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ABSTRACT

The sustainability of cooperatives versus corporations is hotly contested. We propose that strategic choices at entry can help to explain the endurance of these two governance modes. We hypothesize that cooperatives have a survival advantage if their major drawback – high coordination costs – is curbed by high levels of member engagement at founding. Our analysis of survival rates in the United States bio-ethanol industry shows that cooperatives outlive corporations 1) if investment size at founding is large (strong financial engagement), 2) if they enter *de novo* instead of *de alio* (strong product-market engagement), and 3) if the cooperative venture has been carefully planned from the start (greenfield entry) instead of built upon the acquisition of an existing plant (strong venture-building engagement). These findings caution against the view that a particular mode of governance is superior or inferior to another in all circumstances.

Key words: bio-ethanol, cooperatives, governance mode, strategic entry choices, survival

INTRODUCTION

In the slipstream of the global economic crisis the cooperative form, in which ownership and authority are democratically shared by the organization's members, is again being heralded as an alternative to capitalism (Barton, 2011; Boone and Özcan, 2014; Schneiberg, 2013). The General Assembly of the United Nations declared 2012 the International Year of Cooperatives to raise awareness of their contribution to social and economic development and to promote their diffusion worldwide. Advocates believe that cooperatives facilitate sustainable development in local communities, curb unemployment (Staber, 1993), increase the market and institutional power of people who are capable of achieving little or nothing on their own (Ingram and Simons, 2000), energize community members for various entrepreneurial pursuits, and spur social integration and participation (Bonin et al., 1993; Zeuli and Radel, 2005). The recent revival of cooperatives is seen not only in the agricultural sector in developing countries but also in industries in developed countries that have been dominated by corporations for decades such as electricity production in Germany (Liu and Wezel, 2015), and bio-ethanol in the US (Boone and Özcan, 2014).

It is well documented in the literature that cooperatives come and go in waves (Schneiberg, 2013; Schneiberg et al., 2008). Historically there have been peaks of cooperative formation such as the one at the turn of the 19th century in the US when social movements spurred the founding of cooperatives to defend the values of autonomy and craftsmanship against the rise of mass-market ideology (Schneiberg et al., 2008). Ideological incentives often strongly contribute to the (re-) emergence of cooperatives in many settings. For instance, Boone and Özcan (2014) provide evidence that US bio-ethanol cooperatives are generally founded by necessity when markets fail *unless* the presence of strong local anti-corporate sentiments spurs contestation between oppositional identities, fueling affectively laden "hot cognition" (DiMaggio, 2002)[i]. Under such conditions, anti-corporate sentiments

provide forceful ideological motives that galvanize local collective action to establish cooperatives in response to the dominance of corporations (Boone and Özcan, 2014).

It remains, however, an open question whether the affective motives that drive the formation of cooperatives are a sufficiently solid foundation to enable these ventures to become a viable alternative to capitalism. In order to do so cooperatives need to be able to compete with other organizational forms that are established to do the same activities with their own specific advantages and disadvantages (Hansmann, 1996; Staber, 1993). Without the capacity to survive cut-throat rivalry cooperatives would be "scarcely interesting for purposes of organizing economic activity in society at large" (Williamson, 1980, p. 33). Because cooperative founders are often guided by emotions and less by economic rationale they tend to overlook that the cooperative is costly to organize and manage (relative to corporations) (Boone and Özcan, 2014; Williamson, 1985). In this respect, economic theories are highly skeptical about the sustainability of cooperatives and some economists even regard producer cooperatives in particular as "impossible organizations" (Estrin and Jones, 1992, p. 328), cautioning policymakers against using public resources to promote such inefficient forms of organizing production (Porter and Scully, 1987).

A complete understanding of the dynamics of the cooperative form, therefore, requires a focus on the processes of both cooperative founding and survival. To be sure, the debate about the viability of cooperatives has already stimulated much empirical research about the impact of governance modes on organizational efficiency and, to a much lesser extent, longevity (e.g., Barnett and Carroll, 1987; Moore and Kraatz, 2011; Núñez-Nickel and Moyano-Fuentes, 2004). However, the state of the art of the empirical results about whether and when the cooperative form has a performance advantage over commercial firms is ambiguous and often even contradictory (for a review, see Soboh et al., 2014). To shed light on this confusion we argue that the implicit assumption that a particular mode of governance

can be superior or inferior to another in all circumstances should be abandoned. The organizational capabilities associated with a specific governance mode can be reaped only when the organization's context is such that it mitigates the major drawbacks of the form in question (Nickerson and Silverman, 2003; Rao and Neilsen, 1992; Williamson, 1985).

In this paper, we advance such a novel contingency framework arguing that the relative performance advantage of governance modes depends on fundamental strategic choices that founders have to make at entry (e.g., Geroski et al., 2010; Marquis and Tilcsik, 2013; Sine et al., 2007). Strategic entry choices are of major importance for two reasons. First, notwithstanding the fact that cooperative founding is often driven by anti-corporate sentiments embedded in a local community (Boone and Özcan, 2014), subsequent survival also hinges on the strategic capability of cooperative founders to establish sustainable ventures that can survive cut-throat rivalry. Second, the way in which a venture with a particular governance mode is established strongly affects the quality of initial organization, which has persistent, path-dependent consequences for long-run organizational outcomes (Greenwood et al., 2014; Kuilman and Li, 2006; McKendrick and Carroll, 2001)[ii].

Our contingency framework starts from the observation that cooperatives, in contrast to corporations, are particularly vulnerable to the potentially high costs of coordination emerging from the heterogeneous preferences of members which are often reinforced due to the importance of member ideology and affect in the establishment of cooperatives (Hansmann, 1996; Williamson, 1985). As a result, we propose that cooperatives can have a survival advantage only when high-levels of engagement by members at founding compensate for this pressing problem. When engagement is high, members are committed to the cooperative venture while, at the same time, the venture is organized cautiously, systematically involving "cold" strategic cognition (DiMaggio, 2002). With a strong, well-considered and focused social pact among founding members cooperatives enjoy the benefit

of powerful incentives associated with member ownership, common purpose, and shared identity, without incurring excessive coordination costs. All this in turn allows cooperatives to survive competition from strong competitors such as corporations.

We focus on three different strategic choices at entry that are associated with distinct dimensions of the level of engagement of cooperative founding members: the amount of capital invested at founding (financial engagement), *de novo* as opposed to *de alio* entry via diversification from another industry (product-market engagement), and greenfield entry as opposed to entry by acquisition (venture-building engagement). Because these choices collectively represent critical trade-offs faced by founders, which have also been shown to affect the fate of corporations (e.g., Brüderl et al., 1992; Carroll et al., 1996; Geroski et al., 2010; Sharma, 1998), they are excellent candidates to explore how they interact with governance mode in affecting failure rates. We predict that cooperatives are less likely to fail than corporations 1) if investment size at founding is large, 2) if the cooperative in question has a focused product-market engagement (*de novo* entry), and 3) if the cooperative venture has been carefully planned from the start (greenfield entry). We test our hypotheses in the US bio-ethanol industry in the period 1978-2015.

By integrating the literatures on governance modes and strategic entry choices we contribute to both strands of scholarly investigation. The literature on governance modes provides considerable insight into the ways in which the structural context affects the occurrence of different governance modes (e.g., Williamson, 1985). Nevertheless, such studies are silent with regard to the performance consequences of the alignment of governance modes, which is the subject of our study (Nickerson and Silverman, 2003). The literature on entry choices offers vital complementary insights by highlighting the importance of strategic choices during the organizing period (Carroll et al., 1996; Kuilman and Li, 2006; Sine et al., 2007). Nevertheless, this literature has focused exclusively on corporations,

remaining silent about the moderating impact of governance mode. Unfortunately, this obscures the possibility that the same strategic choices at entry will have different effects depending on the venture's governance mode, which we address in the present paper.

THEORY AND HYPOTHESES

Economists have claimed that there are strong economic disincentives associated with the cooperative form. One important reason is that the internal governance systems of cooperatives are less efficient than those of corporations. Transaction costs are higher for cooperatives as it is much more difficult to implement hierarchical leadership and performance monitoring within such structures. In contrast, leadership and control are implemented by fiat in corporations, making it easier to resolve organizational problems associated with opportunism and information asymmetry (Williamson, 1985). The costs of collective decision-making in cooperatives are particularly high when the interests of members are heterogeneous. Such heterogeneity undermines efficiency and spurs free-riding behavior among members (Hansmann, 1996). Further, cooperatives suffer from a horizon problem, which leads to underinvestment in assets with long-term payoffs and a preference for retiring equity over building internal equity (Soboh et al., 2014). Instead of investing in the downstream activities of the cooperative, members simply prefer to invest in their own businesses, thus expanding their volume and increasing their income. It is also more difficult for them to realize economies of scale, as the costs of coordination increase rapidly as the number of members grows (Bonin et al., 1993). For all of these reasons, economists have conjectured that cooperatives will eventually lose to corporations and that they are therefore established primarily by necessity when markets fail (Porter and Scully, 1987).

In contrast, organization theorists argue that, on average, failure rates are likely to be lower for cooperatives than they are for corporate plants for several reasons. First, in contrast to corporations, cooperatives do not have profit maximization as their ultimate objective

(Foreman and Whetten, 2002). Cooperatives tend to be less pressured by hard economic times as long as they create sufficient added value for their members. The very survival of a cooperative often becomes an end in itself (Moore and Kraatz, 2011). Second, given that the members of a cooperative are also users their incomes depend upon continued patronage resulting in strong commitment to the cooperative, which will shield them from adverse environments. In contrast, corporations are more vulnerable to opportunistic behavior by their suppliers who can switch to another firm (Núñez-Nickel and Moyano-Fuentes, 2004)[iii]. More generally, cooperatives and corporations exhibit different compliance relationships with their owners (Etzioni, 1975). While the involvement of the shareholders in their corporations is typically of pecuniary nature, cooperative members' involvement comprises strong moral elements in addition to pecuniary expectations (Foreman and Whetten, 2002) and these moral elements are instrumental for normative coercion of members (Etzioni, 1975). Third, because cooperatives are community organizations, their economic transactions are embedded within social attachments. They have strong local roots (Shepherd and Williams, 2014; Schneiberg et al., 2008). Such ties to the local community offer important advantages, including improved enforcement capability and access to institutional resources (Ingram and Simons, 2000; Weber et al., 2008). These advantages are often unavailable to corporate plants.

Given these contradictory perspectives, it is not surprising that the empirical evidence on the relative performance of cooperatives is inconclusive. This is partly because researchers have tended to rely on corporate-based return benchmarks to evaluate the relative performance of cooperatives. However, as a cooperative has multiple objectives evaluating its performance solely based on profitability is misleading. For instance, cooperatives often provide ancillary services to their members, including, market intelligence, insurance programs, and lobbying. Although these services do not directly contribute to the added value of the cooperative, members value them (Sexton and Iskow, 1993). Indeed, in addition to

pursuing utilitarian objectives, members demand that cooperatives maintain moral objectives emphasizing community involvement and commitment to traditional cooperative ideals (Etzioni, 1975; Foreman and Whetten, 2002). The meaningful empirical evaluation of cooperative performance should therefore account for the dual nature of cooperative objectives. Organizational survival is optimally suited for comparative analysis, as it encompasses the multiple objectives of cooperatives, while providing an ultimate performance outcome for corporations as well (Núñez-Nickel and Moyano-Fuentes, 2004).

The few available studies on cooperative survival also provide mixed evidence. Statistically significant evidence has been reported that the death rates of telephone cooperatives (Barnett and Carroll, 1987) and financial cooperatives (Barron et al., 1994) are lower than are those of their commercial counterparts. In contrast, Rao and Neilsen (1992) report the opposite for mutual savings and loan associations. More recently, Núñez-Nickel and Moyano-Fuentes (2004) demonstrate that, in the Spanish olive oil industry, the average survival of cooperatives is longer than that of corporations.

To reconcile these conflicting findings, we introduce strategic choices at entry as important moderators of the survival advantage of cooperatives relative to corporations. Although hierarchies might be more effective with respect to monitoring and control, their extensive use of low-power incentives makes them vulnerable to motivational problems (Williamson, 1985). In contrast, high-power incentives tend to prevail in cooperatives since members are simultaneously owners and users. However, this situation introduces problems relating to monitoring and control, which increases the costs of coordination for cooperatives relative to corporations. Cooperatives could be expected to outlive corporations if they are able to realize a relative incentive advantage without incurring high coordination costs. This depends on the strategic entry choices of the cooperative members, which reveal their level of financial, product-market and venture-building engagement.

Financial engagement: capital invested at founding

The literature on the survival of new firms consistently reveals that the size at founding and the amount of capital invested are major predictors of their survival rates (Agarwal and Audretsch, 2001; Brüderl et al., 1992; Cooper et al., 1994). In addition, Geroski et al. (2010) found that firms that are larger in the initial year of founding have an almost permanent survival advantage during their life histories. Several reasons have been proposed to account for this effect. First, firms that start relatively big are probably more confident about their ability to compete in the market place (Geroski et al., 2010). It signals founders' engagement and enthusiasm, which further improves the venture's capacity to attract valuable resources, such as qualified human capital and high-quality supplies. Second, new ventures often face severe liquidity constraints. This implies that additional funding is often required which is, however, more difficult for firms with small initial size to raise (Cooper et al., 1994). Third, larger ventures are often more able to withstand environmental shocks and variability. A larger pool of resources allows firms to cope with the negative impact of such events and protects them during the critical start-up period (Brüderl et al., 1992). Put differently, the liability of newness is smaller when new ventures are bigger. Fourth, although smaller ventures may enjoy the benefit of having lower overhead costs and building up their scale in an exploratory fashion (Brüderl et al., 1992), larger start-ups avoid incurring high adjustment costs due to organizational inertia (Geroski et al. 2010). Finally, the capital invested at founding is often irreversible. The higher the capital invested at founding the higher these sunk costs and the more founders might be committed *ex post* to stick to the venture (Agarwal and Audretsch, 2001). If high sunk costs are involved it might be optimal to wait until uncertainty about the prospects of the venture are resolved (Geroski et al., 2010)[iv].

The amount of capital invested at founding is a strong signal of both *ex ante* and *ex post* commitment of the founders to their venture. Given that engagement is so important to

curb the coordination problems associated with the cooperative form, we expect that the survival enhancing effect of capital invested at founding will be even more important for cooperatives compared to corporations for three reasons. First, setting up a cooperative is a very challenging task, as many enthusiasts have to be mobilized to become a member of, and investor in the venture (Gherardi and Masiero, 1987; Schneiberg et al., 2008). Establishing a corporation, where ownership and control are generally separated, is relatively easy, as it does not require strong investor engagement. Capital can be raised swiftly by issuing stock with ownership rights that can be transferred easily. Cooperative entrepreneurship, in contrast, is a collective process that often involves hundreds of members implying huge coordination problems that must be solved. Ideological and affective motives which drive local communities to establish cooperatives (Boone and Özcan, 2014) are by no means sufficient to establish workable and viable ventures. The selection of strongly committed founding members who, after rational cold deliberation, are willing to take an important financial stake in the venture is, therefore, of the utmost importance. By mobilizing such members, cooperatives will be able to raise a large pool of initial resources with high levels of member engagement. Indeed the strategic importance of this is evident anecdotally as well. The following account from the origins of an ethanol cooperative highlights these considerations:

> *"Following the initial meetings convened by the Harrison County R.E.C.* [Iowa], *a small group of 6-8 self-selected individuals from Denison decided to continue meeting to pursue the idea of building an ethanol plant in the town. To do so, they formed a Steering Committee. At that time, each and every member of the Steering Committee demonstrated their commitment to the idea of the ethanol co-operative by making an "at risk" investment of $25,000. This is acknowledged by everyone involved to have been a serious level of personal investment. The purpose of these funds was to provide a reasonable level of seed money to explore the viability of the initiative, and to have sufficient funds to kick start the process of developing the project idea further. By starting off with such a high level of personal investment, the group also wanted to indicate how serious they were about making the project work…their upfront investment also set the bar for all future investors in the project*" (Alkalay, 2007).

Second, initial financial engagement at founding will drive member commitment to contribute to effective daily operations in the cooperative. Since in cooperatives owners are

also members and users, members' personal interests are closely aligned with those of the venture, and this is even more so when initial invested capital is high. High personal stakes provide strong incentives to members to use the cooperative effectively, e.g., by providing stable and smooth corn supply to the plant (Núñez-Nickel and Moyano-Fuentes, 2004) and to employ their personal networks to foster continued community support for the cooperative.

Finally, high initial investments are also likely to escalate cooperative member commitment during hard times. Cooperative investments are more difficult to recover than investments in commercial firms given that secondary markets for selling cooperative shares are often absent (Porter and Scully, 1987). This implies that the "sunk cost" effect is larger for cooperatives than for corporations (especially when financial stakes are high) because members have more to lose. Further, cooperatives offer several benefits beyond profits (Sexton and Iskow, 1993). In bio-ethanol cooperatives, for instance, members are corn farmers who are likely to value the stable supply of corn, as well. Indeed, an important advantage of cooperatives is that supply linkages are internalized, which buffer cooperatives from turmoil in supply chains and/or commodity markets (Núñez-Nickel and Moyano-Fuentes, 2004). The presence of additional interests suggests that the "sunk cost" effects will likely to be reinforced further at greater levels of initial investment.

Taken together, we expect that the capital invested at founding will reduce the failure rates of both corporations and cooperatives, but even more so for cooperatives because cooperative members are so strongly engaged. Because strong engagement allows one to fully reap the benefits of the cooperative form while curbing its main disadvantages we expect:

Hypothesis 1: Cooperatives are less likely to fail, as compared to corporations, when the size of the capital invested at the time of founding is large.

Product-market engagement: *de novo* vs. *de alio* entry

The scope of economic activities in which an organization is engaged at the time of founding is a critical defining element of the nature of its identity, i.e., those elements that internal members and outsiders deem central, distinctive, and enduring (Foreman and Whetten, 2002) and with long-term implications for organizational survival (McKendrick and Carroll, 2001). Organizations that enter a market *de novo* (i.e., as new entities) generally specialize in a narrow range of activities associated with a strong focused identity. In contrast, organizations that enter *de alio* (i.e., diversifying from another industry) typically derive their identities from activities outside the focal industry and therefore have diffuse identities.

In contrast to *de novo* entrants, diversified entrants are likely to benefit from leveraging assets and capabilities from one industry to another (Bayus and Agarwal, 2007) but their diffuse identities limit the formulation of a meaningful and coherent identity narrative and in turn, the extent to which resource holders perceive the entrepreneurial proposal as viable (Navis and Glynn, 2011). The decision to enter *de novo* or *de alio* thus requires entrants to make an important strategic trade-off between a focused product- market identity and the potential for realizing synergies (Carroll et al., 1996; Chen et al., 2012).

Past empirical research suggests that the balance of this trade-off for corporations tips towards *de alio* entry. Corporations that enter *de alio* seem to be able on average to reap synergies, as their survival chances are higher than those that enter *de novo* (e.g., Boone et al., 2013; Carroll et al., 1996). In contrast, we predict that the optimal choice for cooperatives is to enter *de novo* and not *de alio*, and that *de novo* cooperatives (and not *de alio* cooperatives) are particularly likely to outperform corporations for two reasons.

First, a *de novo* cooperative project creates a stronger economic incentive for engagement for members than the horizontal expansion of an existing cooperative. While shareholders have only a singular relationship with corporations, corporate members have a dual relationship with their cooperative – as owners and as transaction partners (suppliers). As

a result, members generally prefer their cooperatives to process higher volumes of their supplies rather than diversifying into other industries. When the latter happens, the levels of their engagement will decline (Hendrikse et al., 2007; Núñez-Nickel and Moyano-Fuentes, 2004). Similarly, compared to a *de alio* project, a *de novo* project will generate a stronger socio-cognitive foundation for engagement. It is more likely to capture the imagination of community members, arouse ideological fervor, and energize them than is the launch of additional businesses at an existing cooperative (Ashforth and Reingen, 2014; McKendrick and Carroll, 2001). Indeed Gherardi and Masiero (1987) observe that in *de novo* cooperatives the bases of commitment are "emotional and ideal" whereas in cooperatives that represent "coalitions" such as *de alio* cooperatives the nature of commitment is "calculative and pragmatic." They also note that features such as "enthusiasm, spirit of sacrifice and a sense of responsibility" characterize the formative phase of primarily *de novo* cooperatives.

Moreover, as additional cooperative businesses are created competing identity claims are likely to emerge which might further dilute member engagement (Foreman and Whetten, 2002). Self-selection reinforces this process. Unlike corporate expansions, cooperative expansion typically involves recruiting new members to secure financial capital to back the new initiative[v], and strongly engaged people join cooperative initiatives earlier than financial pragmatists do (Gherardi and Masiero, 1987). This infusion of pragmatists undermines the social pact that bonds the member community, generates additional conflicts, and decreases commitment and engagement (Ashforth and Reingen, 2014; Foreman and Whetten, 2002).

Second, the resource-leverage advantage of *de alio* entry is much more difficult for cooperatives to realize than it is for corporations. The achievement of synergies between different activities requires a complex organizational and political structure, which dilutes member engagement within the cooperative (Carroll et al., 1996). Diversification and heterogeneous member preferences complicate the economic relations between the members

and the cooperative as well as relations between members. The democratic and consensus-based nature of the cooperative decision-making, which is absent in corporations, already makes decision-making processes lengthy and laborious (Hansmann, 1996). In the face of diversification, more structures have to be built into the organization to reconcile and harmonize what is now a greater heterogeneity of opinions on more diverse issues. Further, some existing members may decline to participate in equity rounds for expansion, or they might lack the capacity to fill their supply rights, while new members might join with ownership restricted to the new unit. These augment the free rider and horizon problems.

In *de alio* cooperatives, therefore, members face major coordination problems, and they are likely to lose control due to rising complexity. Given that cooperative members tend to have low managerial capital, increasing complexity forces cooperative members to delegate greater authority to upper management (Sexton and Iskow, 1993). Increases in managerial discretion and the depletion of members' capacity to convey their preferences create new tensions and goal conflicts that disrupt the internal social bond (Sexton and Iskow, 1993). In a recent ethnographic study of a food cooperative, Ashforth and Reingen (2014) observed clashes over numerous issues, although none were as heated and divisive as the idea of expanding the authority accorded to hired managers.

In contrast, it is easier to achieve strong member engagement and consensus about purpose and internal organization among the many members of highly focused *de novo* peer groups, where it is also easier to avoid subsequent conflict about the deployment of resources. Moreover, *de novo* groups require less depersonalization of managerial roles. Such cooperatives are likely to have few coordination problems, thus implying the possibility of realizing the relative benefits of the cooperative mode of governance.

Taken together, a lack of product-market focus will diminish the overall level of engagement among members. Some members leave due to internal conflicts combined with a

reduced ability to monitor behavior while others shrink their commitment, creating commons problems. Further, the new project's lack of focus increases the collective willingness to terminate the cooperative in the wake of economic losses or evolutionary setbacks, leading to quicker industry exits. In contrast, members of *de novo* producers – who are strongly engaged and attached to the venture – are likely to fight any prospective demise, even at the price of their own economic ruin (Weber et al., 2008). Because coordination and monitoring in corporations is achieved in a top-down fashion, organization-member (i.e., employee) engagement by means of product-market focus is less salient. In contrast, the efficient coordination capacity of corporations facilitates reaping potential synergies associated with *de alio* entry (Williamson, 1985).

Hypothesis 2: Cooperatives are less likely to fail, as compared to corporations, if they have entered de novo instead of de alio.

Venture-building engagement: entry from scratch (greenfield) vs. by acquisition

Entry into an industry occurs primarily through greenfield or by acquisition (Sharma, 1998; Slangen and Hennart, 2008). Both modes of entry confront decision-makers with critical trade-offs. For corporations, research has revealed that the outcome of this trade-off depends on several critical contingencies (see, e.g., Slangen and Hennart, 2008). For cooperatives, our conjecture is that greenfield entry is paramount to survival, whereas entry by acquisition is likely to be detrimental. Because greenfield entry has a long organizing period, it prevents entrants from rapidly exploiting emerging business opportunities, and it provides existing rivals with the time they need to mount effective retaliation (Kuilman and Li, 2006; Sine et al., 2007). Despite the disadvantages of greenfield entry the lengthy period of organizing associated with it is of particular importance to curtail two important sources of coordination problems which escalate under acquisition-based entry.

First, cooperative formation is as much an ideological endeavor as it is an economic one (Ashforth and Reingen, 2014; Boone and Özcan, 2014; Schneiberg et al., 2008). The process of mobilizing members (i.e., "cooperative fundraising") involves intense ideological discourse and moral appeal, in addition to extensive symbolism (Dobrev et al., 2006; Weber et al., 2008). Many prospective cooperative founders could be characterized as emotionally charged individuals who are often fearful of a common threat, implying that hot cognition creeps into their entrepreneurial decision-making (Boone and Özcan, 2014). Furthermore, in order to sell the idea of an organizationally complex business, cooperative pitchers are likely to inflate expectations about local capabilities and resources thus reinforcing their irrationality (Navis and Glynn, 2011). In such a cognitive state, the short organizing period offered by acquisitions limits the possible scrutiny of the cooperative's fundamental assumptions, projections, and future vision. Members of the cooperative are likely to rush into premature judgments with great expectations that increase the likelihood of *ex post* disappointment and, thus, of grave coordination problems. Indeed, in an interview, the managing director of a cooperative plant that eventually failed admitted:

> "*In retrospect, the co-op should have done more research and asked a lot more questions… We should have had more checks and balances. We thought we had checked out everything well, but so many things didn't plan out. We were left with ghosts and shadows"* (Thompson, 2004, p.32).[vi]

In contrast, the pre-organizing periods for corporations involve greater cold cognition. Investors who review corporate business plans typically have greater professional expertise than potential cooperative investors. In this sense, acquisition decisions made by corporations are more likely to be backed by formal strategic analysis by professional strategists. Thus, acquisitions tend to be a more viable entry-choice for corporations compared to cooperatives.

These issues are even more problematic given that most acquisitions involve bankrupt firms or firms in distress (Bruton et al., 1994; Graebner and Eisenhardt, 2004). Selling out is the most commonly choice for firms in which internally directed turnaround efforts have

failed (Bruton et al., 1994). Acquisition of such firms implies that the buyers believe that they are able to achieve what the previous owners could not. If the organizing period is short, this belief is likely to be grounded in a relatively superficial understanding of the problems encountered by the previous owners. Further, the new owners will face higher barriers to success due to the stigma spillovers associated with previous failure. They will experience some disassociation by potential and existing business partners and a great deal of skepticism from the communities which have suffered financially and emotionally from the demise of the previous firm (Bruton et al., 1994). These factors pose additional operational challenges, which further decrease the engagement of members, while straining unity among them and diminishing the collaborative nature of their organization.

Second, cooperatives need carefully crafted organizational processes to avoid coordination problems, which require a long organizing period and strong venture-building engagement. The architects of the organization can install the desired managerial practices and governance mechanisms from the outset. In contrast, a party making an acquisition inherits the culture, routines, and management-control systems of the acquired firm, exposing the buyer to substantial risk of limited control (Hennart and Park, 1993; Slangen and Hennart, 2008). Similarly, in addition to selectively developing or obtaining assets, greenfield entrants pace their accumulation. Entry through acquisition requires entrants to buy the assets immediately upon entry. This approach is also more likely to involve the purchase of unwanted assets and, in turn, a great deal of retrenchment (Bruton et al., 2003), which will take managerial attention away from strategic growth. For all of these reasons, building an organization from scratch allows the development of an organization that is optimized in terms of governance, design, routines, and assets. The developers can also configure the organizational culture and processes in a way that reflects the values of the members, and this facilitates cohesion and mutual trust (Bercovitz et al., 2006). In contrast, the hierarchical and

instrumental nature of employment relationships in corporations reduces the marginal benefits associated with greenfield entry for corporations because top-down turnaround and integration of acquired firms is more easily implemented. Given that all of these factors constitute a necessary condition for the relative performance of a cooperative, we expect:

Hypothesis 3: Cooperatives are less likely to fail, as compared to corporations, if they have entered from scratch (greenfield) instead of by acquisition.

METHOD

Data and context

We test these hypotheses within the context of the bio-ethanol industry in the United States. Bio-ethanol is a high-octane, clean fuel additive produced primarily from corn. Its origin as a transportation fuel dates back to Henry Ford who in 1908 envisioned the Ford Model T running on a fuel that would boost the American rural farm economy. In the subsequent three decades, efforts to promote ethanol failed and this vision never materialized. By 1939, commercial ethanol production had come to a halt and it did not resume until 1978.

The first oil crisis of 1973 was a turning point for this forgotten fuel. In 1974, the state of Nebraska launched the two-million-mile ethanol road-test program. The test confirmed that most vehicles could run on gasoline containing up to 10% ethanol. Following extensive lobbying by the farm groups in the Midwest, in 1978 the Carter administration passed the National Energy Tax Act, which reduced the excise tax on ethanol-blended gasoline until 1985. This subsidy made ethanol competitive with gasoline, triggering its entry into production markets and marking the official beginning of the modern ethanol industry. The second oil price shock of 1979 further expanded the interest in the production and sale of ethanol. From that point on, the industry achieved steady growth. Production capacity rose from 80 million gallons in 1979 to 15 billion gallons in 2015. At the end of 2014, 92% of all gasoline sold was blended with ethanol.

Our population consists of 388 plants that entered the industry between 1978 (the year in which the first ethanol plant opened) and August 2015. These plants were founded in 255 counties across 37 states. Of these companies, 86 were owned by cooperatives spread across 83 counties in 17 states. We assembled the population for this study using archival sources including the annual reports of the Renewable Fuels Association; industry analyses commissioned by US states and the US Department of Energy; filings of the Securities and Exchange Commission; magazines (e.g., *Platt's Oilgram*, *Oxy-Fuel News*, and *Ethanol Producers Magazine*); newspaper archives; and press releases.

Our industry is particularly well suited to study rivalry among different governance modes for two key reasons. First and foremost, as Bonin et al., 1993 indicate, when examining performance differences between cooperatives and corporations the comparison should be made between organizations that are "twins" in all non-organizational respects, e.g., in terms of technology, the product generated, and market conditions. However, identifying "twins (isolation) is often impossible because the existing data on product type and technology are not sufficiently disaggregated" (p.1306). In our industry, both the primary input (corn) and the end product (ethanol) are commodities and the technology used to produce ethanol is virtually identical across the plants. These suggest a form of "all else equal" framework where the effect of the governance mode can be effectively isolated. Second, unlike studies of other contexts in which cooperatives and their commercial counterparts were territorially differentiated (typically cooperatives were in rural areas and corporations in urban ones) and accordingly the rivalry among them had a diffuse character (e.g., Barnett & Carroll, 1987; Barron et al., 1994), in our setting, both producers are generally situated in the same environment, suggesting intense direct rivalry which, therefore, provides a better foundation to examine relative superiority of governance modes.

Dependent variable and estimation

Of the 392 plants that entered the industry during our study period, 131 exited through permanent closure and 64 were sold. Of the 64 plant sales, 60 were classified as failures because they occurred during bankruptcy proceedings, or were *passive failures* (Graebner and Eisenhardt, 2004) that had suspended operations, scaled down production, and defaulted on loans. Because four plants (two cooperative plants and two commercial plants) had changed hands without any disruption to production, we did not categorize them as failures (Sorenson and Audia, 2000). We also did not register them as new entrants post-acquisition, leaving an ultimate sample of 388 plants (of which 86 cooperatives) and 191 failures. We coded failures as 1, with all other cases coded as 0. Figure 1 shows the number of failures over time.

INSERT FIGURE 1 ABOUT HERE

We analyzed plant failures by estimating Cox proportional hazard rate regressions. Unlike parametric event-history models, the Cox model makes no assumptions regarding the shape of the baseline hazard, which helps avoid misspecification of the baseline hazard. This is an issue in the current study, given that it involves analyzing two organizational forms simultaneously. The hazard rate is given by the following formula:

$$h_i(t) = h_0(t)\exp(\beta * z)$$

where $h_i(t)$ is the hazard of plant failure, $h_o(t)$ is the unspecified baseline hazard function, β is the vector of parameters associated with the explanatory variables included in the model, and z is the vector of the explanatory variables. We estimated coefficients and confidence intervals using maximum-likelihood techniques, reporting robust Huber/White standard errors in order to account for the clustering of observations within plant families. We included fixed effects for year. Our data are structured by month, for a total of 34,218 monthly spells.

Focal independent variable and moderators

Cooperative is a dummy variable that captures whether the focal plant is a cooperative plant (yes=1) or not (0). In the data, the mean (median) age at time of exit is 64.87 (41) months,

roughly equal to 5.5 (3.5) years. In terms of forms, cooperatives (commercial plants) exited at the mean age of 91.8 (60.81) months, roughly 7.5 (5) years. 68% of cooperatives that exited did so at an age lower than 8 years, whereas 86% commercial plants were younger than 8 years at time of exit. Thus, overall the plants in our population exited relatively young.

Founding size refers to the focal plant's production capacity (in million gallons per year (mgy)) at time of commencement. We classified a plant as a *de novo entry*, if it began as a start-up (yes=1) or *de alio* (reference category, 0), if it belonged to a firm diversifying into ethanol from another industry. Start-up entrants thus have no affiliation to a business in another industry, and are therefore focused. Our dataset contains 94 *de alio* entries, 11 of which were cooperative entrants, and 294 *de novo* entries, 75 of which were cooperatives. Corporate *de alio* entrants are primarily from the food and agribusiness sector (e.g., ADM, Kraft, Cargill, Louis Dreyfus) and the oil refining and services industries (e.g., Marathon, Sunoco, Valero, Williams Co.). Cooperative *de alio* entrants on the other hand include cooperatives in dairy (e.g., Land O'Lakes, Golden Cheese Co.), food (e.g., LifeLine Foods) and feed production (e.g., United Cooperative), agribusiness (e.g., AGP, MCP), energy (e.g., Cenex) as well as utilities (e.g., Great River Energy Coop).

G*reenfield entry* is a dummy variable that takes the value of 1 if the founders entered the industry by constructing the focal plant from scratch, and 0 otherwise (acquisition). In all, 229 commercial plants and 75 cooperative plants were classified as greenfield entries.

Control variables

We control for several sets of factors at various levels to rule out alternative explanations. The first set includes rivalry and local supply and demand conditions that might affect a focal plant's longevity. Competitive intensity is measured by *local production capacity* which is the logged sum of the production capacity of all plants operating in the county in which the focal plant is located and the counties adjacent to the plant's home country. We included adjacent

counties as research indicates that a mid-sized ethanol plant affects corn prices and supplies within a radius of up to 70 miles (McNew and Griffith, 2005). The *ethanol operating margin* is a metric used by industry insiders to assess the level of profitability of producing ethanol. Ethanol is traded in $/gallon, whereas corn prices are quoted in $/bushel. One bushel of corn yields about 2.75 gallons of ethanol. The margin is calculated as follows:

$$margin_i = (e_i - t_i) - \frac{c_i}{2.75}$$

where *e* is the rack ethanol price in a given month *i*, *c* is the corn price, and *t* is a federal tax credit given to ethanol producers for each gallon of pure ethanol blended with gasoline. We entered this variable by taking the moving average of the past six months.

Corn production denotes the county-level logged annual production of corn in bushels, and it determines the local carrying capacity for ethanol plants. Bypassing ethanol plants, farmers can sell their corn to plants that grind grain for food. We thus controlled for the number of *corn processors in the county.* The presence of many processors reduces the relative market power of ethanol plants as corn buyers. At the same time, however, it can lead to greater farming of corn, thereby improving the ability of plants to cope with supply uncertainties. We obtained data from the County Business Patterns and included flour mills, wet corn mills, and cereal mills. We use *average farm size* (in logged acres), obtained from the census, as a proxy for the concentration of farm ownership within the county over time. Farmers with large acres under cultivation can negotiate better terms with ethanol plants. Nevertheless, the presence of large farms decreases the costs of contracting and transportation, while increasing the reliability of supply flows, making the plants less vulnerable to supply fluctuations in supply. *Livestock* controls for the number of cattle on feed in the county as a proxy for the market for distillers' grain (an ethanol byproduct). A larger market for distillers' grain is in the economic interest of the plant owners.

Next, we introduced a set of institutional controls. The variable *coalition member*

(yes=1, otherwise 0) captures whether the focal plant's state's governor is a member of the Governor's Biofuel Coalition. This variable is a proxy for political goodwill for ethanol. Some states offer tax credits for buyers of ethanol at retail stations, which are intended to boost demand for locally produced ethanol. These credits vary by state and time. We thus include the variable *state tax incentives* to control for the amount of tax credits (per gallon/$) granted by the state in a given month. Finally, in all models, we introduced state fixed-effects to control for persistent, otherwise unmeasured, differences across states.

In terms of firm-level control variables, we included a *relative efficiency scale* measure, which is the ratio of the focal plant's size divided by the mean of the production capacities of all plants existing in that month. We expected this variable to have a negative effect on failure. Unfortunately, we have limited data on profitability. Instead, we introduced the *production capacity growth* as a control for the economic health of the operations and operationalize it as a year on year percentage growth in the plant's production capacity. Capacity expansion is financially costly and risky. When capacity expands, the underlying business must be doing well to be able to afford the expansion project. As membership in larger plant collectives might improve the life chances of a plant (Sorenson and Audia, 2000), the variable *plant family* controls for the number of other plants belonging to the same ownership structure. Lastly, although corn is the primary input for ethanol production, ethanol can also be produced from other sources. We therefore used the dummy variable *non-corn plant* to capture plants utilizing feedstock other than corn (e.g., cheese whey, beverage waste).

FINDINGS

Summary statistics and correlations are reported in Table I. Correlations between the variables are low to moderate. We present the results (coefficients) of our estimates in Table II. Model 1 includes the control variables. Model 2 is the baseline model and includes the main effects of our independent variable and moderators. We entered the interactions sequentially in Models

3 to 5, with Model 6 including all three interactions. We first test and report whether the interaction effects have the expected sign and are significant. At the end of this section we will discuss effect sizes, comparing the failure rate of cooperatives versus corporations in more detail, drawing upon results from the most comprehensive model (Model 6).

INSERT TABLES I AND II ABOUT HERE

In Model 2, the cooperative dummy was negative and highly significant, suggesting that cooperative plants are less likely to fail in this industry than are corporate plants. We obtained hazard ratios by taking the exponent of the coefficients. According to these results, the failure rate of cooperative plants is about 66% (1-exp(-1.09)) lower than that of corporate plants.

In Model 3, we introduced the interaction between the cooperative dummy and size at founding to the model in order to test Hypothesis 1. The interaction term is significantly negative and thus provides evidence in support of Hypothesis 1. The failure rate of cooperatives is lower compared to corporations but only when size at founding is relatively large. Our estimations are cluster-corrected at the plant-family level. For this reason, the log-likelihood values become pseudo values, rendering the standard log-likelihood ratio tests for evaluating relative model fitness invalid. Hence, we applied a Wald test to detect any improvement in model fit. The Wald test yielded a p-value of 0.027 (chi-square = 4.87). Based on this p-value, we are able to conclude that the inclusion of this interaction results in a statistically significant improvement in the fit of the model.

We tested Hypothesis 2 in Model 4. The coefficient of CooperativeXDe Novo Entry is negatively significant, thus confirming Hypothesis 2. Cooperatives appear to have a lower failure rate than corporations when they enter *de novo*. The addition of this variable improves the statistical fit of the model (Wald test results: p-value = 0.00, chi-square = 12.28).

The results for Model 5 support Hypothesis 3, as the coefficient of CooperativeXGreenfield Entry is significantly negative. A cooperative's relative failure rate

goes down when it makes a greenfield entry resulting in a lower failure rate than for corporations. Results from a Wald test indicate that the addition of this interaction significantly improves the statistical fit of the model (p-value = 0.01, chi-square = 5.70).

In Model 6, we entered all interactions simultaneously. Results from a Wald test show that their collective inclusion improves the model fit (p-value = 0.00, chi-square = 28.26). All interaction terms remained significant thus confirming the previous findings.

In Figure 2 we plot the multiplier of the baseline hazard rate as a function of the entry size for cooperatives and corporations separately based on the estimates reported in Model 6 (i.e., exp (0.0135694 Founding Size – 0.0285269 CooperativeXFounding Size)). As is clear from Figure 2, the interaction effect is non-monotonic: the size at founding has a differential effect on cooperative vs. corporate failure rates. Cooperatives are worse off if cooperative founders choose a smaller plant size. In contrast, entering at a larger scale is detrimental to the survival of corporate plants. At an average founding size (i.e., 38 mgy) the failure rate of cooperatives is 43% lower than the baseline while for corporations it is about 68% higher.

INSERT FIGURE 2 ABOUT HERE

In Table III we report the multiplier of the failure rate comparing the implications of entering *de novo*/*de alio* and greenfield/by acquisition for cooperatives vs. corporations. The results show that the estimated interactions are non-monotonic. The failure rate of cooperatives that enter *de novo* and from scratch is at least 52% lower compared to all other organizational forms, including corporations. In contrast, cooperatives that enter *de alio* and by acquisition are the worst performers with a multiplier that is more than 10 times higher than the baseline hazard rate. Interestingly, corporations seem to be well placed to reap potential synergies associated with diversification as they outperform all other corporations when they enter *de alio* compared to *de novo*. In fact, *de alio* corporations that enter by acquisition are the second-best performers with respect to longevity compared to all other

forms. Note that for corporations the difference between greenfield entry vs. entry by acquisition is very small. Taken together, these results clearly show that the impact of governance mode depends on strategic entry choices and vice versa, and that it is misleading to draw conclusions from main effects only (as estimated in Model 2).

INSERT TABLE III ABOUT HERE

Looking across all models, the effects of some control variables are noteworthy. As expected, the average ethanol margin in the past six months is negatively (albeit weakly) related to the rate of failure. Average farm size in the county enhances the life chances of ethanol plants. Although larger farm owners have greater bargaining power, size alone can lead to economies of scale in the supply of corn and reduce supply uncertainty for ethanol plants. In addition, given that the transportation costs for moving corn are relatively high, it is not in the interest of corn farmers to use their market power opportunistically since they also depend on local corn buyers. The models also reveal that the presence of more alternative buyers (corn processing plants) has a weak negative association with the rate of plant failure. This suggests that the agglomeration of corn processors generates mutualistic synergies by creating a munificent resource environment and sustainable resource flows. To boost the use of ethanol several states have introduced various tax credits for consumers that reduce the price of ethanol. Our results show that these subsidies enhance the survival of ethanol plants.

As expected, plants whose capacity is smaller than the average capacity in the industry are weeded out. Production capacity growth has a negative effect on the failure rate, which is also expected. Capacity expansion signifies robust business fundamentals. On the other hand, plants utilizing feedstocks other than corn are less likely to fail than are those using corn as they face less competition in their input markets compared to plants that use corn.

ROBUSTNESS

We assessed the robustness of our results in several ways. First, we experimented with additional controls, including the monthly retail gasoline price, plant density at founding, the presence of an ethanol industry association in the focal plant's state, state population size, and whether the focal plant was eligible for a Small Ethanol Producer's Credit which provided an income tax credit (per gallon) for ethanol producers with a production capacity of less than 30 mgy. Our assessment produced no substantive changes in the results. We also tested for a non-linear moderating effect of founding size, as there might be an optimal entry size conditional upon governance mode but the results showed no significant effects; and, inclusion of the interaction term (CooperativeXFounding Size squared) reduced the model fit.

Second, given the likely correlation of the exit rates of plants belonging to the same plant family it is advisable to assess whether the interdependence of events poses a problem. Sorenson and Audia (2000) recommended re-estimation using only independent plants not belonging to larger collectives (62% of spells in our dataset pertain to single-plant producers). Rerunning the models with this restricted sample produced no change in the signs, reduced the levels of statistical significance marginally (which should be expected due to reduction of sample size by nearly 40%), and changed the magnitude of the estimates only slightly.

Third, we classified both permanent shutdowns and exits through sale as failures in the models reported in Table II. These sales occurred either during bankruptcy or during financial and operational distress (passive failures). We tested the sensitivity of our findings by defining failures as those plants permanently ceasing operations and those sold during bankruptcy only. This reclassification reduces the number of failures by 35. The new estimations produced nearly identical effect sizes and statistical significance for CooperativeXFounding Size and CooperativeXDe Novo Entry but made the CooperativeXGreenfield Entry insignificant. The latter result is expected because when we

reclassify passive failures, we reduce the variation in the greenfield variable (decreasing the percentage of acquisitions from 15% to 9%). All of these estimates are available upon request.

DISCUSSION

Cooperatives are frequently proposed as solutions to social and economic ills in communities and as an antidote to the excesses of corporate capitalism (Bonin et al., 1993; Zeuli and Radel, 2005). Nevertheless, their performance compared to corporations has been hotly contested. The evidence is limited, contradictory, and drawn primarily from the use of corporate-based performance benchmarks, whose applications to cooperatives are limited (Bonin et al., 1993; Sexton and Iskow, 1993; Soboh et al., 2014). Moreover, the literature contains the unrealistic expectation that one form of governance will outperform another in all circumstances.

To resolve this issue, we have developed a contingency approach, building on the premise that a specific governance form will thrive in the long term, given rivalry with another mode of governance, only when conditions are such that they mitigate its major drawbacks (Nickerson and Silverman, 2003). Because the underlying logic of a particular governance mode is shaped when new ventures are designed (Carroll et al., 1996; Greenwood et al., 2014; Kuilman and Li, 2006), the strategic choices at the time of founding offer an important perspective from which to explain the relative performance of governance modes.

Given that the major drawback of cooperatives resides in their relatively high costs of coordination (Hansmann, 1996), we reason that the robustness of the cooperative design hinges on the strength of the founding members' financial, product-market and venture-building engagement. The level of engagement, in turn, is expected to be a function of the way in which the members of a cooperative decide to enter a market. Our analyses of mortality rates in the US bio-ethanol industry reveal that cooperative entry strategy is a major predictor of the relative survival advantage of cooperatives. Indeed, cooperatives substantially outperform all corporate plant types as long as they entered the industry with a large relative

size, *de novo* (rather than *de alio*), and from the ground up (greenfield rather than by acquisition). In contrast, their survival chances drop considerably if financial engagement at founding is relatively small, and if they enter by acquisition and/or *de alio*. The latter underscores the importance for cooperatives of having a focused product-market identity and avoiding acquisitions of failed organizations, which are accompanied by their own legacy structures, cultures, and systems (Bruton et al., 1994; Bruton et al., 2003).

Interestingly, the pattern for corporations appeared to be the opposite. Corporate plants seem to benefit much from *de alio* entry vs. *de novo* entry, presumably because they are better placed to reap synergies from diversification, a finding, which is consistent with earlier research (e.g., Carroll et al., 1996). The performance consequences of acquisition vs. greenfield corporate entry appeared to be negligible suggesting that strategically buying a plant is a viable alternative for corporations in this setting. A surprising finding, which counters previously reported findings (Brüderl et al., 1992; Geroski et al., 2010), is that entry size actually increased the failure rate for corporations. Note that the estimates reported in earlier work were based on very heterogeneous samples, which might have hidden vital differences between industries. Given that contemporaneous size and growth suppress the failure rate of plants, results show that corporations are better off starting small in this industry, where future prospects are often uncertain, while adjusting to optimal size when uncertainty resolves. Taken all results together, such non-monotonic interactions underscore the importance of a contingency approach to the study of governance mode effects.

By merging insights from the literature on governance modes with those from the literatures on strategic entry choices, we have reconciled the pessimistic and optimistic perspectives on cooperative longevity by mapping the conditions under which cooperatives are likely to outperform corporations. Understanding when cooperatives survive is important, as it provides insight into the dynamics of institutional diversity, which constitutes a major

research question in organization theory (Greenwood et al., 2014; Moore and Kraatz, 2011; Schneiberg et al., 2008). Interestingly, when putting our findings in a broader perspective, it appears that the cooperative failure process is governed by a different logic than the founding process. Consistent with the collective nature of cooperative entrepreneurship, prior studies have shown that the emergence of cooperatives is strongly related to ideologically-based features of local communities that fuel affectively laden "hot cognition" of would-be cooperative entrepreneurs (Boone and Özcan, 2014; Schneiberg et al., 2008). The present findings suggest that once founded, however, cooperatives are confronted with the economic reality of intense rivalry with other organizations. The following vignette nicely illustrates this. The chairman of the board of a pioneering ethanol cooperative, which eventually collapsed, admitted that after a "proud beginning" and brief period of success, market shocks and predatory behavior had taught the cooperative a very hard lesson on the realities of being a major player in the commodity manufacturing business. In an interview, he recalled:

> *"We had to become hard-nosed businessmen, realistically assessing the future of our industry and the role we played in it… forget all the warm, fuzzy buzzwords of 'farmer-owned,' 'value-added. We were in a fight for our lives." (Crooks, 2004).*

To survive in the long run, rational strategic choices that complement strong social bonds between members and deep engagement on the part of members are important.

Our results also extend the literature on governance modes that features two critical gaps. First, the literature has thus far failed to address the performance consequences of aligning various modes of governance (Moore and Kraatz, 2011; Nickerson and Silverman, 2003). Second, the literature tends to ignore heterogeneity among cooperatives (but see Gherardi and Masiero, 1987). The results of our study indicate that treating cooperatives as a homogeneous group can be misleading. Indeed, the relative survival advantage of cooperatives appears to be strongly related to their way of entry.

We have also extended the literature on strategic entry choices. This vibrant field has yet to incorporate mode of governance as an important moderator. We argued and found that some of the strategic entry choices that we identify as spurring corporate longevity actually undermine the longevity of cooperatives. Indeed, while studies generally agree that *de alio* corporate entrants tend to outlive *de novo* entrants (Bayus and Agarwal, 2007; Carroll et al., 1996; Chen et al., 2012), our results suggest that the opposite is true for cooperatives.

Limitations

Our results and discussion are tempered by three limitations. First, we do not have financial accounting data (especially short-term profitability measures) for all plants in our population. We have tried to remedy this by including capacity growth as a proxy for financial health, but direct measures such as return on assets would have improved the robustness of our models. Second, although our data is very rich and includes all plants that ever entered, it does not allow any robust investigation of complex age-dependence interactions due to the relatively low number of failure events. As a result, we could not investigate the follow up question, namely, the extent to which the relative performance of different modes of governance is conditional upon the organizational life cycle[vii]. Third, due to the commodity nature of the industry, the standardization of technology and lack of territorial differentiation, our setting is very ideal to examine the differential performance effects of various governance modes. But because our results relate to only one industry, the generalizability of our findings is open to question. Nevertheless, we are convinced that the theory we have developed is general. The coordination problem is an inherent weakness of cooperatives and it must be solved in order to assure sustainable performance in other settings as well. All the same, the details may differ. For example, we have exclusively focused on strategic entry choices for theoretical reasons, as they are critical for competitiveness in capital intensive industries. In other settings, the relative performance of cooperatives might additionally depend on community

characteristics. Specifically, ethanol is a commodity, thus for consumers, the identity of the producer (i.e., cooperative or corporation) might not matter much, as it is not even discernible. The community context, however, is likely to be more salient when consumers are aware of the connection between a product and the identity of producers. For example, this might be the case for consumer cooperatives (see Liu and Wezel, 2014).

Future directions

In modern economies, the corporate form is so widespread and taken-for-granted that it became the default "there-is-no-alternative" way of organizing. This also explains why alternative governance modes have not received much attention in mainstream organization theory. This is unfortunate, however, because time and again social actors in the periphery experiment with alternative forms that might contain the seeds of long-run institutional change (Schneiberg et al., 2008). In addition, as is also illustrated by the present findings, governance mode alignment matters with key implications for organizational performance. As a result, there is a need for more systematic, comparative institutional analysis in future research in which governance mode receives a central place (Moore and Kraatz, 2011).

Inspired by the recent revival of the cooperative form, we investigated its relative longevity finding evidence that cooperatives are more robust than corporations when member engagement is high. Although important, survival is only a baseline organizational outcome. Because performance is a multi-faceted construct, a full-blown comparative analysis of cooperatives and corporations requires unpacking governance-mode implications on multiple economic and social outcomes. This opens up many fruitful avenues for future research. For instance, it would be interesting to compare growth trajectories of cooperatives vs. corporations in the same competitive environment. Given that the sustainability of the cooperative governance mode depends on engagement and cohesion, growth might be more difficult to absorb in cooperatives compared to corporations (Cazzuffi and Moradi, 2012) with

potentially large societal implications as employment opportunities associated with alternative governance modes might differ.

Second, the capability of organizations to create innovation and change is of utmost importance not only for organizational renewal but also for societal welfare. It remains, however, an open question whether, when, and how governance mode affects the extent and effectiveness of innovation. Maybe corporations have a comparative advantage in this respect as it might be easier in "hierarchies" to reap synergies between different activities and to capture the rents of innovation than in "peer groups" such as cooperatives (Williamson, 1985). In contrast, the "robustness" of cooperatives might at the same time make them more vulnerable to the potential disruptive effects associated with innovation and change. Research that digs deeper into how cooperatives relative to corporations deal with change and innovation would therefore be very informative.

Finally, cooperatives and corporations carry different, oppositional institutional logics with associated advantages and disadvantages. Such tensions are often potent forces of the emergence of hybrid forms that try to reconcile the best of both worlds. Recent studies have made important strides into the hybridization processes among corporations (see Battilana and Matthews, 2014 for a review) and to a lesser extent, cooperatives (Ashforth and Reingen, 2014; Dobrev et al, 2006). However, we need studies that examine whether and when such hybrid forms outperform pure cooperatives and corporations. The extension of the comparative governance framework developed here to include hybrids will help us to better identify the shortcomings inherent in pure forms and shed light on when borrowing elements from alternative governance modes helps managers to realize performance benefits.

Managerial implications

There are several managerial implications of our results. While hot cognition is a key ingredient for mobilizing the environment for entrepreneurial pursuits (and especially in

nascent industries), the strategic choices made at entry should rely upon cold cognition. These choices set the organization on its path dependent evolution and configure the foundation for its governance and capabilities. We show that when these choices are not made properly they reduce the life-chances significantly net of all other adjustments managers make post-entry. In relation, our results illustrate that the founders of cooperatives and corporations face different trade-offs at entry. For instance, there is a general tendency to conceive a larger entry size as a positive attribute for start-ups. We show that in nascent, capital intensive industries, cooperatives benefit from larger entry, whereas corporations do not. The latter should enter small, and gradually build up capacity. The founders of cooperatives, on the other hand, should pull the plug for their cooperative project in the pre-organization phase if they realize the fundraising will not generate sufficient capital for entering at a large scale. This is precisely where cold cognition should trump hot cognition. Anecdotal evidence in our context informs that many cooperative organizers try to remedy this size gap by heavily leveraging the cooperative through bank loans. Our results offer a caution on this. Bank loans are not an effective substitute for internal financial engagement.

Similarly, we show that the smartest choice for founders of cooperatives is to stay focused on one industry and build their ventures from scratch. The hazard of failure for a diversifying cooperative that enters through acquisition of a failed plant is nearly twenty times greater than the smartest choice. For corporations, however, the story is different. A diversifying corporation that enters via an acquisition has the best chance of survival. In contrast, *de novo* corporate founders that build their own plants are the worst-off in terms of long-term survival. All these suggest that entrepreneurs need to carefully consider the alignment of governance with strategic choices at entry.

NOTES

[i] Hot cognition refers to affectively charged, emotional reactions, whereas cold cognition refers to detached, painstaking thought that involves rational analysis (DiMaggio, 2002).

[ii] Gherardi and Masiero (1987) called for research that investigates the strategic choices made by founders of cooperatives during the organizing period. They saw the organizing period "crucial to an understanding of the organizational set in the following years: the logic of future conduct is grounded in the solutions found to deal with the cooperative's initial organizational problems" (p. 344). Our research is the first to heed this call.

[iii] Indeed, in one cooperative in our population, farmer members agreed to deliver bushels of corn to the plant at 80 percent of the market price for 13 years. At that point, it was projected that construction loans would be paid off (Post Bulletin, 1993).

[iv] Note that the theoretical mechanisms underlying the impact of initial size are different from the effects of contemporaneous size -- that captures the instantaneous impact of potential scale economies on organizational survival --, and organizational growth, which reflects the adjustment path of firms towards their desired size and indicates the success of firms in doing so. Therefore, modeling the impact of initial size on survival requires controlling for growth and current size as we also do in the models presented in this paper (Geroski et al., 2010).

[v] Cooperatives cannot raise capital in stock markets and their equity shares are either non-transferable or severe restrictions apply to their exchange. As a result, product diversification for cooperatives typically requires deployment of retained earnings, fundraising among existing members and extending membership.

[vi] In the same interview, the director pointed that they hurried the ethanol project also because they feared that delays might cause their members to lose their excitement and eventually abandon the project. This brings out another dimension. A short organizing period can reflect

the presence of a membership base that has not been fully enthusiastic about the cooperative project and are ready to terminate their engagements, when they don't see quick results, such as the start-up of production.

[vii] Given that the average age at failure is "only" 5.5 years and the capital intensive nature of the industry, it is plausible to assume that strategic choices at entry have persistent effects over the firm's life cycle (see Geroski et al., 2010).

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Figure 1: The Number of Plant Failures in the US Bio-ethanol Industry, 1978-2015

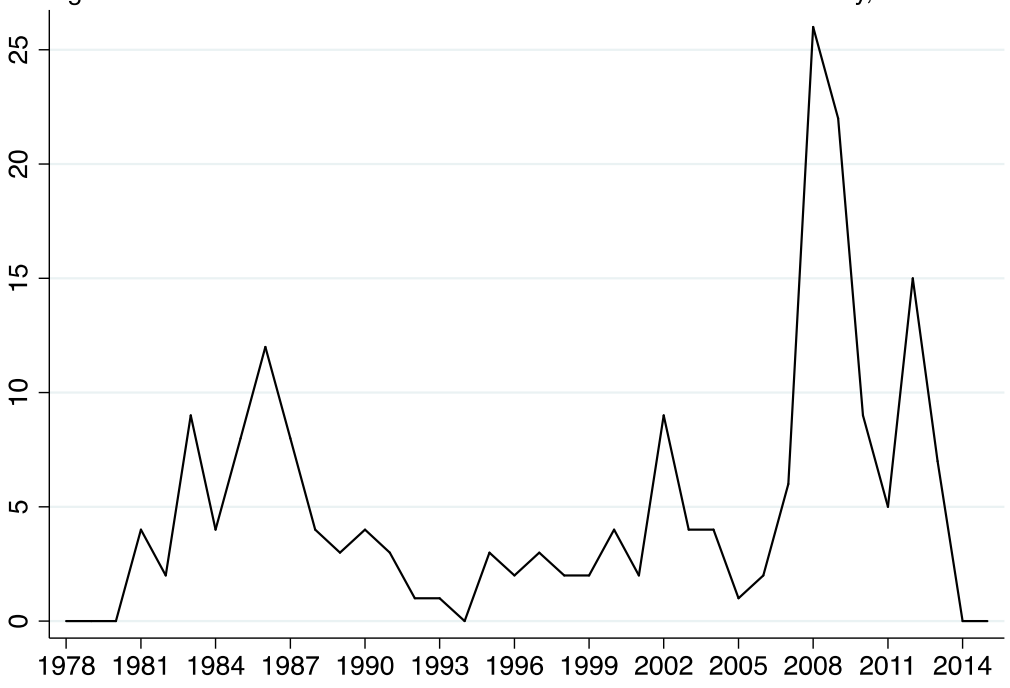

Figure 2: Size at Founding and the Hazard of Plant Failure

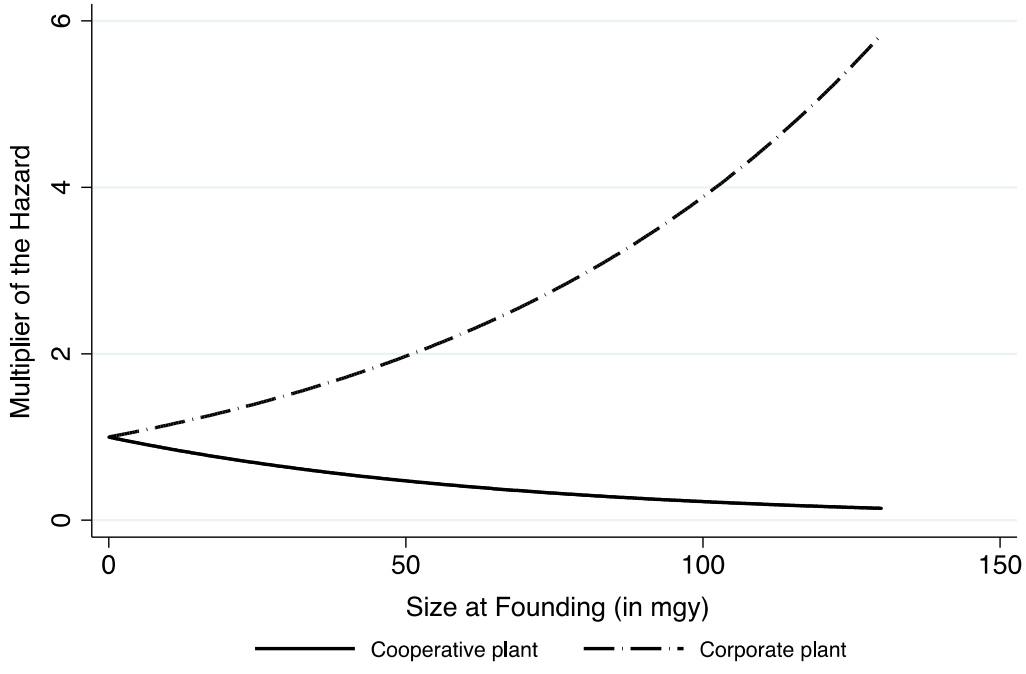

Table I: Descriptive Statistics									
	M	**SD**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1.Failure	0.01	0.07	1.00						
2.Cooperative	0.29	0.46	-0.03	1.00					
3.Founding Size	38.34	34.01	-0.02	-0.04	1.00				
4.De Novo Entry	0.66	0.48	0.02	0.28	-0.08	1.00			
5.Greenfield Entry	0.85	0.36	0.00	0.12	-0.19	0.16	1.00		
6.Local Eth. Prod. Capacity	4.63	1.84	-0.03	0.24	0.63	0.08	-0.11	1.00	
7.Ethanol Operation Margin	0.17	0.39	-0.02	0.13	0.15	0.15	-0.06	0.25	1.00
8.Corn Production	8.69	2.22	-0.03	0.24	0.39	0.10	-0.05	0.16	0.68
9.Corn Processors	0.24	0.40	-0.01	-0.19	0.00	-0.31	0.15	-0.08	-0.08
10.Average Farm Size	5.94	0.79	-0.02	0.00	-0.05	0.19	-0.07	0.03	0.07
11.Livestock	10.18	1.59	0.01	0.09	0.01	0.14	0.00	0.13	0.08
12.Coalition Member	0.79	0.41	-0.03	0.24	0.35	0.14	-0.14	0.20	0.60
13.State Taks Incentives	1.30	2.88	-0.00	0.05	-0.02	0.08	-0.04	0.00	0.01
14.Relative Plant Size	1.00	1.19	-0.02	-0.10	0.51	-0.29	0.03	0.00	0.39
15.Growth in Plant Capacity	0.04	0.03	-0.01	0.03	-0.07	-0.00	-0.00	0.01	-0.00
16.Plant Family	3.80	6.30	-0.02	-0.01	0.27	0.09	-0.03	0.06	0.32
17.Non-corn Plant	0.10	0.30	0.01	-0.13	-0.34	-0.14	0.00	-0.13	-0.46
	8	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
9.Corn Processors	-0.06	1.00							
10.Average Farm Size	0.12	-0.08	1.00						
11.Livestock	0.11	-0.02	0.19	1.00					
12.Coalition Member	0.54	-0.13	0.13	-0.03	1.00				
13.State Tax Incentives	-0.00	-0.08	0.09	0.06	-0.16	1.00			
14.Relative Plant Size	0.26	0.24	-0.08	-0.14	0.06	-0.02	1.00		
15.Growth in Plant Capacity	0.03	-0.01	0.02	-0.00	0.01	-0.03	0.03	1.00	
16.Plant Family	0.19	-0.04	-0.01	-0.04	0.20	0.13	0.11	-0.03	1.00
17.Non-corn Plant	-0.55	0.06	-0.25	-0.10	-0.37	-0.01	-0.23	-0.02	-0.13
Coefficients <-0.02 and >0.02 are significant at a 5% level									

Table II: Cox Proportional Hazard Estimates of Plant Failure						
	1	**2**	**3**	**4**	**5**	**6**
Cooperative		-1.09***	0.09	0.65	0.16	2.39***
		(0.33)	(0.46)	(0.47)	(0.63)	(0.57)
Local Eth. Prod. Capacity	0.02	-0.02	-0.03	-0.02	-0.02	-0.03
	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Ethanol Operating Margin	-0.36*	-0.41**	-0.41**	-0.40*	-0.38*	-0.39*
	(0.19)	(0.20)	(0.21)	(0.21)	(0.21)	(0.21)
Corn Production	0.03	0.01	-0.01	-0.00	0.01	-0.00
	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Corn Processors	-0.45*	-0.35	-0.33	-0.36	-0.39	-0.40
	(0.25)	(0.25)	(0.25)	(0.24)	(0.25)	(0.25)
Average Farm Size	-0.63***	-0.63***	-0.66***	-0.64***	-0.65***	-0.69***
	(0.12)	(0.11)	(0.11)	(0.11)	(0.12)	(0.12)
Livestock	0.05	0.06	0.07	0.07	0.07	0.08
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Coalition Member	-0.66**	-0.70**	-0.73**	-0.69**	-0.62**	-0.61**
	(0.28)	(0.30)	(0.30)	(0.29)	(0.29)	(0.29)
State Tax Incentives	-0.11***	-0.10***	-0.09**	-0.10**	-0.10***	-0.08**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Relative Plant Size	-0.49**	-0.62***	-0.71***	-0.60***	-0.60***	-0.65***
	(0.23)	(0.23)	(0.24)	(0.23)	(0.23)	(0.24)
Growth in Plant Capacity	-2.04**	-1.62**	-1.68**	-1.59**	-1.61**	-1.61**
	(0.79)	(0.68)	(0.68)	(0.69)	(0.67)	(0.70)
Plant Family	-0.06	-0.08	-0.09	-0.08	-0.08	-0.09
	(0.06)	(0.05)	(0.06)	(0.05)	(0.06)	(0.06)
Non-corn Plant	-0.98**	-0.82*	-0.80	-0.93**	-0.87*	-1.06**
	(0.48)	(0.48)	(0.49)	(0.46)	(0.46)	(0.46)
Founding Size		0.01	0.01**	0.01	0.01	0.01**
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
De Novo Entry		0.99***	1.06***	1.28***	0.95***	1.28***
		(0.31)	(0.32)	(0.34)	(0.30)	(0.34)
Greenfield Entry		-0.12	-0.10	-0.15	0.14	0.09
		(0.24)	(0.23)	(0.24)	(0.26)	(0.27)
CooperativeXFounding Size			-0.04**			-0.03**
			(0.02)			(0.01)
CooperativeXDe Novo Entry				-2.11***		-1.78***
				(0.60)		(0.64)
CooperativeXGreenfield Entry					-1.53**	-1.34**
					(0.64)	(0.59)
State Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of spells	34218	34218	34218	34218	34218	34218
Log-Likelihood	-923.23	-902.65	-896.13	-897.18	-899.52	-889.84

Robust standard errors calculated by clustering around plant family. * $p<0.1$ ** $p<0.05$ *** $p<0.01$; Coefficient significance tests are two-tailed

Table III: Multiplier of the Baseline Hazard Rate of Different Forms of Entry

	Multiplier based on focal estimates of Model 6 of Table II[1] Exp (2.39 Cooperative + 1.28 De Novo + 0.09 Greenfield - 1.78 CooperativeXDe Novo - 1.34 CooperativeXGreenfield)	**Exponent**	**Rank** **1 = lowest failure rate**
Corporations			
De alio - By acquisition	Exp (0)	1	***2***
De alio - Greenfield	Exp (0.09)	1.09	***3***
De novo - By acquisition	Exp (1.28)	3.60	6
De novo – Greenfield	Exp (1.28 + 0.09)	3.94	7
Cooperatives			
De alio - By acquisition	Exp (2.39)	10.91	***8***
De alio - Greenfield	Exp (2.39 – 1.34)	2.86	5
De novo - By acquisition	Exp (2.39 – 1.78)	1.84	4
De novo - Greenfield	Exp (2.39 – 1.78 – 1.34)	0.48	***1***

[1] The multiplier is calculated by inserting the appropriate values of the dummy variables (1 or 0). For instance, the multiplier of *de alio* corporations that enter by acquisition is Exp (0), the baseline, because then Cooperative, De Novo Entry and Greenfield Entry all equal zero.