs, there is no constructive means to extract payment from 
the employee without the risk of business disruption. And yet, not only do small 
business owners frequently lend money to employees; they often do so “off-the-
books,” (OTB) meaning that the loan is made as an illegal, informal economic 
transaction with no loan agreement, no interest, and no repayment schedule 
(Glasscock, 2011; Osteryoung, 2011; WSJ, 2010). OTB loans violate a number of 
state and federal laws, and openly flout applicable tax codes due to the fact that 
neither party to these off-the-book transactions recognizes the payments as a 
taxable event (26 U.S.C. § 102(c)).

The existence of OTB loans further magnifies the question: Why would a 
business owner ever assume the risk of making a loan through informal economic 
mechanisms, with no documentation, legal recourse or apparent financial benefit? 
And more generally, why would an individual forego the protections of formal
markets and institutions by engaging in illegal, informal market mechanisms even when formal alternatives are available? While commonsense would seem to dictate that an owner should either refuse to lend altogether or should at least insist upon a comprehensive loan agreement that addresses creditor rights, this study suggests that informal market activity through OTB lending constitutes a rational, carefully considered alternative to formal market inefficiencies (Henry, 1987; Castells and Portes, 1989; De Soto 2000; Portes and Haller, 2005; Venkatesh, 2006; Chen, 2007), including the labor uncertainties faced by business owners and the unavailability of reasonable credit faced by employees.

Through a detailed examination of 459 employee loans issued by the owners of 83 private, labor-intensive businesses, this study constitutes a rare portal to the inner workings of decision-making within the informal economy. It offers unprecedented insights into the details of when informal activity occurs, where it occurs and why it occurs. This research reveals that far from being a foolhardy stumble into the informal economy, OTB loans involve a carefully calculated effort by business owners to exercise labor control (Santiago and Thorbecke, 1988) through informal economic mechanisms. Joining Webb and colleagues (2009: 492) I accept that the informal economy is economic activity that falls “outside of formal institutional boundaries.” OTB loans constitute informal economic activity because they “evade applicable tax codes” and sidestep laws governing “property relationships, commercial licensing, labor contracts, torts, financial credit, and social security systems” (Feige, 1990: 992).
The mere presence of OTB loans flies in the face of existing analyses of the informal economy because the activity occurs despite the availability of legitimate formal alternatives. This fact underscores the sizable gap in scholars’ understanding of the decision-choice mechanisms that ultimately drive IE activity. By and large, the scholarly orthodoxy has been to maintain the view that firms use IE mechanisms because they are forced to do so by necessity (Gaughan and Ferman, 1987; Hart, 1973; Lewis, 1954). Conceptualized in this fashion, the IE is considered to be inferior, less evolved (Lewis, 1954), because firms resorting to informal mechanisms inherently operate under a cloud of illegitimacy (Becker, 2004; Castells and Portes 1989; Portes and Haller, 2005). The “stain” of illegitimacy from IE activity is thought to be a potent deterrent for small firms seeking attain and maintain highly prized cognitive and socio-economic legitimacy (Aldrich and Fiol 1994), each of which is considered instrumental to operational performance and firm survival (Suchman 1995). Rendered in this fashion, it is widely believed that only the most disadvantaged, marginalized and desperate firms would resort to IE activity (Lewis 1954).

In fact, this theoretical perspective over-simplifies and mischaracterizes the decision-choice dynamics that actually govern informal market participation. Given the importance of firm, industry and market legitimacy (Aldrich and Fiol 1994), the issuance of OTB loans in the context of legal alternatives stretches to the breaking point conventional notions of the informal economy. This has, in turn, unleashed potent evidence of the IE’s complexities and convolutions.
For example, OTB loans may provide employees with immediate interest-free funds, thereby functioning as a preferable alternative to other sources of credit, but the money is far from free. On the contrary, I discovered that business owners issue OTB loans based on a complex decision-choice rubric that aims to maximize relational rents (Dyer and Singh, 1998), which owners subsequently appropriate by binding employees through the front-end appearance of parity (Eswaran and Kotwal, 1985), but the back-end operationalization of paternalism (Alston and Ferrie, 1993) and peonage (Brass, 1999; Fishback, 1989). In this sense, the transaction-level dataset serves as a microcosm of the wealth creation and wealth transfer that typifies informal economic activity.

My study makes a number of notable contributions. First, this study is among the first to examine the informal economy at the transaction level of analysis. Prior research has been conspicuously bimodal, exemplified by macro-level studies that focus on aggregate indicators of the informal economy’s pervasiveness and analyses of business registration data (Godfrey, 2011; ILO, 2002; LaPorta and Schleifer, 2008; Lewis, 1954; Polanyi, 1957) or by micro-level ethnographies and case studies that have limited generalizability (Hart, 1973; Sassen-Koob, 1989; Venkatesh, 2006; Vogel, 2006). With a relatively large, fine-grained set of transaction-level data, I was able to address the empirical and theoretical gaps caused by this bimodality. Second, I offer empirical evidence that informal economic activity occurs side-by-side formal market alternatives, usually as a consequence of incomplete markets (Stiglitz, 1993). This constitutes one of the first
studies to demonstrate a decision-choice dynamic in which market participants actively risk losing legitimacy by choosing to undertake informal economic activity in the presence of legal alternatives.

Third, I present an explanatory mechanism for the presence of informal activity in developed countries, namely: actors perceiving formal market alternatives to be inefficient or unfair will seek to consummate complementary exchanges in the informal economy. In particular, I invoke the concept of “relational rents” (Dyer and Singh, 1998) and extend its application in purposeful fashion to dyadic interpersonal exchanges, recasting the relational element in terms of relational surplus. As complementary exchanges, OTB loans create benefits that neither party could achieve independently through formal market mechanisms.

Finally, I contribute empirically and theoretically to understanding the informal economy as a collection of “mixed blessings” (Portes and Haller, 2005; Venkatesh, 2006). By developing a conceptualization of OTB loans that variously involves parity, paternalism and peonage, this study breaks new ground in extending the model developed by LaPorta and Schleiffer (2008), Portes and Sensenbrenner (1993), and Venkatesh, (2006) that neither a romantic nor a parasitic conception of the informal economy is accurate.

In the next section, I discuss the relevant literature from organizational sociology, strategy and economics, applying this prior work to develop testable hypotheses. Following this, I detail the methods used to collect and analyze transaction-level data in the context of OTB loans and the informal economy. After
presenting the major results, I review the practical and theoretical implications and a number of important considerations for future research.

2. THEORETICAL DEVELOPMENT AND HYPOTHESES

The Informal Economy

Keith Hart, a British anthropologist, is generally credited for first developing the concept of an “informal sector” in his study of symbiotic socio-economic patterns in Ghana (1973). However, active interest in unofficial economic activity dates back to the 1950s, including Lewis’ influential model of the “dual economy” in which extensive investment occurred in some parts of the economy while underinvestment dominated others (Lewis, 1954). The over-arching premise of the dualist view is that the informal economy is a manifestation of less-developed markets and institutions. As such, a realignment of incentives (Lewis, 1954) and a strengthening of property rights and rule of law (Webb, Tihanyi, Ireland, and Sirmon, 2009) will facilitate a migration to a modern and efficient formal economy.

While it is widely accepted that the informal economy is more prevalent in areas with small-scale (Gaughan and Ferman, 1987), labor-intensive (Becker, 2004) and undercapitalized enterprises (Godfrey, 2011), more recent scholarly efforts have discovered conceptual and empirical faults with the dualist model (Portes and Haller, 2005; Chen, 2006). “Despite predictions of its eventual demise, the informal economy has not only grown in many countries, but also emerged in new guises and unexpected places” (Chen, 2007). The persistence of informal activity in developed
economies poses a challenge to the dualist perspective. Portes and Haller emphasized this point, “What is new in the current context is that the informal sector grows, even in highly institutionalized economies, at the expense of already formalized work relationships. Thus, it represents a novel social trend instead of being a mere "lag" from traditional relationships of production” (2005: 13).

Social conditions are undeniably connected to the persistence of the informal economy, but an exclusive focus on social conditions can result in the myopic categorization of the informal economy as a patently third world phenomenon (Portes and Haller, 2005). Alternatively, a focus on decision-making logics may result in a more fruitful distillation of the reasons individuals engage in unofficial activities. For instance, Webb et al. assert that the informal economy involves “activities through which actors recognize and exploit opportunities” (2009: 492). Extending this logic, I assert that actors may actively choose between formal and informal mechanisms based on two factors: (a) a personal preference test, driven by necessity, opportunity cost and perceived fairness; and (b) the ability to identify and informally contract with a party experiencing a complementary need that cannot be serviced through formal market mechanisms. Godfrey issues an explicit call for improved targeting of these topics: “One avenue for fruitful inquiry would consider not if informal and formal arrangements are substitutes or complements but when the two substitute for each other and when they act as complements” (2011: 268). The co-existence of formal and informal economies is far more pervasive than the exclusive domain of one or the other, argued Portes and Haller (2005) and Chen
In the context of this co-existence, individuals are presented with either-or decisions regarding informal and formal activities, for which I predict that:

Hypothesis 1: Individuals will choose to engage in informal economic activity even when formal market alternatives are available, if the formal alternatives are perceived to be unattractive.

Social Exchange

The informal economy is “governed by custom or personal ties” (Godfrey, 2011:231) in which the “relationships are grounded primarily on social, not legal, contracts” (London and Hart, 2004: 352). Given this, social exchange theory (SET) plays a central role describing the interactions that result in informal activities. SET was founded at the crossroads of economics, psychology and sociology to describe human social behavior in economic undertakings (Homans, 1958). It is also heavily reliant upon rational choice theory, making SET highly relevant to the treatment of the informal economy.

According to Blau (1964), a social exchange in the informal economy develops an obligation by one party to the other. Through a series of interdependent social interactions (Blau, 1964), obligations are generated (Gouldner, 1960; Emerson, 1976) that evolve into “trusting, loyal, and mutual commitments” (Cropanzano and Mitchell, 2005:875). By its very nature then, “an exchange requires a bidirectional transaction—something has to be given and something returned” (Cropanzano and Mitchell, 2005: 876). These complementary exchanges form the basis of reciprocity (Molm 2003), since interdependent exchanges are fundamentally comprised of “contingent interpersonal transactions” (Gergen, 1969). This means that no
exchange occurs unless there exists complementary needs and some assurance of reciprocity.

In the context of OTB loans, the social exchange that takes place between the owner and the employee consists of movement of resources, when imperfect market conditions exist, between dyads via a social process (Emerson, 1976). I predict that business owners will issue OTB loans in order to transform the loan from a financial transaction into a social exchange. However, this preference will only occur in dealing with the most highly prized employees. In essence, the owner uses the informal economy to operationalize benefits that can only be accrued by transforming the loan into a social exchange.

Hypothesis 2a: Business owners will prefer to use informal economy mechanisms with their most-valued employees by issuing OTB loans.

Hypothesis 2b: Business owners will prefer to use formal economy mechanisms with their less-valued employees by issuing written, tax-complaint loan agreements.

Relational Surplus

Relational exchanges have the potential to create value for exchange participants (Dyer and Singh, 1998, Poppo and Zenger, 2002). In the context of the informal economy, relational mechanisms provide a potent explanatory framework precisely because action is being taken outside the boundaries of formal markets and formal institutions. The empirical and theoretical heritage of recent work on relational mechanisms (Barney and Hansen, 1995; Uzzi, 1997; Dyer and Singh, 1998) has its roots in studies of embeddedness (Granovetter, 1985), relational
contracting (Macaulay, 1963) and transaction cost economics (Williamson, 1985). As Uzzi noted, “There is a growing need to understand how social structure assists or impedes economic performance” (1996: 674). SET stresses the manner in which individual transactions are embedded within larger socio-economic systems that are instrumental in providing robust socio-cultural incentives to fulfill obligations even without legal sanctions. “Not only are contracts and contract law not needed in many situations,” Macaulay asserts, “their use may have, or may be thought to have, undesirable consequences” (1963: 64). Transaction cost economics (TCE), similarly considers the importance of relational contracting (Williamson, 1991), but in the context of contract cost minimization and governance structure optimization. Building on Coase (1937), Williamson posits that frequent interactions and the mutual commitment of significant resources creates conditions for more flexible, idiosyncratic interorganizational agreements (Williamson, 1991).

Dyer and Singh take these concepts a step farther, “Idiosyncratic interfirm linkages are a source of relational rents and competitive advantage” (1998:661). They define relational rent as a “supernormal profit jointly generated in an exchange relationship that cannot be generated by either firm in isolation and can only be created through the joint idiosyncratic contributions of the specific alliance partners” (662). Extended to interpersonal relational transactions, idiosyncratic linkages allow for surpluses to be generated through exchange relationships. Absent the exchange, neither partner could achieve the same results in formal markets.
OTB loans function in precisely this fashion, as illustrated in Figure 1, depicting the complementary needs of business owners and highly valued, credit-challenged employees. The employee needs access to immediate credit at reasonable rates. The business owner needs a source of reliable labor. Under the circumstances in which neither party is able to satisfactorily address their respective needs through formal market mechanisms, the owner and employee will find it advantageous to transact an exchange using informal economy mechanisms.

**Figure 1. Decision-Making with Co-Existent Formal and Informal Economic Alternatives**
Although Dyer and Singh (1998) refer to the supernormal gains as “relational rents,” it is more fruitful to consider this quantity as a relational surplus in the context of interpersonal exchanges. From a microeconomic perspective this relational surplus is essentially a consumer surplus (Marshall, 2009), the difference between the market-clearing price and the price consumers would have been willing to pay. Figure 2 displays the relational surplus derived from OTB loans.

**Figure 2. Formal Loan versus OTB Loan Relational Surplus**

![Graph showing formal loan versus OTB loan relational surplus]

As the graph reveals, there is no relational surplus at the market rate and only modest surplus with owner-provisioned formal loans (Area B). Since formal loans constitute financial transactions, it would not specifically address the owner’s
need for reliable labor. Only through the issuance of an OTB loan is the relational surplus maximized (The sum of Areas A & B).

Hypothesis 3a: *Business owners will seek to maximize the relational surplus when lending to their most-valued employees.*

Hypothesis 3b: *Business owners will seek to minimize the relational surplus when lending to their less-valued employees.*

**Parity, Paternalism and Peonage**

In the context of loans to employees, it appears that a relational surplus will only occur through informal economic activity because business owners can only address their need for reliable labor when a long-term obligation is created through OTB loans. Owner efforts to bind employees through informal economic mechanisms demonstrate the simultaneity of “creativity and coercion” (Godfrey, 2011:265) that underlies much of the informal economy. Venkatesh’s insightful explication of the informal economy’s schizophrenic nature reveals a conundrum whereby participants encounter opportunity alongside exploitation and punishment (2006). Portes and Sensenbrenner find that informal mechanisms are often accompanied by a loss of “individual freedom” (1993: 1333). Indeed, labor-intensive industries make them particularly susceptible to the “dark side” of the informal economy. Even relational exchanges that appear to be complementary must be evaluated in terms of parity, paternalism or peonage (See Table 1).
### Table 1. Characteristics of Parity, Paternalism and Peonage in the Informal Economy

<table>
<thead>
<tr>
<th>Category</th>
<th>Functional Definition</th>
<th>Manifestation in the Informal Economy</th>
<th>Manifestation in Off-the-Books Loans to Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parity</td>
<td>Actors have equivalent power and status.</td>
<td>Rare. Balanced needs of exchange partners less common than subjugation. (Eswaran and Kotwal 1985)</td>
<td>Complementary exchange to resolve the mutual absence of satisfactory market solution.</td>
</tr>
<tr>
<td>Paternalism</td>
<td>A system predicated on social control. Authority figure services the needs or regulates conduct.</td>
<td>Common. Informal economy participants often beholden to exploitative “protector” (Alston and Ferrie 1993)</td>
<td>OTB loans used to assuage employee financial hardship, but with implied obligations.</td>
</tr>
<tr>
<td>Peonage</td>
<td>The practice of holding persons in servitude to work off a debt.</td>
<td>Informal economy participants locked into predicament, sometimes for multiple generations. (Fishback 1989)</td>
<td>OTB loans used to bind debtor-employees so owners can appropriate relational surplus.</td>
</tr>
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</table>

Work by economists (Akerlof, 1982; Fishback, 1989; Alston and Ferrie, 1993; Alston, Mattiace, and Nonnenmacher, 2009), anthropologists (Meyers and Carlson, 2002), and historians (Cross, 1979; Knight, 1986) have documented actions by business and land owners to deal with labor supply uncertainties through paternalism and peonage. Alston and Ferrie note the use of “nonmonetary inducements” to create “loyalty-like behaviors” and “dependable service” (1993: 855). Well into the mid-1900s, they find that “planters exercised control over the credit extended to their workers” as a means of insuring a reliable source of “good and faithful” labor (856). Owners have also used debt as a means to discriminate between high-quality and low-quality workers and “more productive workers incurred more debt” (Alston, et al., 2009: 131).
The circumstances surrounding the issuance of OTB loans bear a striking similarity to these prior studies. Although the reciprocal exchange between business owners and employees appears to be fair and balanced (Akerlof, 1982), the question is: Once a relational surplus is created, who stands to benefit? At first, it appears that employees will appropriate the surplus, or at least share decisively in its benefits, since the loans are fully paid in cash at the time of the transaction. However, the owner can recoup the principal and time-value of the money by binding the employee for a protracted period. The owner will appeal to social, cultural, ethical and economic factors (Cross, 1979; Knight, 1986) to appropriate the relational surplus. Paradoxically then, by explicitly crafting a non-financial transaction with valued employees, the business owner succeeds in achieving a far more lucrative financial payout than if the transaction had been a formal, financial arrangement.

Hypothesis 4: Business owners will derive incremental loan-related profits through the selective use of informal economic exchanges with their employees.

If it were true that owners use OTB loans to create and then profit from informal economic exchanges, then I would expect that owners would target the most desirable employees for an OTB lending arrangement, as I predicted in hypotheses 2a and 3a. Testing Alston, Mattiace, and Nonnenmacher (2009), I also expect that business owners will use informal economic mechanisms in those cases that have the highest likelihood of producing a sense of obligation (Fishback, 1989; Alston, Mattiace, and Nonnenmacher, 2009), particularly with respect to racial and
ethnic minorities. By exploiting socio-cultural biases towards the most credit-marginalized employees, I predict that business owners will exhibit paternalism and peonage more frequently in their lending to Hispanic workers than to non-Hispanic workers (Cross, 1979; Alston, Mattiace, and Nonnenmacher, 2009). These dimensions of paternalism and peonage are tested in the following series of hypotheses:

Hypothesis 5a: Business owners will issue OTB loans to Hispanic workers more frequently than non-minorities.

Even among exclusively Hispanic workers, OTB loans are predicted to be the norm:

Hypothesis 5b: Business owners will issue OTB loans to Hispanic workers more frequently than they will issue formal, tax-compliant loans.

3. METHODS AND DATA

To test these eight hypotheses, I gathered transaction-level employee loan data from owner-managers of labor-intensive small businesses that were pre-screened for the presence of lending activity. Although this approach constitutes intentionally sampling on the dependent variable, none of the hypotheses involved predictions regarding the general prevalence of employer lending. Rather, the focus of my investigation centers on the decision-choice logics of owners who engage in lending to employees.
The compilation of transaction-level informal economic data is notoriously difficult to obtain, evidenced by the paucity of empirical studies using transactions as the unit of analysis. “By definition, informal economic activities bypass existing laws and the regulatory agencies of the state,” noted Portes and Haller (2005: 408). This constitutes a serious challenge for research because “underground activities often elude enumeration and measurement in the social accounting systems designed to monitor economic activity” (Feige, 1990:994). For this reason, access to data on unofficial activity, particularly data below the firm level, is unusually elusive. Cognizant of prior literature connecting informal activity to “labor-intensive businesses requiring little capital” (Henry, 1987:140; Becker, 2004), my search for informal economic decision-making focused on labor-intensive industries.

**Sample.** In order to assemble a pool of loan transactions for this study, I chose to focus on specialty contractors: painting, asbestos abatement, walls and ceilings, roofers, masonry, glazing and curtain walls. This sector was chosen in order to access businesses facing a common set of macro-level challenges and industry-specific features, including a heavy reliance on labor as the largest factor of production. Using Colorado trade association web sites and directories, I compiled list of 900 specialty contractors, for initial screening.

**Screening Survey.** To identify businesses that loaned money to employees, a three-question screening questionnaire was sent to potential participants via e-mail, asking whether the business was still operating, how many full-time employees worked for the business and whether or not the owners have ever loaned
money to employees. Participants owning operational businesses with at least three employees that had previously loaned money to employees were asked to participate in a detailed survey. 689 business owners completed the screening survey, for an initial response rate of 77 percent. Of these, 465 of the firms completing the screening survey lent money to employees; however, 302 firms had fewer than three employees, reducing the addressable population of firms to 163. 124 of these businesses indicated a willingness to complete a subsequent detailed survey, generating a 76 percent response rate for the addressable population of owner-lending businesses larger than three employees.

Detailed Survey

**Pilot Test.** Prior to disseminating the detailed survey, I conducted a small-scale pilot with 23 participants to insure that the questions were interpreted correctly. In particular, I sought to insure that participants fully understood the difference between formal, legally compliant loans and off-the-books loans. I found that the owners of very small businesses often did not recognize any difference. Ten subjects in the pilot owned businesses with three or fewer employees and only four of these knew that there are tax consequences related to employee loans. Of the 13 subjects who owned businesses with more than three employees, twelve understood the tax implications of employee loans.

Three other findings were drawn from the pilot test. First, owners were willing to share detailed data regarding individual transactions. Second, I
determined that firms with fewer than three employees should be excluded from the study (see below). Third, I determined that owners who claimed to be ignorant of relevant tax laws should be excluded from the study (see below).

**Final Survey.** The final detailed survey focused on individual loan transactions and consisted of questions regarding company-specific, owner-specific, employee-specific, and loan-specific data. Detailed surveys required between 15 and 60 minutes to complete, depending upon the extent to which a firm engaged in lending to employees. Responses were hand-recorded by the interviewer and checked for accuracy by the respondent.

**Sampling and Survey Execution Challenges**

**Self-Selection Bias and Self-Presentation.** An extensive body of research examines the extent to which self-selection (Kerlinger and Lee, 2000) and self-presentation (Neuman, 2003) can significantly impact survey results, particularly when the information being gathered is of a sensitive nature (Neuman, 2003), and when it is related to informal economic activity (Feige, 1990). In this study, self-selection potentially reduced the pool of participants since full disclosure of informal activity would have involved admitting to non-compliant lending practices. Likewise, self-presentation effects potentially reduced the owner disclosure rate of their respective non-compliant behaviors. Consequently, both self-selection and self-presentation would have had the effect of understating the prevalence of OTB loans.
Retrospective Censoring. Since business owners are the only source for transaction-level details regarding loans to employees, I took several steps to reduce the errors associated with retrospective accounts of unrecorded data (Miller, Cardinal and Glick, 1997; Schwarz, 1999). First, the pilot study enabled me to check all the questions for interpretability and intelligibility. Second, I encouraged participants to make notes prior to the detailed surveys. Third, I supplied clarifying definitions for all data fields, including transaction-related terminology. Most important was the decision to conduct the surveys via telephone or in person, resulting in higher survey completion rates and more comprehensive responses from owners with numerous loans.

Common Method Bias. Although the dependent variables in this study are archival indicators, I addressed the possibility that consistency artifacts and common methods bias (Podsakoff, MacKenzie, Lee. and Podsakoff, 2003) may influence the models by situating subjective items prior to questions on the transaction details and randomly sequencing the two questions involving opinions or judgments.

Very Small Firm Exclusion. Businesses with only a few employees dominate the specialty contractors market. The pilot survey data indicated that many of these very small firms have virtually no administrative support or legal knowledge. Since more than half of the very small business owners did not realize
there is a difference between formal and OTB loans, conservatism dictated that these data be excluded.

*"Ignorant Actor" Exclusion.* The issuance of OTB loans by an owner who is ignorant of the applicable tax prohibitions may constitute informal economy activity, but the decision-making process is obviously very different if one is cognizant of such prohibitions. Ten owners who completed the detailed survey were excluded from the final data set for this absence of prior knowledge. These ten owners issued 43 OTB loans to employees and zero formal loans. All ten of these owners claimed that they had no knowledge prior to issuing OTB loans that there are tax code differences between formal and OTB loans. Conservatism dictated that these data be excluded from the study.

*Final Survey Population.* 124 owners of businesses with more than three employees indicated that they loaned money to employees and were willing to share the details of that lending in an extended survey. Of these, 19 were unable to schedule a convenient time to be interviewed, 7 elected to not complete the survey after it had begun and 5 were unable to offer sufficiently detailed information to be included in the final pool. 93 surveys were fully completed representing a 75 percent response rate for the addressable population of businesses larger than 3 employees who loaned money to their employees. As a final adjustment, 10 completed surveys were deemed non-utilizable due to the “ignorant actor” effect noted above.
In total, usable data were obtained for 459 transactions from 83 businesses. 197 of the loans (43 percent) involved a formal loan agreement detailing interest, repayment terms and recourse in the event of a default. 262 loans (57 percent) were issued off the books.

**Dependent Variables.**

Four dependent variables were used: loan type, large OTB loans, relational surplus and Owner Profit.

*Loan Type.* Loan Type is a discrete dichotomous variable, involving the issuance of either a formal, legally compliant loan or an off-the-books loan. Applying applicable provisions of the U.S. Internal Revenue Service (26 U.S.C. § 102(c)), the definitions were set so there are no possible categorizations other than “formal” or “OTB.” For instance, the loans could not be construed as “gifting” because gifts to employees are subject to taxation in accordance with 26 U.S.C. § 102(c). *Loan Type* captures the transaction-level decision-making process related to formal or informal economic mechanisms, coded “0” for formal loans and “1” for OTB loans.

*Large OTB Loans.* In addition to predicting formal and OTB loans in aggregate, I also studied the decision-making effects associated with large OTB (loans over $1,000). Isolation of this variable assuages any concerns that OTB loans exist to alleviate administrative burden.

*Relational Surplus.* The third dependent variable is Relational Surplus, which in its traditional economic context, is essentially “consumer surplus,” or the
difference between the price a consumer actually paid to purchase something versus
the highest price that they would be willing to pay (Marshall, 2009). In the context
of employee loans, however, it is difficult to consider this quantity as a consumer
surplus because the specific terms of the transaction are unique to the individuals
involved in the exchange. The business owner is not offering a general market for
credit. Nor is the employee selecting from among a number of different employers
for the best credit terms. Classically conceived, the consumer surplus is expressed
as:

\[ CS = \frac{1}{2} Q_{mkt} (P_{max} - P_{mkt}) \]

where the demand will increase indefinitely as the price approaches 0.

\[ CS = \int_{P_{mkt}}^{P_{max}} D(P) \, dP \]

In the case of OTB loans, if \( Q_{mkt} \) is 1 and \( P_{mkt} \) is 0, then the consumer surplus will
consist of the entire difference between the maximum price a consumer is willing to
pay (\( P_{max} \)) and the market price (\( P_{mkt} \)). As the expression of \( Q_{mkt} = 1 \) suggests, there
is only one set of relational exchange conditions under which \( P_{mkt} = 0 \), so that the
exchange surplus is a relational surplus, the ownership of which is a consequence of
time and the relationship.

Functionally, the relational surplus created by OTB loans is the difference
between the formal market solution and informal economy solution. This is
expressed as the cost of formal market credit less the cost of owner-issued credit, where $P$ is the interest rate and $L$ is the loan principal. In the case of formal loans, the surplus will be

$$\text{RELSURPL}_{\text{formal}} = L \cdot (P_{\text{mkt}} - P_{\text{owner}}),$$

such that the product of the loan principal times the difference in the market price for debt (taken as the local average for payday loans) and the interest rate charged by the owner. The relational surplus for formal loans solely consists of the difference in interest rates as the owner functions as the creditor for the transaction. For OTB loans, the surplus will be

$$\text{RELSURPL}_{\text{OTB}} = L \cdot e^{[1 + (P_{\text{mkt}} - 0)].}$$

Here, the interest rate is zero, maximizing the difference between the market rate and the loan rate. Also, since the principal is not repaid there is a perpetual benefit associated with the loan. The value for $P_{\text{mkt}}$ is a blended calculation of interest rates paid by credit-challenged borrowers in Colorado, including a variety of formal market alternatives: payday loans, commercial credit loans, high-risk credit cards and high-risk auto loans. The blended rate for $P_{\text{mkt}}$ is 35 percent. Illegal loan sources, such as loan sharking, are not included in the calculation, though loan sharking rates are not significantly higher than some of the formal market alternatives.
Owner Profit. This third dependent variable, pertaining to Hypothesis 8, is a measure of the incremental profit or loss realized by an owner-operator from issuing OTB loans. It is calculated as:

\[ OP = \frac{(RV_{jl} \times (S_{otb} - S_{formal}) e^{i \times k})}{(1 + i)^t} - (L) e^{i \times t} \]

RV\(_{jl}\) is the retention value in dollars for the \(j\)-th owner at the \(l\)-th performance rating for any given recipient of an OTB loan. Retention values were obtained from each owner for each of the five performance levels used in the employee performance ratings for this study. Owners indicated for each performance level the estimated value of retaining an employee for one additional year.

\(S_{otb}\) is the average post-loan length of service for recipients of OTB loans. \(S_{formal}\) is the average post-loan length of service for recipients of formal loans. The difference between these two quantities is calculated as a perpetuity of the owner’s cost of capital \(k\), multiplied by the retention value and discounted to its present value for \(t\) periods. \(i\) is the average formal loan interest rate. \(L\) is the loan principal. The assumption of an OTB is that neither the principal nor any interest will ever be paid to the issuer.

The Owner Profit is separately calculated for all 262 OTB loans in the study. The values will be positive if the post-loan length of service is, on average, greater for OTB loans than for formal loans, and if the discounted retention value for the difference exceeds the perpetuity value of the original loan. If the resulting OP is
positive, then the owner has created incremental profit by issuing an OTB loan. If OP is negative, then the owner has destroyed value by issuing an OTB loan.

**Predictors**

*Loan Type.* Loan Type is also an independent variable in for model comparisons of relational surplus analysis. It is dummy-coded with a value of 1 if an OTB and 0 if a formal loan.

*Loan Amount.* Continuous variable of the principal amount loaned.

*Large Loans.* Variable indicating 1 if the loan principal was equal to or exceeded $1,000 and indicating 0 if the loan was under $1,000.

*Hispanic Employee.* Variable has a value of 1 if employee is Hispanic and 0 otherwise.

*Hispanic Employer.* Variable has a value of 1 if employer is Hispanic and 0 otherwise.

*Employee Gender.* Variable that has a value of 1 if the employer is male and 0 otherwise.

*Employee Age.* Continuous variable for employee age at the time of the survey.

*Length of Service -Total.* Continuous variable for employee tenure in years.

*Length of Service – Pre-Loan.* Continuous variable for total length of employment prior to receiving the loan.

*Length of Service – Post-Loan.* Continuous variable for total length of employment after receiving the loan.

*Performance Rating.* Categorical variable reflecting a performance rating between 1 (low) and 5 (high) assigned by business owners for each employee receiving a loan.

*Reason for the Loan (Reason).* Categorical variable indicating the reason the loan was requested. All 459 requests fell into one of ten categories, laddered by severity of financial need.
Control Variables

A number of control variables are included in the models in order to properly account for potential differences arising as a consequence of firm-level and macro-level effects. The former are incorporated through a vector of firm-specific controls pertaining to firm size (revenues, assets and total employees) and age. In order to account for the non-independence of multiple loans issued by the same firm, a set of dummy codes were used to control for unobserved firm-specific effects.

Industry controls consisted of a series of dummy codes by-industry, by-year in order to account for unobserved industry effects across the specialty contractor segments included in the study.

Macro-economic factors may also be significant determinants of loan request volumes. The specialty trade sector is highly susceptible to fluctuations on the macro-economic climate, including factors influencing employment, renovation and construction, and general economic growth. Since the issuance frequency is a function of the loan request frequency, a vector of macro-economic controls specific to Colorado was created based on the unemployment rate, new home starts and economic growth.

Model Specifications

Three statistical methods were used to test the hypotheses. The most basic of these methods models, mean differences, relates to those hypotheses that predicted an occurrence of the focal phenomena at a rate statistically greater than random
chance. For instance, among owners who issue both formal and OTB loans, I test whether OTB loans are issued at a greater rate than formal loans. The second method utilizes a logistic regression model to assess the probability of an outcome in relation to a set of hypothesized predictors. Key among these is the set of predictors related to the issuance of formal or OTB loans. The basic structure of the Logistic Regression Model is represented by:

\[
\text{LOAN TYPE} = \beta_0 + \beta_1 \text{CONFirm} + \beta_2 \text{CONmacro} + \beta_3 \text{OWNER} + \beta_4 \text{AGE} + \beta_5 \text{MINORITY} + \\
\beta_6 \text{LOSpre} + \beta_7 \text{PERFORMANCE}
\] (1)

The final method involves an OLS regression model to test for the best fitting relationship between relational surplus or owner profit and a model containing transaction-specific and employee-specific predictors. The generalized OLS Model is represented by:

\[
\text{RELATIONAL SURPLUS (or OWNER PROFIT)} = \beta_0 + \beta_1 \text{CONFirm} + \beta_2 \text{CONmacro} + \\
\beta_3 \text{OWNERETHNIC} + \beta_4 \text{LOANTYPE} + \beta_5 \text{REASON} + \beta_6 \text{AGE} + \beta_7 \text{PERFORMANCE} + \\
\beta_8 \text{EMPLOYETHNIC}
\] (2)

4. RESULTS

Descriptive statistics are presented in Table 2 and a correlation matrix appears in Table 3. Of the 459 transactions captured in this study, 57 percent (262) were OTB loans. Among the 187 loans greater than $1,000, 69 percent (128) were OTB, reflecting a willingness by business owners to issue employee loans without formal documentation. Employee demographics closely resemble the broader population: 73 percent Hispanic and 86 percent male workers, compared to 70
percent and 85 percent respectively for Statewide figures compiled by the Pew
Institute (2011). Businesses in the study ranged between 3 and 96 employees and
between $150,000 and $12 million in annual revenue.

**TABLE 2. DESCRIPTIVE STATISTICS**

<table>
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<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
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<th>s.d.</th>
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<tr>
<td>Total Loans</td>
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<td>$25</td>
<td>$11,500</td>
<td>$1,100</td>
<td>$1,500</td>
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<td>Formal</td>
<td>197</td>
<td>$50</td>
<td>$10,000</td>
<td>$822</td>
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<td>Large Loans (&gt; $1,000)</td>
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<td>$11,500</td>
<td>$2,136</td>
<td>$1,908</td>
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<td>$23</td>
<td>$44,361</td>
<td>$2,917</td>
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<td>1.96</td>
<td>1.53</td>
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<td><strong>Employee Data</strong></td>
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<td>Ethnicity (1 = Hispanic)</td>
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<td>0</td>
<td>1</td>
<td>0.73</td>
<td>0.44</td>
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<td>Age</td>
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<td>54</td>
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<td>5</td>
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<td>1</td>
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<td>Firm Age (Years)</td>
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<td>42</td>
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<td>96</td>
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<td>$40,000</td>
<td>$3,250,000</td>
<td>$446,390</td>
<td>$492,212</td>
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</table>
The 83 businesses issued an average of 5.5 employee loans. 27 businesses only issued OTB loans, 17 issued only formal loans and 39 issued both OTB and formal loans. Those owners issuing both kinds of loans are of the greatest interest since these owners are engaged in an active decision-making process of choosing to lend through the formal economy or the informal economy. Table 4 provides a closer look at this pool of transactions. For loans less than $1,000, owners issue OTB loans 51 percent of the time. However, for loans larger than $1,000, owners elect to issue an OTB loan 72 percent of the time.

<table>
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<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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<tr>
<td>Firm - Age</td>
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<td>0.55**</td>
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<td>0.39**</td>
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<td>-0.01</td>
<td>-0.03</td>
<td>-0.02</td>
<td>0.01</td>
<td>0.20*</td>
<td>0.09</td>
<td>0.15**</td>
<td>-0.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of Service</td>
<td>-0.03</td>
<td>0.23</td>
<td>0.33**</td>
<td>0.17**</td>
<td>0.13**</td>
<td>-0.12**</td>
<td>0.01</td>
<td>0.04</td>
<td>0.42**</td>
<td>-0.05</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>Loan Amount</td>
<td>0.16**</td>
<td>0.45**</td>
<td>0.08</td>
<td>0.94</td>
<td>0.08</td>
<td>-0.02</td>
<td>0.06</td>
<td>0.10*</td>
<td>0.24**</td>
<td>-0.28**</td>
<td>0.33**</td>
<td>0.25*</td>
</tr>
</tbody>
</table>

*** p < 0.001, ** p < .01, * p < .05
The magnitude and directionality of the correlations displayed in Table 3 are consistent with expectations. The employee attributes most highly favored by business owners are positively correlated with higher lending rates and larger
relational surplus. Larger and older firms exhibit an inverse relationship with all forms of lending to employees, a predictable consequence of being higher profile and more likely to have an annual financial audit.

Table 5 displays the logit analysis for loan selection. In the logit analysis, Models 1 through 6 are estimated for Loan Type. The analysis examines three different
portions of the study sample: all loans, only loans over $1,000 and only loans issued by owners who have offered employees both formal and OTB loans. Models 1, 3 and 5 provide estimations based solely upon the control variables, while Models 2, 4 and 6 include the focal predictors.

### Table 6. Results of OLS Estimation for Relational Surplus (N=459)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>2957***</td>
<td>-945**</td>
<td>1445***</td>
<td>3765**</td>
<td>-4575***</td>
<td>-4725**</td>
</tr>
<tr>
<td>Firm Age</td>
<td>(530)</td>
<td>(613)</td>
<td>(572)</td>
<td>(823)</td>
<td>(1185)</td>
<td>(1130)</td>
</tr>
<tr>
<td></td>
<td>78*</td>
<td>69*</td>
<td>69*</td>
<td>46</td>
<td>57</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>(52)</td>
<td>(47)</td>
<td>(52)</td>
<td>(50)</td>
<td>(44)</td>
<td>(43)</td>
</tr>
<tr>
<td>Employees</td>
<td>-85</td>
<td>35</td>
<td>-87</td>
<td>-84</td>
<td>-106</td>
<td>-93</td>
</tr>
<tr>
<td></td>
<td>(111)</td>
<td>(100)</td>
<td>(115)</td>
<td>(105)</td>
<td>(92)</td>
<td>(92)</td>
</tr>
<tr>
<td>Revenue</td>
<td>-17</td>
<td>-20</td>
<td>-17</td>
<td>-15</td>
<td>-20</td>
<td>-18</td>
</tr>
<tr>
<td></td>
<td>(40)</td>
<td>(42)</td>
<td>(41)</td>
<td>(37)</td>
<td>(34)</td>
<td>(34)</td>
</tr>
<tr>
<td>Economic Climate</td>
<td>3.44</td>
<td>3</td>
<td>3.12</td>
<td>2.17</td>
<td>-1.51</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>(2.12)</td>
<td>(2.24)</td>
<td>(2.70)</td>
<td>(1.40)</td>
<td>(1.25)</td>
<td>(0)</td>
</tr>
<tr>
<td>Owner (Hispanic=1)</td>
<td>-254*</td>
<td>-770*</td>
<td>-1077</td>
<td>-1073</td>
<td>-799</td>
<td>-795</td>
</tr>
<tr>
<td></td>
<td>(977)</td>
<td>(883)</td>
<td>(687)</td>
<td>(921)</td>
<td>(807)</td>
<td>(767)</td>
</tr>
<tr>
<td>Type of Loan (OTB=1)</td>
<td>5134***</td>
<td>5045***</td>
<td>4245***</td>
<td>3006***</td>
<td>2887***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(505)</td>
<td>(491)</td>
<td>(405)</td>
<td>(479)</td>
<td>(504)</td>
<td></td>
</tr>
<tr>
<td>Reason for Loan</td>
<td>-422**</td>
<td>-407**</td>
<td>-298**</td>
<td>-299**</td>
<td>-299**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(79)</td>
<td>(68)</td>
<td>(74)</td>
<td>(71)</td>
<td>(71)</td>
<td></td>
</tr>
<tr>
<td>Employee Age (Ctred)</td>
<td>-271***</td>
<td>-115**</td>
<td>-113**</td>
<td>-113**</td>
<td>-113**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(54)</td>
<td>(54)</td>
<td>(54)</td>
<td>(54)</td>
<td>(54)</td>
<td></td>
</tr>
<tr>
<td>Employee Perf Rating</td>
<td>2231***</td>
<td>2220***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(238)</td>
<td>(238)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee (Hispanic=1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>372**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(490)</td>
<td></td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.187</td>
<td>0.256</td>
<td>0.303</td>
<td>0.414</td>
<td>0.583</td>
<td>0.619</td>
</tr>
<tr>
<td>F-value</td>
<td>2.19*</td>
<td>18.4***</td>
<td>24.7***</td>
<td>30.8***</td>
<td>42.3***</td>
<td>57.7***</td>
</tr>
</tbody>
</table>

*D.V. is Relational Surplus. *** p < 0.001, ** p < .01, * p < .05*
Employee age and length of service are both mean-centered, so that the model measures divergence from mean values. All the focal predictors are highly significant, except for length of service. Among the controls, it is noteworthy that variables related to the economic climate are not significant. The issuance of employee loans appears to function independently of these exogenous developments.

Table 6 displays the OLS estimation, which analyzes the component contributions of key employee attributes on relational surplus. To guard against entry-order biases, all the permutations were tested, none of which varied materially from the results used in Table 6. The values in the table are expressed in dollars. For example, in Model F, the issuance of an OTB loan increases the relational surplus by $2,887. Hispanic employees increase the surplus $372. Each one-level improvement in performance rating increases the surplus by $2,220. Each one-year variance from the mean age (31) reduces the surplus by $113. And, each one-level increase in loan urgency reduces the surplus by $299. By building a hierarchical analysis it is possible to see the joint significance as well as the individual contribution of each variable. Despite the complexity of the transactional variables, Model F explains 62 percent of the surplus variance.

The Use of Informal Market Alternatives

In extending propositions by Chen (2007) and Portes and Haller (2005), the first hypothesis predicts that informal economic activity will occur even in the presence of formal economy alternatives. The results of the logit analysis,
particularly Model 6, provide strong support for this assertion. Overall, owners choose to lend money to employees off-the-books 57 percent of time. While it could be claimed that owners rely on informal lending to minimize the transaction costs (MacLeod and Malcomson, 1989) associated with small loans, the results demonstrate that this is not the case. In fact, the tendency to issue OTB loans is higher for large loans than it is for small loans. Among owners who issue both formal and OTB loans, there is a slight preference for formal loans when the principal is less than $1,000 and a strong preference for OTB loans when the principal is above $1,000. This confirms the prediction that actors will engage in informal economic activity even in the presence of formal market alternatives.

**Debt for Performance**

From an owner’s perspective, an employee’s value is demonstrated by the ability and willingness to deliver “good and faithful labor” (Alston and Ferrie 1993). Table 4 shows that for owners issuing both formal and OTB loans there is a pronounced preference to use OTB loans with the most-valued employees and a preference for formal loans with the least-valued employees. 96 percent of employees who were rated as a “5” (on a scale of 1 to 5) were issued an OTB loan.

Further, 90 percent of employees between the ages of 30 and 35 were issued an OTB loan. Meanwhile, formal loans were issued 50 percent of the time to low-rated employees. These findings are supported by the logit results in Models 2, 4 and 6, where age and performance are robust predictors of OTB-loan issuance,
signaling that business owners employ informal mechanisms in lending to the most-valued employees (p < .001). This confirms hypotheses 2a and 2b, indicating that the most-valued employees are channeled towards OTB loans and the less-valued employees are channeled towards formal loans.

**Surplus Maximization**

The data suggest that business owners will issue OTB loans to their employees when doing so will enrich their self-interest. The measure of the owner’s claim on this enrichment is relational surplus; the value created by transacting a complementary exchange at a cost less than what would have been achievable through formal market mechanisms.

As Table 2 shows, the relational surplus across the 459 transactions ranged from a low of $23 to a high of $44,361, with a mean value of $2,917. On average, formal loans created a relational surplus of $227, while OTB loans created a surplus that is 23 times higher, at $4,940. The OLS analysis in Table 6 provides support for hypotheses 3a and 3b. With dollars as the unit of analysis, it is evident that the key drivers of value for the business owners are significant generators of relational surplus: ethnicity, age and performance. Employees who do not possess these characteristics will display significantly lower relational surplus, primarily because less-valued employees will be offered formal loans, which have a limited capacity to create surplus.
FIGURE 3A. RELATIONAL SURPLUS BY EMPLOYEE AGE (N = 459)

![Relational Surplus by Age](image)

FIGURE 3B. AVERAGE RELATIONAL SURPLUS BY EMPLOYEE PERFORMANCE RATING (N = 459)

![Relational Surplus by Performance Rating](image)
Figures 3a and 3b display the significant relationship between relational surplus, the age and performance. The two figures demonstrate graphically the essential findings of OLS results (Table 6). Owners will seek loan-transactions that maximize relational surplus with high-performing (p < .001) employees in the target age range (p < .001). This is achieved by engaging informal economic mechanisms in the form of OTB loans (p < .001).

**Surplus Appropriation**

Hypothesis 4 predicts that business owners will forego the protections of formal markets and institutions because the issuance of OTB loans affords them the ability to recoup the relational surplus created through complementary exchanges in the informal economy.

**Figure 4. Mean Values for Length of Service Post-Loan (N = 459)**

(All mean differences significant at p=0.001)
In analyzing all 459 transactions (Figure 4), there is evidence that the issuance of OTB loans is associated with extended service. The ability to translate the implied obligations (Rousseau, 1989) of OTB loans into extended service enables owners to recoup the relational surplus though the avoidance of numerous costs: recruitment, training, equipment, quality impacts, and productivity impacts. The length-of-service effects are even greater for loans over $1,000. Consistent with the predictions, large OTB loans result in 1.38 more years of service (i.e. 1.95 years for formal loans vs. 3.33 years for OTB loans). Among business owners who have issued both formal and OTB loans, the difference is even greater: 1.74 years (i.e. 1.78 years for formal loans vs. 3.52 years for OTB loans).

In order to determine if the owner recoup the outlays associated with the issuance of OTB loans, it is first necessary to calculate the value of extended service. As part of the detailed survey, I asked owners to estimate the annual retention benefit based on the performance rating scale (Table 7). For each of the five possible performance ratings (i.e. from a low of 1 to a high of 5), each owner was asked to estimate the financial value that he or she would accrue as a result of not having to replace an employee. For example, the estimated annual value of retaining an employee with a performance rating of 3 was, on average, $3,760. Meanwhile, the estimated annual value of retaining an employee who received the highest possible performance rating (a rating of 5) was, on average, $13,300. Retention of a high-value employee can be enormous, even in the specialty trades industry. One owner calculated that the annual retention value of an employee
receiving a performance rating of 5 to be $100,000, meaning that even a very large OTB loan would pay for itself in just a few months of incremental retention over and above the norm for formal loans.

**TABLE 7. ANNUAL RETENTION VALUE BY PERFORMANCE LEVEL**

<table>
<thead>
<tr>
<th>Performance Rating</th>
<th>Low</th>
<th>High</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$(1,500)</td>
<td>$ 2,500</td>
<td>$ 220</td>
<td>$ 510</td>
</tr>
<tr>
<td>2</td>
<td>$ 0</td>
<td>$ 5,000</td>
<td>$ 1,220</td>
<td>$ 1,647</td>
</tr>
<tr>
<td>3</td>
<td>$ 1,500</td>
<td>$ 15,000</td>
<td>$ 3,760</td>
<td>$ 3,809</td>
</tr>
<tr>
<td>4</td>
<td>$ 1,500</td>
<td>$ 40,000</td>
<td>$ 8,440</td>
<td>$ 9,325</td>
</tr>
<tr>
<td>5</td>
<td>$ 5,000</td>
<td>$100,000</td>
<td>$13,300</td>
<td>$11,942</td>
</tr>
</tbody>
</table>

Note: n = 83 Business Owners

A conservative rendering of the incremental owner profit is presented in Table 8. The incremental owner profit is calculated as the net present value of the employee retention value for 1.74 years, calculating the gain in perpetuity, less the loan costs to the owner. The owner’s loan costs are the sum of the OTB principal and the foregone perpetuity at the average formal loan rate, thereby amounting to the cost to the owner of electing to issue an OTB loan rather than a formal loan. The retention value is the value assigned by each owner for each loan based on his or her estimates of retention value by performance rating (Table 7). Incremental owner profit was calculated separately for all 262 OTB loans. The average by performance rating is presented in Table 8.
These findings demonstrate that owners not only fully recoup the costs of issuing OTB loans, but are able to generate a lucrative incremental stream over and above those costs, adjudged through a conservative rendering of the owner benefit solely realized through the retention value associated with high-quality employees. This provides strong support for hypothesis 4.

**The Role of Ethnicity**

Hypotheses 5a and 5b examine the role played by ethnicity in the issuance of debt to employees. Both the logit analysis of loan type preferences in Table 5 and the OLS analysis for relational surplus in Table 6 provide support for both of the ethnicity-related hypotheses. 73 percent of the transactions in this study involved Hispanic employees. Even after controlling for performance rating, age and reason for the loan request, being Hispanic was positively related to the issuance of OTB loans (p < .001) and the creation of relational surplus (p < .01). As Table 4 reveals, 92 percent of Hispanic employees receiving a large loan were issued an OTB loan versus 22 percent for non-Hispanic employees (p < .001). Figures 5a, 5b and 5c graphically depict the differential approach by owners to the issuance of OTB loans.

### Table 8. **Incremental Loan-Related Owner Profit**

<table>
<thead>
<tr>
<th>Performance Rating</th>
<th>Average Incremental Owner Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>$ 6,189</td>
</tr>
<tr>
<td>3</td>
<td>$ 19,072</td>
</tr>
<tr>
<td>4</td>
<td>$ 31,551</td>
</tr>
<tr>
<td>5</td>
<td>$ 48,362</td>
</tr>
</tbody>
</table>

*Note: n = 262 OTB loans*
**Figure 5A. All Loans to Hispanic and Non-Hispanic Employees (N = 459)**

Note: n = 459 total loans in the study

**Figure 5B. Large Loans to Hispanic and Non-Hispanic Employees (N = 187)**

Note: n = 187 loans greater than $1,000
Figure 5c. Large Loans from Owners Issuing Formal and OTBs (N = 129)

![Graph showing the distribution of loans between Hispanic and Non-Hispanic workers for formal and OTB loans.]

Note: n = 129 loans greater than $1,000 from owners who issued both OTB and formal loans

Figure 5a shows that Hispanic workers are issued substantially more OTB loans, relative to the formal loan volume and to the lending trends involving non-Hispanics. With respect to large loans, the logit analysis in Table 5 demonstrates that the disproportionate tendency to issue OTB loans to Hispanic employees increases with loans over $1,000. This support is further illustrated in Figure 5b, which shows Hispanic employees receiving 94 percent of the large OTB loans.

The most radical difference between the issuance of formal and OTB loans is seen in the lending practices of business owners who issue both kinds of loans. Consistent with logit Model 6 (Table 5), Figure 5c shows that owners who actively choose between formal and OTB loans appear to channel Hispanic employees to
OTB loans. This confirms the significance of the Hispanic indicator variable in both the logit and OLS analyses.

The high OTB volume among Hispanic workers is mirrored by high relational surpluses among Hispanic borrowers (Figure 6). On average, Hispanic employees create substantially more relational surplus than non-Hispanic employees. This difference is a direct consequence of the rate with which OTB loans are issued, since formal loans create minimal relational surplus.

**Figure 6. Average Relational Surplus Comparison—Hispanic and Non-Hispanic Employees (N = 459)**

(All mean differences significant at p=0.001)

As the support for hypothesis 4 demonstrated above, business owners use OTB loans to bind quality employees and appropriate the relational surplus. The results in support of hypotheses 5a and 5b take this a step farther by suggesting that
Hispanic employees are disproportionately targeted for this cycle of relational surplus creation and appropriation.

Although OTB loans to minority employees are rarely repaid, the survey results indicate that owners consider OTB loans to be outstanding debt, even as long as 8 years after the loan is issued. Overall, 66 owners issued 262 OTB loans, comprised of 226 to minorities and 36 to non-minorities. 16% of the OTB loans to minorities had been repaid after three years, while 53% of the OTB loans to non-minorities had been repaid after three years. Of the 192 OTB loans to minorities that had not been repaid at the time of the study, 183 were still considered outstanding debt by the business owners, even though the average age of unpaid OTB loans exceeded three years. For the 43 unpaid OTB loans to minorities that were five or more years old, 41 were still considered by owners to be outstanding debts.

5. DISCUSSION

Ultimately, markets are comprised of transactions (Coase, 1937; Friedman, 1962; Williamson, 1985), regardless of whether the activity occurs through formal or informal market mechanisms. It is ironic then that most of the research related to the informal economy has failed to examine transaction-level phenomena. Macro-level analyses (e.g. ILO 2002; LaPorta and Schleifer, 2008), examining broad metrics related to the prevalence of informal economic activity across regions, countries or even continents, are well-represented in the literature. Common aims of these studies include estimating the total percentage of the labor force employed
through the informal economy (ILO, 2002), or the ratio of registered firms to non-registered firms (LaPorta and Schleifer, 2008). At the other end of the spectrum, micro-level case studies and ethnographies (Hart, 1973; Sassen-Koob, 1989; Venkatesh, 2006; Vogel, 2006) have contributed descriptive richness to the discussion of the informal economy. Despite the importance of both the macro and micro approaches, the extreme bimodality represented by these two research streams has created an explanatory gap that weakens the ability to understand and explain informal economic activity. Between the insufficiently detailed macro-level studies and the insufficiently generalizable case studies lies a vast population of unexplained business decisions and informal market transactions.

This gap is theoretically and empirically consequential. Macro-level explications of the informal economy’s sheer scope and scale have led some scholars to frame informal activity as being principally an institutional issue (Polanyi 1957; Castells and Portes 1989, North 1990; Hudson and Wehrell, 2005) for which stronger institutions will provoke stronger, more purposeful responses to informal activity (North, 1990). The problem with this line of analysis is that informal economic activity is present even in the context of the world’s most stable institutions (Portes and Haller 2005; Chen 2007). Meanwhile, micro-level perspectives of the informal economy have led some scholars to overly romanticize the liberating aspects of the informal economy (Hart, 1990; DeSoto, 2000) or to overly vilify its well-documented entrapments (LaPorta and Schleifer, 2008). Ultimately, neither romanticism nor vilification is useful in generalizing causal
mechanisms related to informal economic activity (Portes and Haller, 2005; Venkatesh, 2006).

Absent the analysis of transaction-level data, prior studies of the informal economy have missed the essential role played by transactional relationships; specifically, the dyadic pursuit of relational rents (Dyer and Singh, 1998) through complementary exchanges built on informal economic mechanisms. The purpose of this paper is to extend the conception of relational rents to informal economic transactions in order to address the heretofore-unanswered question: How is it possible for formal and informal economies to exist side-by-side, and what are the consequences of this co-existence? This question has profound implications for economists, political scientists, sociologists, historians, anthropologists and, of course, management scholars, because a satisfactory answer must resolve the question of why informal activities persist in developed economies, despite long-standing predictions that informal economies will disappear in advanced markets (Lewis, 1954).

By extending the conceptions of social exchange (Homans, 1958; Blau, 1964; Emerson, 1976) and relational rents (Dyer and Singh, 1999) to the dyadic exchange involving owner-employee loan transactions, the study contributes an important new dimension to the understanding of informal economy decision-making. I have shown that individuals will choose to engage in informal economic activity even in the presence of formal market alternatives, when the formal alternatives are perceived to be inefficient or unfair. I have further shown complementary exchange
partners can create a significant surplus by abandoning formal market mechanisms. For instance, a $1,000 formal loan bearing 10 percent interest creates a relational surplus of $250. However, a $1,000 OTB loan (i.e. no interest and no principal repayment) creates a relational surplus of $3,857. This is the margin that owners will seek to co-create and then appropriate through informal economic mechanisms.

Limitations and Opportunities

By its very nature, transactional data from small private companies requires self-reporting by the business owners. This reliance on self-reporting is subject to whole host of reliability risks, especially when sensitive information is involved (Schwarz, 1999), such as non-compliant lending to employees. Although the nature of the information that I collected left little room for editorial comment by the owners, the study does rely heavily upon owner input for the construction of the data set. Anecdotally, however, the perception of a long-term obligation appears to be shared by employee-borrowers. With the approval of 16 different business owners, non-random, job-site interviews were conducted with 45 employees (all minorities) who had received OTB loans more than three years prior to the study. All 45 OTB recipients confirmed the timing and amount of the loans as well as the absence of a contract, stated interest rate or payback period. In three cases, the employees indicated that the debt had been verbally forgiven. The other 42 employees believed that they were still obligated to repay the debts, seven of which were more than five years old.
Generalizability from the Colorado-based sample also deserves some scrutiny. Based on the findings of ethnic targeting, it is likely that the number of, and environment for, OTB loans in places like Los Angeles, Miami, or New York may differ from the precise conditions found in Colorado. Nonetheless, there were crucial benefits to the geographical and industry sector boundaries circumscribed by the study, particularly with respect to macro-level controls and participant contact (Neuman, 2003). Examining a specific sector in a specific locale provided comprehensive control for labor market conditions that would otherwise prove to be unmanageably convoluted.

Reverse causality is also a legitimate concern, since I only asked about loans that were actually issued. It could be asserted that employees who receive OTB loans are subsequently judged to be top employees. Though illogical, the contention is not completely without merit. The relationship between employee performance and OTB loans is so strong that the only way to definitively discard the possibility of reverse causality is to collect and analyze data on non-events; instances in which loans were requested by high-ranked and low-ranked employees but not issued. I considered this additional dimension to be well beyond any reasonable expectation of accurate recall on the part of the business owners. Therefore, no formal data was collected regarding loans that were denied to employees.

Finally, it can be reasonably argued that the sum of the employee’s loan perpetuity value and the incremental owner income does not fully capture the entire relational capital created through the issuance of an OTB loan. This is almost
certainly true, albeit immeasurably so. During the study interviews, owners mentioned in unprompted fashion an array of beneficial outcomes, including reduced monitoring costs, higher customer satisfaction and an improved predictive certainty regarding project completion timing. Therefore, incremental owner income is an extremely conservative measure of relational capital. In reality, the long-term benefits to the employee and the owner are greater and more multi-faceted than can be readily quantified, meaning that incremental owner income should be considered the minimally identifiable component of the relational capital created by OTB loans.

**Conclusion**

Off-the-books loans to employees are in some sense a microcosm of the conundrum that engulfs efforts to comprehend the informal economy. On the one hand, the complementary OTB exchange that allows each party to reciprocally internalize one another’s costs appears to be highly entrepreneurial. At this level, OTB loans are reminiscent of the “liberating practices,” referenced by de Soto (2000) and the “eruption of a true market in an otherwise straitjacketed economy,” identified by Portes and Haller (2005:406). The detailed analysis suggests that in the absence of satisfactory formal market solutions, owners and employees will craft informal economic mechanisms that address complementary needs.

On the other hand, one must be careful to not romanticize implicitly OTB transactions (LaPorta and Schleiffer, 2008). Despite the short-term financial refuge afforded by OTB loans to employee-borrowers, the relational surplus appropriation
by owners is emblematic of a surreptitious element that Sassen-Koob broadly referred to as an “acute example of exploitation” (1989:73). At this level, OTB loans are the epitome of Fortuna and Prates’ conception of the informal economy as a multifaceted and ethically elusive “feature of labor-capital relations” (1989: 79). As both the logit results and the OLS results demonstrate, OTB loans may appear to be parity-based transactions at the time of the complementary exchange; however, the targeting of Hispanic employees and the significantly longer post-loan tenures for OTB recipients suggest that parity gives way to the forces of paternalism (Alston and Ferrie, 1993) and peonage (Fishback, 1989) when owners appropriate the relational surplus created by the exchange.

Theoretically and methodologically, this study makes it clear that great insights into the informal economy can be harvested from dyadic, transactional data. This level of analysis is elusive but the richness of the data is proportional to the effort expended in obtaining it. In provocative fashion, access to individual transactions opens the door to further examination of decision-making in the context of parity (Eswaran and Kotwal, 1985), paternalism (Alston and Ferrie, 1993) and peonage (Cross, 1979; Meyers and Carlson, 2002; Alston, Mattiace, and Nonnenmacher, 2009) in the informal economy. Future studies should leverage the findings that socially and economically disadvantaged individuals are specifically targeted through the use of informal economic mechanisms. Answers to questions related to why these groups are targeted and why others are not could have implications well beyond the parameters of employee lending.
REFERENCES


CHAPTER FIVE

CONCLUSION
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The purpose of this dissertation is to develop more veridical, intelligible and useful explanatory frameworks for the examination of entry and survival strategies among entrepreneurial firms. By employing a transaction perspective in the context of theoretical work in microfoundations, capabilities, and strategic entrepreneurship, I simultaneously address context, strategies and outcomes in multi-level fashion. This enables me to make a number of noteworthy contributions related to the identification, prediction and evaluation of performance and survival variance among new and small firms.

Individually, the three essays contribute fresh insights, important new boundary conditions, and corrective logics to three broad theoretical streams of mutual interest to scholars engaged in the study of strategy and entrepreneurship. The first essay delves into the matter of strategic coherence, offering the first comprehensive evaluation of patterned operational behavior for the entire history of an entire industry. Through this I show that entrepreneurial firms lacking in strategic coherence flounder and fail with great speed and regularity. The second essay brings to light several unexpected sources of performance variance among entry cohorts and spinoff siblings, offering a forceful counter-point to extant
theories on entrepreneurial spinoffs and the hereditary transfer of knowledge and capabilities. My findings suggest that often spinoffs exhibit a performance disadvantage and that good and bad parent-firms each spawn both good and bad progeny. Finally, the third essay applies a transaction perspective to the survival strategies of fully operational firms. Specifically, I focus on the development of novel strategic approaches among entrepreneurs who face incomplete markets and persistent resource uncertainties, revealing the ongoing efforts of entrepreneurs to devise and implement viable survival strategies, even if doing so requires pursuing exchange opportunities outside the domain for formal markets and institutions.

Collectively, the papers constitute a value greater than the sum of the three parts by making a strong case for the reconceptualization of how and why strategy is formulated and implemented in new and small firms. The veridicality gap addressed in each of the three essays is, in some sense, the essence of the design, measurement and analysis problems that have plagued strategic management (Ketchen, Boyd Bergh 2008) and entrepreneurship (Short, Ketchen, Combs, & Ireland 2010). Construct operationalization, level-of-analysis and unit-of-analysis difficulties (Armstrong & Shimizu 2007; Bergh et al. 2004; Dess, Gupta, Hennart, & Hill 1995; Hitt, Beamish, Jackson, & Mathieu 2007) persist because the particularism versus universalism tension inherent in strategic management (Boyd, Finkelstein, & Gove 2005) cannot be addressed by assuming a patently micro or macro perspective. Instead, robust empirical analysis of strategy, entrepreneurship and institutions should employ transaction data wherever possible.
The emphasis on transactions as an opportunity-laden unit of analysis squarely inserts my dissertation into one of the most heated debates confronting the study of business strategies: macro explanations versus micro explanations of strategic activity. On the one hand, macro-focused scholars have long held a collectivist approach. “Firms exist because they provide a social community of voluntaristic action structured by organizing principles that are not reducible to individuals,” claimed Kogut and Zander (1992). Two generations of research on strategic capabilities, tracing back to Nelson and Winter’s initial work on organizational routines (1982), have reinforced the perspective that sustainable competitive advantages are borne of firm-level capabilities in marshalling key resources (Barney 1991; Peteraf 1990; Wernerfelt 1984), knowledge stocks (Grant 1996; Kogut & Zander 1992; Eisenhardt & Santos 2002), and dynamic capabilities (Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece & Winter 2007). On the other hand, micro scholars have been unapologetically reductionistic. In this open rebellion against the promulgation of macro-level explanations, Abell, Felin and Foss wrote, “There are no mechanisms that work solely on the macro level, directly connecting routines and capabilities to firm-level outcomes.” (2008: 491).

Accepting that there are valid arguments and numerous adherents supporting both micro and macro approaches, the key question is this: If, as Vromen suggested, macro explanations need not be causally mapped to individual mechanisms, then what is the potential role for transaction-based analysis to mediate this seemingly irresolvable split between macro and micro perspectives? A
central premise of this dissertation is that transactions offer both micro and macro adherents a common ground upon which to develop viable theoretical frameworks for business strategy and entrepreneurship that embody the aims of intelligibility, veridicality and usefulness. The mutual reliance of macro and micro perspectives on an intermediating transaction-based unit of analysis is depicted in Figure 2.

**FIGURE 1: THE INTERMEDIATION OF TRANSACTIONS**

As I have modeled the relationships in Figure 2 and have demonstrated in the three empirical studies comprising this dissertation, transactions can be thought of as *committed actions*, serving an intermediating role, between micro-level mechanisms that are pre-commitment states and macro-level aggregations that are post-commitment outcomes. In this fashion, the micro and macro perspectives are rendered more intelligible, veridical and useful by engaging the bounty of irreducible information associated with the commitment phase, which consists of transactions. As Abell et al. note (2008), micro scholars study the
“actions and interactions of individuals.” Without such interactions, individuals are not engaged in the implementation of strategy. On the other hand, such interactions are the basic function of transactions. Macro scholars, meanwhile, engage in post-commitment explanations, for which there is no intelligible basis for discussion without the presence of transactions, since without transactions there is no commercial activity to aggregate. While micro-mechanisms cannot be summed into macro outcomes, it is possible to aggregate transaction-based information, because the language of transactions can be translated into outcome-related metrics.

By addressing performance and survival variance through novel datasets, complete populations and a transaction perspective, my dissertation makes several noteworthy contributions.

First, the three studies provide important insights into the creation and survival of new and small organizations. By creating provocative portals through which to assess strategic activity at its most atomistic level over time and across market participants, my findings tangibly enrich the efforts to formulate better predictive models for firm survival and failure. For example, the use of loan transaction detail in Essay Three serves as an enabling platform for the development of an explanatory model for the persistence of informal economic mechanisms even in the presence of legal, formal market alternatives. In this case, the creation and strategic use of OTB loans by owners facing severe labor uncertainties, is made apparent through the portal of these relational exchanges. The findings revealed through this design and dataset address important gaps
regarding the entrepreneurial use of informal economic mechanisms and, more broadly, the development and implementation of survival strategies by small and new firms.

Second, I develop and test the first comprehensive measure of strategic coherence from a transaction perspective. The few existing studies of strategic coherence have focused on firm-level strategic relatedness pertaining to consistency in mergers and acquisitions (Teece and Rumelt, 1994), budgeting (Nath and Sudarshan, 1994) and business model implementation (Lamberg et al. 2005). While each of these confirmed the importance of coherence, the specific effects of relatedness on the entry and survival strategies of entrepreneurial firms have largely passed unexamined. As the findings in the first essay demonstrate, strategic coherence has a pronounced role in determining firm performance and survival.

Although the specific context of my research on strategic coherence focuses on new and small firms, the implications are far more expansive. By effectively defining strategic coherence and then evaluating patterned operational behavior in light of 5.7 million decision nodes, I bring to light concepts that are highly germane to methods and theories employed strategy and entrepreneurship scholars. The extent to which an industry’s performance and survival variance is revealed through this analysis poses serious issues for extant theories concerning the entry and survival strategies all firms, regardless of age, size, location or lineage.

Third, I demonstrate a useful approach to bridging the micro – macro divide that continues to bedevil much of entrepreneurship and strategy research. By
simultaneously engaging conditions, strategies and outcomes through the use of transaction-level data, I establish common ground for a more productive interchange between the microfoundations and capabilities streams.

In this fashion my three studies provide a compelling case for the importance of applying a transaction-based perspective specifically to the study of entrepreneurship and strategy. Much of the extant literature, even in the realm of strategic entrepreneurship, focuses either on pre-strategic activity at the micro-level, which runs the risk of being unintelligible due to the decontextualization that accompanies micro-analysis, or post-strategic activity at the macro-level, which runs the risk of being non-veridical due to firm-level and sector-level aggregations. In marked contrast, I show that a transaction perspective uniquely offers a view of strategy, as it exists in fact, in the form of the committed actions associated with transactional activity. For instance, prior literature on the informal economy is bifurcated between macro studies employing aggregated national and regional data, and micro studies employing a case study approach. In bridging fashion, my use of transaction-level data insures that the benefits of the micro approach’s articulation of specific phenomena and macro approach’s ease of generalizability are preserved, while the shortcomings of each are remediated.

Finally, I contribute usefulness to existing theories in entrepreneurship and strategic management by developing explanatory frameworks that are more intelligible and veridical than incumbent models. As Rumelt et al. asserted (1991), the scholarly study of strategic management has long and deep roots in practice of
strategic management. Each of the three studies comprising this dissertation presents exciting new insights and opportunities for practitioners and policymakers. Essay One directly challenges the view that the effects of institutional support are largely homogenous. On the contrary, my findings suggest that a multitude of strategic responses may emerge from a common set of munificent conditions, which in turn results in a wide array of outcomes. Importantly, this more veridical rendering of institutions, contagion and strategic coherence does not sacrifice intelligibility.

Essay Two involves the analysis of a complete population to reveal important misconceptions about the form and fate of entrepreneurial spinoffs. Specifically, I demonstrate that the market entry of spinoffs is often significantly understated, while the operational performance is significantly overstated. I find that contrary to extant literature, spinoffs exhibit extreme heterogeneity of performance, even among firms emanating from the same parent-firm cohort. This approach and the associated findings offer greater veridicality by depicting a far more chaotic set of operating conditions than had been accounted for in prior literature. Even so, my transaction-based perspective does not come at the expense of intelligibility. Rather, by using the granular data of this complete population, I pivot to a more viable explanatory mechanism grounded in the relative ability or inability of firm founders to meet the demands of the marketplace.

Essay Three also stakes a claim for both veridicality and intelligibility by assessing the motives and outcomes of dyadic relations in the informal economy. By
moving past national or regional business registration data and other high-level aggregations of informal activity, am able to demonstrate that behavior in the informal economy is neither patently innocuous nor predatory. Through this, I present a far more veridical depiction of complex relationships in the informal economy; yet I once again do so in fashion that does not sacrifice intelligibility. Demonstrating the intermediating value of transactions, I provide both micro-level analysis of individual transactions and a generalizable model proffering a decision-choice mechanism that has significant predictive value.

By balancing veridicality and intelligibility more effectively than many of the incumbent frameworks in the three areas circumscribing this dissertation, I contribute an added element of usefulness to scholars, practitioners and policymakers. Notably, this usefulness is not attained through the identification of main effects or average effects, but by delving into the heterogeneity that singularly defines the study of strategic management and holds the greatest promise for continued progress in the study of entrepreneurship. And, the portal through which this usefulness is derived is built upon a transaction perspective.
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