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PARTNERS IN CRIME: THE EFFECTS OF DIVERSITY ON THE LONGEVITY OF CARTELS

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Despite the importance of organizational misconduct, still not much is known about coordinated misconduct between firms. In this study, we seek a better understanding of how the profile of the partners involved in cartels affects the longevity of their joint misconduct activities. Drawing upon diversity theory, we leverage a distinction between three types of diversity—variety of age-based experience, separation in uncertainty avoidance, and power disparity—in collective organizational misconduct between firms, and study their respective influence on the longevity of cartels. Our empirical analysis gives support to our main arguments: the longevity of cartels tends to be increased by the level of variety of age-based experience and power disparity between partners but reduced by their level of separation in uncertainty avoidance. Implications for the literature on organizational misconduct are discussed.

> "If you reveal your secrets to the wind, you should not blame the wind for revealing them to the trees."
>
> Kahlil Gibran (1883–1931)

The last two decades have witnessed a substantial increase in "cartels" (Connor, 2009), or groups of firms that decide to associate to achieve certain goals. However, contrary to lawful partnerships, these associations of independent firms in the same industry strive to reduce competition by agreeing on areas such as production or pricing. Cartels are illegal in the eyes of antitrust authorities (Bertrand, Lumineau, & Fedorova, 2014; Martin, 2010) and thereby represent "organizational misconduct." Defined as "behavior in or by an organization that a social-control agent judges to transgress a line separating right from wrong" (Greve, Palmer, & Pozner, 2010: 56), organizational misconduct has attracted the attention of management scholars for decades. Researchers of organizational misconduct have studied top management fraud or white-collar crimes by focusing on issues such as insider trading or financial statement fraud (e.g., Moberg, 1997; Zahra, Priem, & Rasheed, 2005). However, the organizational misconduct literature has mainly focused on individuals' misconduct or misconduct *within* firms without directly considering the collective misconduct of firms (refer to Greve et al., 2010, and Palmer, 2012, for recent reviews). We do not know much regarding the collective dimension of organizational misconduct or, in particular, the organization of cartels. This relative lack of attention by organizational misconduct scholars contrasts with the wealth of anecdotal and managerial evidence, suggesting the economic and social importance of cartels for many stakeholders (Morgan, 2009). Instead of competing with one another, cartel members rely on each other's agreed course of action. Consequently, these underhanded agreements reduce the member firms' incentives to provide new or better products and services at competitive prices. Their clients (other businesses or final consumers) ultimately pay more for lower quality (Martin, 2010). Final consumers observe a reduction in their welfare, and businesses suffer from more expensive inputs. By artificially decreasing the natural level of competition in the market, cartels decrease the overall competitiveness

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not only of the cartelized industry but also of other industries. The damage to customers and other businesses can thus be significant, particularly when cartels are able to last for years (Utton, 2011).[1]

Prior research has shown the value of investigating the profile of the actors involved in organizational misconduct, such as through their demographic characteristics (Cox, Lobel, & McLeod, 1991; Tsui & O'Reilly, 1989). Cartels as collective misconduct, however, go beyond individual characteristics, because they imply the sustained coordination of *multiple* parties to achieve a specific goal (Levenstein & Suslow, 2006; Martin, 2010). Examining the average characteristics of the group may show what the group is as a whole, but it does not capture how its members are likely to interact and work together. We suggest, instead, that the study of the cartels' composition and the diversity of their members is crucial to the understanding of how cartel members are likely to conduct their joint activities in secret. Because firms involved in cartels risk being caught, they must *collectively* conceal their conspiracy from antitrust authorities. The composition of members is, therefore, critical to observe secrecy and guarantee concealment over time. As the poet Kahlil Gibran suggested in our introductory quote, it is important to have the right partners with whom to share secrets. The importance of firms' identities has motivated us to examine the diversity of these "partners in crime" involved in cartels. Whereas the difference between actors is a non-issue when misconduct involves one actor, diversity is at the heart of the organization of cartels.

Drawing upon the research on diversity theories (Bunderson & Sutcliffe, 2002; Harrison & Klein, 2007), we study how different facets of diversity between firms that participate in a cartel influence its longevity. We believe that solving this problem may provide us with a better understanding of the mechanisms that are at play in maintaining the secrecy between cartels' members. Indeed, cartels seek both to maximize profit and to maintain secrecy, as observed by Baker and Faulkner (1993: 854) who stated that, in a cartel, "efficiency is important, but the need to maintain secrecy is even more important." The issue of longevity has substantial implications for a large number of actors ranging from competitors to consumers and shareholders. In fact, the literature on corporate misconduct (Punch, 1996; Scott, 2013; Spencer & Sims, 1995; Vaughan, 1985) has shown that not only are misconduct activities increasingly detrimental over time, but they also tend to reach a broader range of stakeholders when they have time to develop. Given the progressive amplification of their negative effects when misconduct activities last longer (Vaughan, 1999), we tackle the issue of the longevity of cartels.

We tested our hypotheses with a sample of firms involved in cartels in the European Union. Our empirical analysis provided support to our main arguments: the longevity of an organizational misconduct activity is positively related to the variety of age-based experience and power disparity between the involved firms, and negatively related to their level of separation in uncertainty avoidance.

With its interest in cartels, our study departs from the prior research on diversity in two major ways. First, we study diversity effects in the *context of misconduct activities*. Illegal partnerships such as cartels distinguish themselves by the concealment issue. Firms involved in cartels must not only combine the partners' contributions, they must also maintain secrecy when working together across organizational boundaries. Each participating firm faces the risk that another firm may not respect the collective secret and could break the agreement. Internal conflicts between firms may also enhance the risk of being detected. In fact, cartels must remain secret from the antitrust authorities and, at the same time, cannot rely on the state to adjudicate internal conflicts among wrongdoers (Eilstrup-Sangiovanni & Jones, 2008). Given this central element of secrecy, certain mechanisms to explain misconduct activities in cartels differ from those of legitimate coordination.

Second, we are interested in diversity at the *interfirm level*. Although research on organizational misconduct has primarily focused on misconduct by individuals or by organizations (Vadera & Pratt, 2013; Zahra et al., 2005), collective misconduct in

[1] For example, in 2013, the European Commission fined five car parts suppliers a total of more than €140 million (U.S. $190 million) for operating cartels (European Commission, 2013). The suppliers—Yazaki, Furukawa, S-Y Systems Technologies, and Leoni—have been heavily fined for coordinating prices and allocating supplies of wire harnesses to the manufacturers of Toyota, Honda, Nissan, and Renault. These cartels took place between 2000 and 2009. A few years earlier, the Commission imposed fines totaling €750 million (U.S. $1.03 billion) on 20 European and Japanese companies—including, in particular, the German company Siemens AG and the Japanese firms Mitsubishi Electric and Toshiba—for their participation in a cartel in the market for gas-insulated switchgears between 1988 and 2004 (Court of Justice of the European Commission, 2013). The cartel had operated for more than 16 years, with agreements between the European companies not to sell in Japan and vice versa.

cartels has received very limited attention in the management literature (Greve et al., 2010). However, this type of misconduct strongly differs from individual or intraorganizational misconduct because it requires coordinated action between several distinct organizations. Cartels are second-order organizations that lack the feature of a unitary corporate actor (Borys & Jemison, 1989). Thus, they differ from firm organizations in that the governed actors are not individuals but firms. Because the partner firms join voluntarily and agree to relinquish certain freedoms, the interfirm relationship introduces an additional organizational domain. The first-order organizations of the partner firms, which are composed of individuals (i.e., the firms' employees), are complemented by a second-order organization, the cartel's governance system, which includes parts of each of the members (Albers, 2010). Given the absence of a single, top-level, central authority that can align interests and resolve conflicts between the partners through its formal decision power, which is the capstone of hierarchies, cartels are mainly self-governed arrangements; in addition, bargaining plays a major role in their decision-making processes (Levenstein & Suslow, 2006). This aspect can be critical in cartels because the agreement made between the firms is not enforceable in court. Whereas traditional hierarchies are based on top-down management and authoritative rules to govern relations, cartels lack a legitimate organizational authority, and, thus, are self-enforcing governance structures.

Therefore, we have advanced the research on organizational misconduct by analyzing the role of diversity to explain the longevity of cartels.

THEORETICAL BACKGROUND

Collective Organizational Misconduct

Research on organizational misconduct has a long history (Clinard & Yeager, 1980; Staw & Szwajkowski, 1975). Most works have focused on misconduct by single individuals (Zahra et al., 2005; Zhang, Bartol, Smith, Pfarrer, & Khanin, 2008) or organizations (Mishina, Dykes, Block, & Pollock, 2010; Pinto, Leana, & Pil, 2008). Overall, the literature on organizational misconduct has investigated two main issues (refer to Greve et al., 2010; Palmer, 2012; and Vaughan, 1999, for reviews). On one hand, scholars have examined the actors engaged in misconduct and have identified a number of individual and contextual characteristics that prompt misconduct (refer to Kish-Gephart, Harrison, & Treviño, 2010, for a recent meta-analysis and Tenbrunsel & Smith-Crowe, 2008, for a qualitative review). On the other hand, another stream of research has focused on the existence of a social vector or spread of misconduct throughout an organization (e.g., Bizjak, Lemmon, & Whitby, 2009; Palmer & Yenkey, 2016; Pierce & Snyder, 2008). This stream of research has focused on how misconduct perpetrated by one or a few individuals within a firm can become an organizational phenomenon (Ashforth & Anand, 2003; Brief, Buttram, & Dukerich, 2001; Shadnam & Lawrence, 2011). These scholars emphasized the role of top managers in fostering a culture that endorses misconduct and the use of formal authority to direct subordinates to engage in misconduct (Brown, Treviño, & Harrison, 2005; Jordan, Brown, & Treviño, 2013; Schaubroeck et al., 2012). Although these works have considered the collective dimension of organizational misconduct, they highlighted the proliferation of misconduct among individuals *within* a firm and not collective misconduct at the interfirm level.[2]

In their recent review of the literature, Greve et al. (2010) confirmed this relative lack of research on collective misconduct of firms. Three studies are highlighted as exceptions. One is the study of the structure of price-fixing networks in the heavy electrical equipment industry by Baker and Faulkner (1993), in which the authors noted how the structure of the cartel network is driven by the need to maximize concealment contingent on the information-processing needs imposed by attributes of a product and its market. Another qualitative study by Genesove and Mullin (2001) analyzed the Sugar Institute's role as a mechanism for governance and a forum for communication among the 14 firms involved in the sugar-refining cartel that existed in the United States between 1927 and 1936. Finally, Faulkner, Cheney, Fisher, and Baker (2003) studied the steam turbine conspiracy of 1954–1959 in the electrical industry. They investigated the social role played by committee meetings in the effectiveness of cartel price-fixing. Although each study repeatedly referred to the different types of actors, none of these works has analyzed the diversity of firms as a central element in the organization of cartels. In addition, these three studies focused on specific case studies and so may lack external validity.

Our study of cartels departs from prior research in misconduct in several respects. An important feature

[2] We also note a large stream of research in the industrial organization arena regarding cartels. However, this literature has not directly studied firms' diversity in cartels (see Levenstein & Suslow, 2006, and Martin, 2010, for reviews).

of the study of cartels is that participating firms *coordinate* their actions to organize misconduct activities. For example, in contrast to Bennett, Pierce, Snyder, and Toffel's (2013) study of vehicle emission tests in which increased competition was found to motivate firms to provide an illegal form of quality to avoid losing business, firms in cartels do not simply react to environmental forces. Instead, they willingly deploy coordinated efforts to organize secrecy. Failures in coordination among members may actually increase the risk of being detected. Misconduct in cartels also distinguishes itself when compared with misconduct by a single individual or an organization. In comparison with misconduct by single actors, the analysis of cartels raises the question of the *collective* dimension of misconduct. In situations of misconduct by single actors, the wrongdoer (a firm or an individual) has sole responsibility for the misconduct. In contrast, a group of firms must mutually observe secrecy when developing their collective action. This means that each participating firm faces the risk that another firm may not respect the collective secret and may break the agreement. Furthermore, within firms, newcomers experience uniform socialization, employees have traditionally lengthy tenures and significant time commitments, and leaders have formal authority, including the control of incentives and penalties. As noted by prior literature (Brief et al., 2001; Palmer, 2008), these formal rules are central to understanding the development of organizational misconduct among individuals within a firm. However, such organizational and hierarchical structures do not pre-exist between firms. Before initiating relationships, firms are not linked by formal authority relations, rules of enforcement, or the control of rewards (Greve et al., 2010). Although cartels entail extensive social interactions (Palmer, 2012), the *absence of formal structures* between firms is a unique challenge for managing misconduct at the interfirm level. Because cartels represent deviance from the law and/or societal values (Greve et al., 2010), the members' identities and their ability to conduct their joint activities in secret are then critical to maintain the secret. For this reason, we focus on the role of firms' diversity in cartels in this study.

Organizational Diversity

A large stream of research has shown the importance of understanding the diversity of partners involved in collective action. However, until recently, diversity has largely had a taken-for-granted quality in the organization literature and has seldom been explicitly defined (Bunderson & Sutcliffe, 2002). Although most works on diversity tie it to differences, they rarely substantiate the nature of those differences. In contrast, Harrison and Klein (2007) noted that an overall study of diversity masks substantive distinctions, and, based on an extensive review of the literature, identified three main types of diversity in organizations. First, *variety* fits Lieberson's (1969) traditional definition, because it captures differences in types or categories primarily of information, knowledge, or experience among unit members on a categorical variable. Second, *separation* refers to differences or disagreements on attitudes or opinions among unit members. These are captured through horizontal distance along a single continuum that represents dissimilarity in a particular attitude or value (e.g., disagreements along ideological lines among political parties). Finally, *disparity* refers to the differences in the concentration of valued social assets or resources (such as differences in the possession of pay or power) among unit members, and is studied as dispersion along a hierarchical continuum.

Findings regarding the respective effects of variety, separation, and disparity have started to converge in recent meta-analyses (Horwitz & Horwitz, 2007; Joshi & Roh, 2009). However, this literature has overwhelmingly focused on team diversity (refer to, e.g., Carpenter, Geletkanycz, & Sanders, 2004, and Homberg & Bui, 2013, for reviews on top management team composition) and is not related to misconduct issues. To our knowledge, only the theoretical study by Daboub, Rasheed, Priem, and Gray (1995) has attempted to combine the issue of diversity with misconduct activities. Their analysis focused on a top management team's characteristics as a moderator between contextual factors and the likelihood of misconduct at the organizational level. We thus combined the literature on organizational misconduct and diversity to arrive at a better understanding of how different types of diversity between the firms engaged in a cartel are likely to influence its longevity.

However, our intent was not to capture all aspects of variety, separation, and disparity in this study. In accordance with both diversity scholars' (Harrison & Klein, 2007; Jackson, Joshi, & Erhardt, 2003; Martins, Milliken, Wiesenfeld, & Salgado, 2003) and misconduct scholars' (Cooper, Dacin, & Palmer, 2013; Gabbioneta, Greenwood, Mazzola, & Minoja, 2013) recommendations, we acknowledge the importance of contextual considerations. Hence, we focus on different dimensions of diversity that particularly

pertain to the need for information exchange, coordination, and control in the longevity of cartels; specifically, we focus on the variety of age-based experience, separation in uncertainty avoidance, and power disparity.

A close reading of the few case studies on cartels reveals the role of the different sets of knowledge and information shared between partners. For example, Levenstein and Suslow (2006: 67) asserted:

> ... cartels must identify a collusive equilibrium, coordinate on it, and then continuously update as demand and costs fluctuate. Cartels develop these organizations over time as a result of organizational learning. When cartels "learn," what are they learning? They learn how to monitor output and prices of individual cartel members.

They also learn how not to be detected by antitrust authorities. Thus, the types of information and knowledge provided and exchanged by the members appear to be a key factor in the organization of cartels (Dick, 1996; Suslow, 2005). In this paper, we study the different types of experience associated with the age of an organization, and focus on the variety of age-based experience between firms. This is the recombination property of diverse knowledge pools that is likely to benefit the group. We suggest, below, that it is by combining different sets of experiences that the cartel increases its ability to conduct misconduct activities over a long period of time.

Another insight suggested by the prior literature is the importance of cultural cohesion to the stability of interfirm misconduct activities. In cartels, because frequent negotiations are necessary and information must be exchanged quickly and accurately to organize their secret activities (Baker & Faulkner, 1993; Genesove & Mullin, 2001), similarity between firms is likely to make coordination easier. For instance, in their analysis of a British shipping cartel, Podolny and Scott Morton (1999) highlighted the role of cultural ties between the cartel's members. Similarly, van Driel (2000) showed the importance of common bonds and shared culture in the cartel stability for four European transportation industries. Additionally, a large body of literature supports the predominant role of uncertainty avoidance in international cooperation among the cultural factors (Barkema & Vermeulen, 1997; Doh, Clark, & Maggitti, 2010; Hofstede, 1989). For instance, Shenkar (2001: 525) noted that:

> ... some cultural gaps are less disruptive than others, and that differences in uncertainty avoidance are potentially the most problematic for international cooperation due to their correlates in terms of differential tolerances towards risk, formalization, and the like.

We thus analyzed the level of separation in uncertainty avoidance between the firms involved in a cartel.

Prior literature has also suggested that power issues are critical factors in collective misconduct activities. For instance, Faulkner et al. (2003) noted the role of the centralization of cartel authority, whereas Levenstein and Suslow (2006) found that successful cartels often develop a hierarchy between their members. Therefore, we study the power disparity between firms (Gulati & Sytch, 2007; Lumineau & Malhotra, 2011).

HYPOTHESIS DEVELOPMENT

Variety of Age-Based Experience

The benefits of combining different types of experience have been noted in the literature on alliances and interorganizational relationships. Because knowledge creation and learning often result from the combination of experience and information (Kogut & Zander, 1992; Zahra, Ireland, & Hitt, 2000), firms that acquire complementary resources from other partners can create more value by using distinct assets that are difficult to accumulate solely from internal sources (Lavie, 2006; Shenkar & Li, 1999). The transfer of knowledge between firms creates positive outcomes when their experience is complementary; however, if their knowledge is redundant, the knowledge transfer may be meaningless (Dussauge, Garrette, & Mitchell, 2000; Rosenkopf & Almeida, 2003).

We extended this logic to suggest that the variety of age-based experience between firms may support the longevity of their misconduct activities. Our approach of variety of experience between firms is, therefore, time based rather than task based. In fact, cartels work in narrow industry markets in which time shapes distinct experiences, and they typically have high information-processing requirements. Suslow (2005) described the complexity of establishing price-fixing policies and rules regarding production quotas and penalties to organize and manage misconduct among firms. To be able to remain concealed over time, hidden organizations must identify and circumvent rapidly shifting countermeasures, avoid past mistakes, and recover from missteps (Eilstrup-Sangiovanni & Jones, 2008). Cartels also distinguish themselves by the need to develop inventive solutions to circumvent existing rules and outmaneuver antitrust authorities. Examples abound

in the misconduct literature regarding the importance of the ingenuity of partners operating underground and doing their best to endure unnoticed (Abadinsky, 2013; Punch, 1996; Scott, 2013). For instance, firms involved in the switchgear conspiracy crafted a "phases-of-the-moon" pricing formula, which included a schedule of numbers that established the bidding order of the various switchgear manufacturers. This "effective scheme produced a pattern of prices that baffled Justice Department investigators; the code sheets could not be deciphered, even with the help of a professional cryptographer" (Baker & Faulkner, 1993: 839). This imaginative mechanism allowed the firms to outsmart authorities and maintain their secret activities for more than a decade (Geis, 2006). Thus, the availability of various categories of informational resources and experiences from different firms can be particularly valuable in the context of cartels. Indeed, research has suggested that access to information and knowledge is one of the major challenges in the organization of misconduct (Genesove & Mullin, 2001; Levenstein, 1996).

Both the ecology and learning theories have largely discussed the different types of experience associated with the age of an organization. The difference between young firms and mature firms is an important driver of access to knowledge and information (Cooper et al., 1994; Eisenhardt & Schoonhoven, 1996; Kotha et al., 2011). Because young firms typically face a "liability of newness" (Stinchcombe, 1965), they often lack knowledge regarding what they can or should do (Jovanovic, 1982; Lippman & Rumelt, 1982). At the same time, recent research has suggested the existence of several advantages specific to young firms (Choi & Shepherd, 2005; Nagy, Blair, & Lohrke, 2014). For example, younger firms are likely to be more flexible than mature firms because their structures, routines, processes, and technological competencies are not constrained by past inertial pressures (Sørensen & Stuart, 2000; Tushman & Anderson, 1986). Younger firms also have a higher capacity to take in new knowledge (Autio, Sapienza, & Almeida, 2000), and this organizational flexibility may be another important asset of newness (Nagy et al., 2014). In the same way, maturity can be both positive and negative. Although mature firms may have the advantage of more experience, established external relationships, or the development of more technological competencies (Thornhill, 2006; Tushman & Anderson, 1986), a large stream of literature has discussed their structural inertia (Hannan & Freeman, 1984; Ranger-Moore, 1997) and the liability of senescence (Barron, West, & Hannan, 1994). Older firms often become more rigid or sluggish, feature bureaucratic structures, and develop a "competency trap" whereby past successes and areas of expertise create inertial pressures that prevent them from exploring new ideas (Sørensen & Stuart, 2000; Staw, 1981).

Thus, young firms have access to information that mature firms cannot easily obtain, and vice versa. Younger firms provide flexibility and creativity to the group, whereas more mature firms carry distinct knowledge because of their well-embedded routines derived from prior business experience (Kotha et al., 2011; Sørensen & Stuart, 2000). The variety between young versus mature firms enriches the supply of ideas and fosters a greater awareness in sensing problems (Eisenhardt & Schoonhoven, 1996; Kotha, Zheng, & George, 2011), thereby increasing collective vigilance. Mature firms have the experience of proven methods, whereas younger firms can provide complementary resources to organize the concealment of the cartel and achieve operational efficiency by providing cutting-edge thinking and challenging existing methods (Sørensen & Stuart, 2000; Zhou, Barnes, & Lu, 2010). This variety of age-based experience between different categories of firms supports a broad range of perspectives, skills, and insights that can enhance problem-solving capabilities (Cooper, Gimeno-Gascon, & Woo, 1994; Kim, Lu, & Rhee, 2012), such as how to safely maintain their secret when coordinating operations between firms. Our arguments focus here on the role of cognitive and informational variety with all other things being equal. We suggest that a variety of age-based experience helps firms become more aware in sensing problems, increases their collective vigilance, and thereby increases their ability to conduct their misconduct activities over a long period.

Hypothesis 1. A cartel's longevity is positively related to the variety of age-based experience of its members.

Separation in Uncertainty Avoidance

There is extensive evidence that group members tend to categorize other group members into subgroups (Hogg & Terry, 2000; Tajfel, 1981), which can form the basis for an in-group–out-group distinction. As a result of social categorization, out-group members are often attributed negative characteristics and intentions (van Knippenberg, 2003), which may generate or reinforce feelings of suspicion. Conversely, shared values, norms, and patterns of behavior facilitate

the creation of a shared identity and the emergence of trust, while simultaneously limiting the potential for conflict in a relationship (Brewer & Brown, 1998). Common cultural values support a harmony of interests that reduces communication problems (Casson, 1991). Analogous processes have been reported in interorganizational relationships. Similar patterns of communication and behaviors between firms make coordination easier and facilitate mutual understanding and integration (Malhotra & Lumineau, 2011; Park & Ungson, 1997). As value differences between firms impede communication and increase coordination difficulty (Björkman, Stahl, & Vaara, 2007; Parkhe, 1991), cultural separation has a strong negative effect on the survival of their collaboration (Barkema & Vermeulen, 1997; Hennart & Zeng, 2002). In particular, separation in uncertainty avoidance is critical in explaining firms' behavior in our context because uncertainty and risk are key intrinsic factors of cartels. Differences in uncertainty avoidance reflect needs concerning security (Hofstede, 1989) and imply important differences in how partners perceive and respond to opportunities and threats in their environment (Barkema & Vermeulen, 1997; Doh et al., 2010). In contrast to classical interfirm relationships, cartels are per se illegal. Therefore, cartel members face the permanent risk of being caught and severely sanctioned.

Cartels rely on the member firms' ability to coordinate their actions and their agreement to collectively conceal their activities over time (Levenstein & Suslow, 2011; Palmer, 2008). A group of firms with a high level of value incongruence is likely to experience integration difficulties and a low level of cohesion and identification (Björkman et al., 2007; Malik & Zhao, 2013). Separation in uncertainty avoidance is likely to trigger conflicts between firms and lead to unsatisfactory compromises. Not only do conflicts have deleterious effects on group functioning (Hennart & Zeng, 2002; Park & Ungson, 1997) but such conflicts between firms may also damage group cohesion and stability, and potentially compromise the existence of the hidden organization. For instance, a lack of commitment and identification between partners increases the risk that a member will leave the group or betray the collective secret. The development of collective actions between firms with different frames of reference may also intensify the risks of opportunistic behaviors (Casson, 1991; Kogut & Singh, 1988). In contrast, although a social comparison is particularly prevalent in situations in which there is uncertainty regarding how to act, perceived cultural similarity regarding how to tackle uncertainty can support socialization and provide satisfactory answers to complex decision-making problems related to concealed activities (Palmer, 2008). Thus, a low level of separation in uncertainty avoidance may facilitate the organization and survival of collective wrongdoing of firms. Hence, we propose the next hypothesis:

Hypothesis 2. A cartel's longevity is negatively related to the separation in uncertainty avoidance of its members.

Power Disparity

In addition to variety of experience and separation in uncertainty avoidance, power disparity is another important type of diversity in cartels. In situations of *low power disparity*, firms are essentially equal. Cartels are then characterized by a lack of centralized control and authoritative rules. As suggested by Gould (2003), conflict is more likely to occur in a situation of symmetrical relationships, among social equals, than in hierarchical ones, wherein the difference in social ranks between the parties is previously established. In fact, internal competition and tensions often occur when firms vie for leadership and attempt to achieve superiority over others. Whereas single firms are traditionally based on top-down management, which resolves conflicts through the firm's formal decision power, interfirm relationships lack an internal authority to control the group (Albers, Wohlgezogen, & Zajac, 2016; Cao & Lumineau, 2015). Therefore, they are self-enforcing governance structures, or rely on external enforcement mechanisms. Situations of low disparity are particularly problematic in cartels. Contrary to lawful partnerships, they must hide their behavior from antitrust authorities and cannot rely on such external mechanisms to adjudicate internal conflicts among wrongdoers (Eilstrup-Sangiovanni & Jones, 2008). Because of this lack of centralized control and authoritative rules to govern relations, cartels are particularly susceptible to internal strife and contention when there is low disparity between firms. In fact, the absence of a hierarchy may lead near-equal members to compete with each other to decide the goals and orientations of the collective conspiracy. Challengers are also more willing to assert themselves when leadership is weak (Eilstrup-Sangiovanni & Jones, 2008). Disputes and head-on rivalries between potential leading firms may be particularly disruptive and difficult to settle because there is no one above them to help in resolving their

differences. This source of instability may destabilize the cartel. When such forces take hold, firms may deploy tactics aimed at winning the dispute, rather than engage in an objective debate to distill the best task solutions for the group as a whole (Groysberg, Polzer, & Elfenbein, 2011; Kilduff, Elfenbein, & Staw, 2010). Thus, low disparity may become a breeding ground for dysfunctional, unstable, and counterproductive relationships between firms attempting to organize their efforts in secret. As a result, misconduct activities with low disparity among their members are likely to face internal control challenges, jeopardizing the longevity of the concealed organization. This logic, therefore, departs from most other works in the diversity literature. Although lower disparity is ordinarily better, because members can voice their concerns and speak freely and honestly to influence organizational actions (e.g., Bowen & Blackmon, 2003; Lawler, 1992) and because members tend to have greater motivational inputs to put their efforts toward achieving the goal, we suggest, instead, that cartels with high power disparity tend to survive longer.

Power disparity is at a *high level* when one firm alone outranks all the others. This firm may then serve as a leader for the group (Gaski, 1984; Hagedoorn, 1995). This leading firm can act as a gatekeeper and regulator of resource flows and use its power to provide social order and guide the other firms toward common goals (Casciaro & Piskorski, 2005; Frazier & Rody, 1991). Because the behavior and decisions made by the leader are visible and easily observed by the other firms, the leader can serve as a focal point around which followers can organize their collective actions (Belaya & Hanf, 2013; Benton & Maloni, 2005). Furthermore, as mentioned above, cartels involve agreements that are not enforceable in court (Palmer, 2008). Because these agreements do not legally bind the partners, the presence of a leading firm may be critical for enforcing the agreement, limiting opportunistic behavior, and deterring partners from cheating. The leading firm has the power to draw the line between acceptable and unacceptable behaviors within the group and may thus dampen instability from emerging factions. The leading firm also exerts influence on its partners and decides most issues by fiat, reducing the saliency of differences between firms that could disrupt the decision process (Dwyer & Walker, 1981; Schul & Babakus, 1988; Zhao, Huo, Flynn, & Yeung, 2008) and the existence of the concealed activities. In summary, given the superior rank of a leader, following firms tend to conform and defer to the leader's actions. Because the presence of one leading firm is likely to support the organization of wrongdoing, cartels with high power disparity tend to last relatively longer than cartels with low power disparity among their members. We thus suggest the following:

Hypothesis 3. A cartel's longevity is positively related to the power disparity of its members.

METHOD

Empirical Setting and Data Collection

In this study, our goal is to examine how different facets of diversity between firms that participate in a cartel influence the cartel's longevity. Therefore, we first collected information on cartels that were prosecuted between 2001 and 2011 by the Directorate General for Competition within the European Commission, which is responsible for enforcing the European antitrust regime. Antitrust authorities use a number of methods to detect cartels. These methods can be divided into reactive versus proactive methods (International Competition Network, 2010; Organization for Economic Cooperation and Development, 2013).[3] We focused on this ten-year period because of the availability of the data. This period is characterized by an increased number of cartels investigated by the Directorate General for Competition as a result of an improvement in the anticartel enforcement policy. Article 101 of the Treaty on the Functioning of the European Union (ex-Article 81 of the Amsterdam Treaty) prohibits agreements between two or more independent firms that restrict

[3] First, in reactive methods, the antitrust violation is reported to antitrust authorities by stakeholders, such as disgruntled consumers, customers, competitors, or employees. For instance, complaints from whistleblowers or third parties can provide authorities with essential information on operational cartels. Second, antitrust authorities proactively seek out cartels and initiate independent inquiry against suspicious firms (Organization for Economic Cooperation and Development, 2013). Authorities can regularly monitor industry activities to discover any evidence of cartel activity and collect day-to-day business information via media reports or the trade press (International Competition Network, 2010). Antitrust authorities can also conduct economic analysis to screen markets and uncover suspicious behaviors (Harrington, 2008). Furthermore, when sufficient preliminary evidence has been gathered, antitrust authorities can launch a full-scale investigation to obtain hard evidence on cartels.

competition (European Commission, 2011). For these cartels, the public and non-confidential version of the decision was released and reported in the *Official Journal of the European Commission* (refer to http://eur-lex.europa.eu/JOIndex.do).[4] Such archival data offer the advantage of limiting many problems of retrospective biases or lapses of memory that are often associated with perceptual measures from a survey instrument (Golden, 1992). In addition, for each decision reported by the European Commission, the products and markets involved in each cartel are described in detail. To match the cartel and the industry and to capture the competition at the most detailed level possible, we used the finest-grained industry classification available: the NAICS (North American Industry Classification System) with a six-digit classification. In fact, cartels operated in narrow segments of industries, such as the plastic bag, gypsum products, or textile machinery industries.

We then used both the Amadeus and Orbis databases (from Bureau Van Dijk) to collect data on the firms involved in these cartels. The Amadeus and Orbis databases provide comparable economic and financial information on the balance sheets and the profit-and-loss accounts for public and private firms for European and non-European firms beginning in 1997.

The sample that we studied consisted of 41 cartels. These cartels existed in the primary, manufacturing, transportation, and retailing industries. Manufacturing industries (such as chemical or machinery manufacturing), however, contained the majority of cartels (78.6%). In total, 463 firms were involved in these cartels. The bulk of participating firms (84.4%) were located in 23 European countries, with a dominant share in Germany (20.3%), the Netherlands (13.7%), the United Kingdom (12.7%), and France (11.2%). The remainder of the firms that participated in these cartels were located outside Europe, primarily in Japan and the United States (35.6% and 38.4% of non-European firms, respectively).

Methods and Variables

Dependent variable and econometric method. We are interested in the longevity, or survival, of cartels. As noted by Suarez and Utterback (1995: 415):

> . . . survival or long-term viability has long been recognized as a basic goal for a business organization (Barnard, 1938; Dertouzos, Lester, & Solow, 1989). Survival is, at least in the long term, a prerequisite for success in other terms, such as market share and profitability.

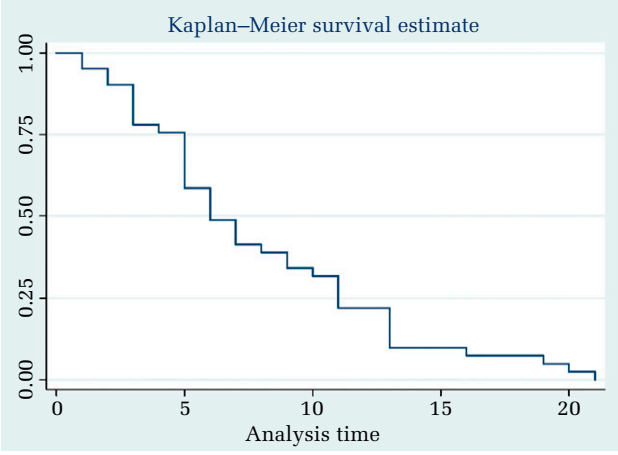
In fact, organizational longevity directly measures organizational failure (Burgelman & Grove, 2007) and is a necessary condition for positive profits (Cottrell & Nault, 2004). Prior studies have shown that longevity correlates with the way managers perceive the success of a business (Geringer & Hebert, 1991) and with financial performance (Evans, 1987; Mitchell, Shaver, & Yeung, 1994; Pan & Chi, 1999). In turn, the survival of alliances and interfirm relationships has been a central topic of research among organizational scholars (e.g., Hennart & Zeng, 2002; Inkpen & Beamish, 1997; Park & Russo, 1996; Xia, 2011). In the context of cartels, the survival of the partnership is all the more critical because cartels are illegal. Contrary to a classical alliance whose failure usually has a limited effect on partners, the discovery of the cartel by antitrust authorities will have very detrimental consequences, ranging from severely harming the firms' reputation among their various stakeholders to jeopardizing their ability to conduct business. In fact, although cartels are formed to increase members' profits, the main priority of cartel members is to first maintain secrecy (Baker & Faulkner, 1993).

To examine the effects of different facets of diversity on the longevity of cartels, we adopted a survival modeling approach (Greene, 2011). In our study, the longevity of the cartel was measured by the period between the cartel's formation date and its termination date (sourced from the *Official Journal of the European Commission*). This period was split into (multiple) annual spells, resulting in 195 cartel-year observations. The average longevity of cartels was 7.95 years (for a variance of 26.44). Figure 1 displays the graph of the Kaplan–Meier survival (non-parametric) estimates; it shows the probability that a cartel existed after a year *t*. The probability of a cartel surviving 5, 10, and 15 years is 60%, 35%, and 12%, respectively.

In our survival model, the dependent variable was the hazard rate of cartel termination (Hosmer & Lemeshow, 1999; Kleinbaum & Klein, 1996). The hazard rate combines both the likelihood of and the timing of a cartel termination. We conducted a Cox

[4] Some data collected for this study were also used to investigate firms' reasons for taking part in cartels. In Bertrand et al. (2014), we built on the rational choice perspective in organizational misconduct to examine the factors influencing the propensity of firms to participate, or not, in a cartel.

FIGURE 1
Kaplan–Meier Graph of Survival Likelihood



proportional hazard model, the main advantage of which is that it is a semi-parametric model that does not require the specification of a particular shape of the hazard function (Blossfeld & Rohwer, 1995; Yamaguchi, 1991). The underlying distribution of the hazard rates is left unspecified; that is, it is more general in nature. The Cox model is, therefore, viewed as a conservative model that helps to avoid misspecification. It also allows for incorporating time-varying explanatory variables. To account for the potential dependence of observations of the same cartel, we used robust standard errors clustered by cartels (Cui, Calantone, & Griffith, 2011).[5] In our model, all monetary variables were expressed in thousands of Euros and were deflated using the GDP deflator (sourced from the World Bank). All time-varying variables X were lagged by one year. This lag structure accounts for the fact that the effects of explanatory variables may take time to materialize because their impact is likely to be non-immediate (Bertrand & Mol, 2013). The numbers displayed in the estimation tables report coefficient estimates and do not report hazard ratios. A positive coefficient β of a covariate X means that the likelihood that the cartel will be terminated is increased (and, therefore, the probability of survival is reduced), and vice versa.

[5] Another option to control for potential dependence of observations of the same cartel was to employ a shared frailty model; that is, a shared-frailty Cox model (e.g., STATA, 2012; see Cleves, Gutierrez, Gould, & Marchenki, 2010). Results were robust to this alternative approach.

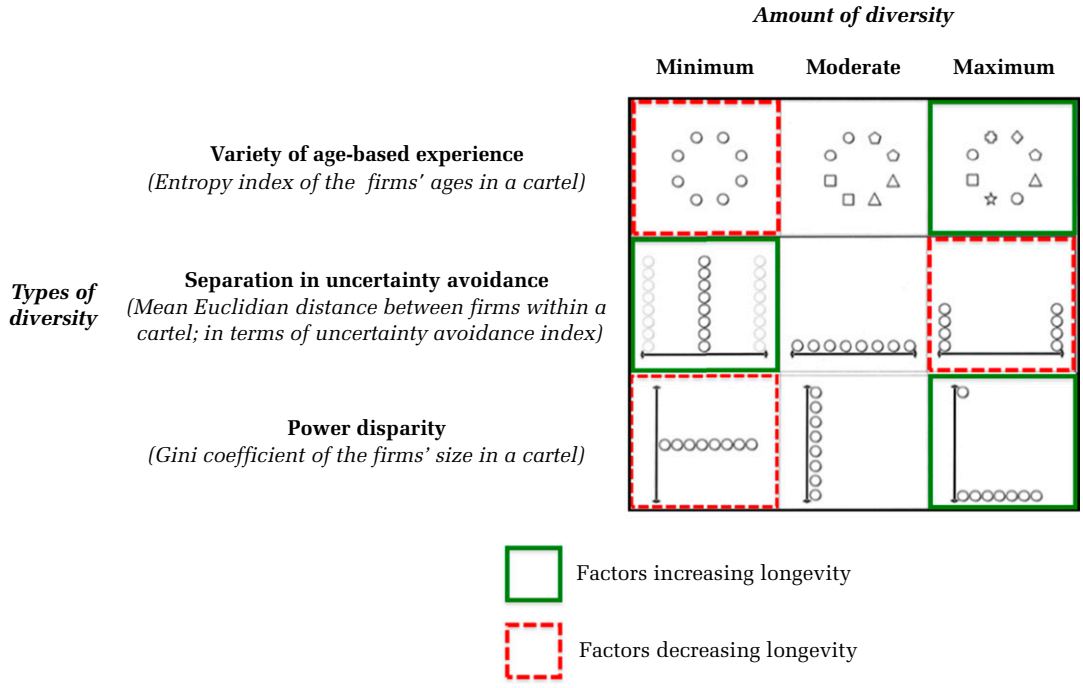
The following sections set out how we operationalized our three dimensions of diversity: (1) variety of age-based experience, (2) separation in uncertainty avoidance, and (3) power disparity. Our arguments and operationalization are visually summarized in Figure 2.

Independent variable: Variety of age-based experience. We investigated the variety of age-based experience through the qualitative differences between young and mature firms. "Minimum variety" occurs when all members belong to the same category (e.g., all young firms), whereas "maximum variety" comes about when each member originates from a unique category (e.g., one young firm, one experienced firm, and one mature firm). We referred to Harrison and Klein (2007) to calculate this index of variety. For variety, the researchers recommended computing an entropy index of the underlying variable. In fact, because variety reflects qualitative distinctions between different categories, the use of continuous distances would not have been meaningful (Harrison & Klein, 2007). Under a conceptualization of diversity as variety, a standard deviation measure, for instance, is inappropriate.

In our context, to account for the variety of age-based experience within a cartel (variable *Variety of age-based experience*), we thus calculated the entropy index of the firms' ages in a cartel (Teachman, 1980) as $-\sum p_k.\ln(p_k)$, where p_k represents the proportion of firms in the different age categories. The age of the firm was assessed as the number of years a firm has been in business (Rothaermel & Boeker, 2008; Sørensen & Stuart, 2000). When computing the entropy value, we used the following age intervals: [1–5], [6–10], [11–15] ... [46–50], [51; +[. The variable *Variety of age-based experience* has a mean of 1.39 and a variance equal to 0.21. For instance, variety is high in the petroleum refinery industry, as the age of the 24 members is distributed relatively evenly across the different age categories (from a few years to 100 years of existence). Conversely, in the gypsum product industry, the score for variety is lower, as most cartel members belong to a few similar age categories.

Independent variable: Separation in uncertainty avoidance. We measured the levels of uncertainty avoidance in the firms' environments because prior literature has shown that this reflects important differences in values (Kirkman, Lowe, & Gibson, 2006; Taras, Kirkman, & Steel, 2010). A country's uncertainty avoidance has been defined as "the extent to which a society feels threatened by uncertain and ambiguous situations" (Hofstede, 1980: 45). Consistent with prior

FIGURE 2[a]
Overview of the Study's Arguments and Operationalization



[a] Adapted from Harrison and Klein (2007).

literature, we refer to uncertainty avoidance as the extent to which parties feel either uncomfortable or comfortable in novel, unknown, surprising, and unusual situations (Barr & Glynn, 2004; Hofstede, 2001). Because firms usually feel bound to follow the social norms prescribed by the culture of their home country (Hofstede, Neuijen, Ohayv, & Sanders, 1990), a significant body of research has documented the influence of national cultural norms and moral values that guide managerial behavior (Earley & Gibson, 1998; House, Hanges, Javidan, Dorfman, & Gupta, 2004). Separation in uncertainty avoidance is minimal when all actors in a group share the same values and maximal when a group is composed of two extreme cliques polarized on opposite levels of tolerance for uncertainty. We again referred to Harrison and Klein (2007), who advocated measuring an index of separation based on the Euclidean distance of the underlying variable. "Because of its symmetric nature, separation is best indexed at the unit level by cumulating the absolute or squared distances between pairs of firms" (Harrison & Klein, 2007: 1210).

In our context, to measure the separation in uncertainty avoidance within a cartel (variable *Separation in uncertainty avoidance*), we calculated the mean Euclidian distance between firms within a cartel. Within a unit, the mean Euclidean distance of one member, *i*, from all the other members, *j*, is the root mean squared distance between each of those *i*, *j* pairs:

$$\sum \sqrt{\left[\sum (S_i - S_j)^2 / n\right]} \Big/ n$$

where S_i, S_j, and n represent the uncertainty avoidance value for firms *i* and *j* and the number of firms in a cartel (Tsui, Egan, & O'Reilly, 1992), respectively. In terms of operationalization, we employed the uncertainty avoidance value (the cultural values scores) from the Globe study (House et al., 2004). This variable, *Separation in uncertainty avoidance*, has a mean of 0.57 and a variance of 0.02. For example, a cartel in the inorganic chemical industry is characterized by a high cultural separation score because the cartel is composed of two main cliques with contrasting uncertainty avoidance scores. The first clique is composed of firms from the Netherlands and Sweden while the second clique includes firms from France and Spain. In contrast, in the textile machinery industry, the cultural separation score was lower because the cartel was formed by firms from Germany and the United Kingdom with similar cultural scores.

Independent variable: Power disparity. Finally, again in accordance with prior literature, the disparity was studied through the various sizes of the firms, as this indicates diverging power (Gulati & Sytch, 2007; Lumineau & Malhotra, 2011) between the firms involved in collective organizational misconduct. In accordance with Harrison and Klein (2007), we calculated the index of disparity by computing a Gini coefficient of our underlying variable. In our context, to evaluate the level of power disparity (variable *Power disparity*) within a cartel, we used the Gini coefficient of the firms' size. The power disparity reflects both the distances between firms and the dominance of those of a larger size (Harrison & Klein, 2007). The calculation of the Gini index of firm size is computed as:

$$\left(\sum |D_i - D_j|\right) / \left(2.n^2.D_{mean}\right)$$

where D_i, D_j, D_{mean}, and n represent the firms' size values for firms i and j, the mean firms' size value, and the number of firms in a cartel. The size was measured through the firm's total assets (e.g., Hansen & Wernerfelt, 1989; Waddock & Graves, 1997). The variable *Power disparity* has a mean of 0.58 and a variance equal to 0.03. For example, a cartel in the plastic bag industry exhibits a very high power disparity because the cartel is dominated by a single firm, which is more than 15 times larger than all the remaining cartel members. In contrast, the cartel that operates in the primary smelting and copper-refining industry is composed of firms of relatively equal size and is, therefore, characterized by a low disparity score.

Control variables. Because of the small size of our sample and to conserve degrees of freedom, we established a parsimonious model as our baseline. Additional control variables were included in the estimations as a robustness check (see Appendix A).

First, we controlled for the average characteristics of cartel members (data sourced from Amadeus and Orbis). We also controlled for the average size and the age of firms involved in the cartel (the variables *Average firm size* and *Average firm age*, respectively). When estimating the effect of diversity parameters, Harrison and Klein (2007) recommended accounting for the mean values of the attribute on which diversity variables are based. Furthermore, we included the yearly profitability of the cartel—that is, the yearly average of cartel members' profitability—as a control variable (variable *Average firm profitability*). Indeed, one of the cartel's goals is to increase the profit of each of its members (Martin, 2010; Utton, 2011). Consequently, lower cartel profitability could create dissensions among members or push them to make riskier decisions. As a measure of profitability, we used the return on assets, a widely used profitability measure in management (Richard, Devinney, Yip, & Johnson, 2009). The return was measured as the earnings before interest, taxes, depreciation and amortization, divided by the total assets of a firm. This indicator provided information on the company's operating profit before non-operating expenses (such as interest) and non-cash charges (such as depreciation and amortization). Moreover, the measure allowed us to eliminate the influence of financing and accounting decisions (Kusewitt, 2006; Qian, Khoury, Peng, & Qian, 2010). Finally, we considered the liquidity of firms (variable *Average firm liquidity*) as measured by the ratio of the difference between current assets and inventories and current liabilities (Chatterjee & Wernerfelt, 1991). This control variable captured a firm's ability to meet its short-term obligations and the corporate funds available to managers for making investments. Furthermore, it accounted for the firm's availability of financial resources and its ability to achieve strategic flexibility (Short, Ketchen, Palmer, & Hult, 2007).

Second, in addition to average firm-level characteristics, we included the number of firms in a cartel (variable *Number of members*) to explain the cartel structure. The number of members in a cartel could influence the difficulty that members encounter in coordinating their actions and hiding their misconduct, thereby diminishing their longevity (Levenstein & Suslow, 2006).

Third, at the industry level, we added an indicator of industry concentration in Europe (data source: Amadeus). To achieve this objective, we calculated the Herfindahl–Hirschman index (variable *Industry concentration*). The firms' market shares were squared and then summed across industries (at a six-digit level). It is expected to be less difficult for firms in a highly concentrated industry, compared with industries with many firms, to coordinate their actions and neutralize non-participating firms (Martin, 2010).

Fourth, to account for the country context in which cartel members operate, in addition to the *Separation in uncertainty avoidance* variable (based on the uncertainty avoidance index described above), we controlled for the average value of uncertainty avoidance in a cartel (variable *Average uncertainty avoidance*). Furthermore, the quality of the country's institutions in the firm's environment may influence the effectiveness of antitrust enforcement and the

amount of resources dedicated to monitoring and fighting cartels (Ma, 2010). Additionally, better institutional quality could raise the cost and the difficulty of hiding through efficient law enforcement (Treisman, 2000), stable political processes, or extensive freedom of the press (Lederman, Loayza, & Soares, 2005). In accordance with previous research (He, Brouthers, & Filatotchev, 2013; Meyer, Estrin, Bhaumik, & Peng, 2009), we assessed the quality of institutions (variable *Average quality of institutions*) based on the Economic Freedom Index (source: Heritage Foundation). To fight cartels, the European Union has a leniency program, which has existed since 1996, under which companies that help to provide information regarding a cartel in which they participated may receive full or partial immunity from fines. This program was reformed in 2002 to make it more transparent and credible (Organization for Economic Cooperation and Development, 2005). To include this reform and the higher effectiveness of the leniency program, we used a dummy variable that takes the value of "1" after 2002 and "0" before that year (variable *Leniency reform*).

Descriptive statistics and cross-correlations of our main explanatory variables are provided in Table 1. The variance inflation factors are below the recommended ceiling of 10 (with the maximum of 1.63 for the full model), indicating no multicollinearity problems.

RESULTS

Main Empirical Results

We investigated the role of the different facets of diversity on the longevity of the cartel. Our baseline model is reported in Table 2. Model 1 of Table 2 includes the control variables. Models 2 to 4 augment Model 1 by adding each of our independent variables—that is, the variables of *Variety of age-based experience*, *Separation in uncertainty avoidance*, and *Power disparity*—and Model 5 is the full model. The results are consistent across models.

Hypothesis 1 predicted a positive relationship between the variety between firms involved in organizational misconduct and the longevity of the cartel. In Model 5, the coefficient estimate for the variable *Variety of age-based experience* is negative and significant (-0.17, $p < .05$). An increase in the *Variety of age-based experience* reduces the probability of cartel termination; that is, it increases the longevity of cartels, therefore providing support for Hypothesis 1. When the variable *Variety of age-based experience* is increased by one standard deviation, the hazard rate of cartel termination is decreased by 7.54%.

Hypothesis 2 proposed that the higher the separation between firms involved in organizational misconduct, the lower their longevity. The variable *Separation in uncertainty avoidance* is positive and significant in Model 5 (0.49, $p < .01$). A rise in *Separation in uncertainty avoidance* increases the probability of cartel termination; that is, it decreases the longevity of cartels, thereby providing support for Hypothesis 2. A single standard deviation increase in the variable *Separation in uncertainty avoidance* increases the hazard rate of cartel termination by 7.61%.

We finally predicted, in Hypothesis 3, that there is a positive relationship between the level of disparity between firms involved in organizational misconduct and the longevity of the cartel. In support of Hypothesis 3, the coefficient estimate for *Power disparity* is negative (-0.43, $p < .01$) in our full model (Model 5). The higher the level of *Power disparity*, the lower the probability of cartel termination. A single standard deviation increase in the variable *Power disparity* results in a decrease of cartel termination hazard rate by 7.34%.

Concerning the control variables, Model 5 shows that, at the firm level, the average size ($-3.30e\text{-}08$, $p < .001$), the level of liquidity (-0.71, $p < .05$), and the profitability of cartel members (-3.17, $p < .1$) reduce the probability of cartel termination. The average age of members does not appear to matter significantly. At the cartel level, the number of participants in a cartel affects the cartel's longevity significantly and negatively (0.03, $p < .001$). At the industry level, the industry concentration index has no significant impact on cartel longevity. Finally, at the country level, the variables *Average quality of institutions* (0.04, $p < .001$) and *Leniency reform* (1.24, $p < .001$) have a positive and significant effect on cartel termination. The average level of uncertainty avoidance in the firms' environment decreases the likelihood of cartel termination (-0.12, $p < .05$).

Further empirical investigation of our theory. In the logic of a difference-in-difference estimation approach, we have further investigated our theory by examining the effect of an exogenous regulatory shift. To this end, we used the leniency reform as a proxy of such an exogenous regulatory shift. We made our variable *Leniency reform* interact with our three main independent variables: variety of age-based experience, separation in uncertainty avoidance, and power disparity. Consistent with our theory, we found that the leniency reform has increased the probability of a cartel being detected. However, it

TABLE 1
Summary Statistics and Correlation Matrix[a]

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	Cartel duration	1												
2	Average firm profitability	0.06	1.00											
3	Average firm age	0.08	−0.14	1.00										
4	Average firm size	0.10	0.25	−0.12	1.00									
5	Average firm liquidity	−0.03	0.24	−0.13	0.27	1.00								
6	Industry concentration	0.08	0.01	0.00	0.10	0.09	1.00							
7	Number of members	−0.10	−0.17	0.06	−0.01	0.09	−0.09	1.00						
8	Average quality of institutions	−0.06	−0.00	0.08	0.11	0.07	−0.11	0.06	1.00					
9	Average uncertainty avoidance	−0.08	−0.04	−0.30	0.04	0.23	0.06	0.31	0.31	1.00				
10	Leniency reform	−0.16	−0.07	0.02	−0.32	−0.01	−0.13	0.02	−0.10	0.06	1.00			
11	Separation in uncertainty avoidance	−0.16	−0.12	0.19	−0.25	−0.08	−0.12	0.01	0.15	−0.16	0.06	1.00		
12	Variety of age-based experience	0.14	0.01	0.23	−0.19	−0.19	0.05	0.35	−0.06	−0.02	−0.04	0.08	1.00	
13	Power disparity	0.17	0.08	0.03	0.23	−0.00	0.12	0.24	−0.03	−0.22	−0.21	−0.16	0.32	1.00
	Mean	7.95	0.08	38.82	4.05E+06	1.15	0.19	11.32	65.34	4.29	0.34	0.57	1.39	0.58
	SD	5.14	0.04	14.6	5.44E+06	0.41	0.18	7.69	4.15	0.27	0.50	0.15	0.46	0.18
	Min.	1	−0.00	9.4	25614	0.41	0.00	3	50.1	3.55	0	0.06	0.14	0.14
	Max.	21	0.17	81.75	2.69E+07	2.09	0.60	30	75.15	4.92	1	0.95	2.22	0.89

[a] $N = 195$ (cartel-year observations). Correlations greater than $|0.14|$ are significant at $p < .05$.

TABLE 2
Diversity and Cartel Longevity[a]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Average firm size	−5.75e-08***	−6.12e-08***	−5.70e-08***	−5.02e-08***	−3.30e-08***
	(1.63e-08)	(9.25e-09)	(9.25e-09)	(1.45e-08)	(9.95e-09)
Average firm age	−0.01	−0.01	−0.00	−0.00	−0.00
	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
Average firm profitability	−0.19	−1.04	−1.92	−3.68†	−3.17†
	(3.15)	(2.77)	(1.57)	(2.05)	(1.66)
Average firm liquidity	−0.90†	−0.86†	−1.45*	−0.68†	−0.71*
	(0.55)	(0.49)	(0.65)	(0.39)	(0.29)
Number of members	0.04**	0.04**	0.04***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Industry concentration	−0.25	−0.27	−0.26	−0.01	−0.05
	(0.40)	(0.38)	(0.30)	(0.20)	(0.13)
Average uncertainty avoidance	−0.02	−0.15†	−0.17†	−0.09	−0.12*
	(0.09)	(0.09)	(0.10)	(0.06)	(0.05)
Average quality of institutions	0.05***	0.06***	0.04***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Leniency reform	0.92**	0.98***	1.34***	1.04***	1.24***
	(0.33)	(0.26)	(0.23)	(0.21)	(0.13)
Variety of age-based experience		−0.25**			−0.17*
		(0.08)			(0.07)
Separation in uncertainty avoidance			1.02***		0.49**
			(0.28)		(0.18)
Power disparity				−0.84***	−0.43**
				(0.23)	(0.15)
Observations	195	195	195	195	195

[a] Numbers displayed in the estimation table report coefficient estimates and not hazard ratios. Positive coefficients indicate that an increase in the explanatory variable increases the likelihood of cartel termination and therefore decreases the longevity of cartels (and vice versa). We used robust standard errors clustered by cartels.

† $p < .1$
* $p < .05$
** $p < .01$
*** $p < .001$

has increased to a lower extent the probability of being detected for cartels with a higher variety of age-based experience, a lower separation in uncertainty avoidance, or a higher power disparity. In other words, cartels with a higher variety of age-based experience, a lower separation in uncertainty avoidance, or a higher power disparity tend to be more able to face a strengthening of the antitrust legislation framework than do cartels with a lower variety of age-based experience, a higher separation in uncertainty avoidance, or a lower power disparity. These results are available from the authors on request.

Several robustness checks to examine the sensitivity of our results and to provide additional empirical evidence are presented in Appendix A.

DISCUSSION

Our goal was to investigate how different dimensions of diversity between firms that participate in a cartel influence the cartel's longevity. Drawing upon diversity theory, we developed a theoretical framework organized around three specific aspects of diversity in cartels: variety of age-based experience, separation in uncertainty avoidance, and power disparity. The empirical findings broadly support our theoretical framework.

We found evidence to substantiate our main argument that the diversity of members involved in cartels is a critical factor of the longevity of such collusive activities. Specifically, we first found that the variety of age-based experience between firms engaged in cartels tends to influence the longevity of their concealed activities. A group of firms with a high variety of age-based experience may benefit from the diverse pools of information and knowledge resources of its members. In turn, groups with such variety are likely to better organize their misconduct activities and survive longer. Second, we suggest that the differences in values between group

members may hamper their ability to make the most of their misconduct activities. In accordance with our theoretical arguments, the results have shown that the higher the separation in uncertainty avoidance, the shorter the longevity of the cartel. Third, our empirical analysis provides support for a positive relationship between the level of power disparity between firms that participate in cartels and the longevity of their secret activities. In summary, the longevity of cartels is expected to be the highest when members have a variety of age-based experience (i.e., there is a high variety of age-based experience), are culturally similar (i.e., there is low separation in uncertainty avoidance), and when the group is driven by a leader (i.e., there is high power disparity). Conversely, cartels are less likely to survive when group members have similar backgrounds (i.e., there is a low variety of age-based experience), they do not share the same values (i.e., there is high separation in uncertainty avoidance), and when there is no leader to conduct the group (i.e., there is low power disparity).

Theoretical Implications

Our study has extended the previous research on organizational misconduct by developing theoretical arguments to understand organizational misconduct at the interfirm level. Our study also complements emerging works on collective misconduct (Ashforth & Anand, 2003; Palmer, 2008). To date, research on organizational misconduct has primarily focused on misconduct by an individual or by an organization (Vadera & Pratt, 2013; Zahra et al., 2005). Although collective misconduct has received limited attention in the management literature, we assert that collective misconduct in cartels strongly differs from individual misconduct because it requires coordinated action between several distinct organizations. In contrast with the few studies on collective misconduct that have focused on intraorganizational misconduct (refer to Baker & Faulkner, 1993, and Genesove & Mullin, 2001, for exceptions), we have shown how cartels involve the intentional orchestration of collective efforts between independent firms to conceal their joint activities from antitrust authorities. Our arguments note the role of information exchange, coordination, and control as relevant underlying causal mechanisms of the longevity of cartels. Moreover, our findings suggest that the misconduct activities' longevity relies on a balance between elements of control to minimize shirking behavior and to align incentives of self-interested firms and elements of coordination to foster information exchange between partners. The central element of secrecy may mean that the organization of collective misconduct does not follow the same logic as the organization of lawful partnerships (Baker & Faulkner, 1993). Although a direct comparison between legal and illegal partnerships is beyond the scope of this study, a systematic empirical exploration of the similarities and possible differences between these two types of partnerships remains an intriguing avenue for further research. Additionally, it could be particularly interesting to study whether these legal and illegal alliances complement or substitute each other to explain firm performance.

We have also contributed to the research on diversity by directly responding to the calls for research including multiple dimensions of diversity (Shore et al., 2009; van Knippenberg, De Dreu, & Homan, 2004). The cumulative findings of the prior literature on diversity have been inconsistent and often conflict with studies that suggest a positive relationship between diversity and outcomes while other studies suggest a negative relationship (Barkema & Shvyrkov, 2007; Bell, Özbilgin, Beauregard, & Sürgevil, 2011). Although it has been argued that the construct of diversity has different dimensions and that such a distinction is important because it may produce distinct outcomes (Harrison & Klein, 2007), our study empirically verifies some of those assertions. In accordance with our arguments, the findings actually indicate that, in our empirical context of cartels, variety of age-based experience and power disparity have a positive influence on the longevity of misconduct, whereas separation in uncertainty avoidance has a negative influence. Thus, the longevity of wrongdoing is not influenced in the same manner by each of our diversity dimensions. An important implication of our results concerns the simultaneity with which diversity can provide positive and negative outcomes. Our conceptual and empirical distinction has been fruitful in arriving at a more accurate understanding of the differential influences of diversity in the context of cartels. Thus, treating diversity as a generic unidimensional and unidirectional concept is unlikely to capture its complex nature and its different influences.

More broadly, beyond our study of cartels as conspiracies, we hope our study could set the stage for studies of other collectives. Although diversity has been studied at multiple levels, including the individual, the individual within the work group, the individual in relation to the manager, the work group, the management team, and the organization

(refer to Shore et al., 2009, for a review), the issue of diversity has not been provided much attention in the literature on interfirm relationships. Although a few studies have considered group composition in the context of international alliances (Hambrick, Li, Xin, & Tsui, 2001; Li & Hambrick, 2005; Zoogah, Vora, Richard, & Peng, 2011), these studies have focused on the diversity of the strategic alliance team at the team member level. We observed opportunities to leverage our analysis to gain a better understanding of the role of diversity in alliances. For instance, an emerging stream of research is interested in alliance portfolios (Lavie, 2007; Lavie & Miller, 2008). However, this work has primarily focused on diversity as variety by using the Blau index (e.g., Jiang, Tao, & Santoro, 2010; Sarkar, Aulakh, & Madhok, 2009). It would be particularly interesting to know whether each facet of diversity would be more or less advantageous for firms that work together in less nefarious ways.

Managerial Implications

Even highly successful organizations are not immune to the lure of the dark side (Palmer, 2012). Thus, research designed to advance our knowledge of illegal, unethical, or socially irresponsible behaviors is both highly relevant and critically important. A better understanding of collective misconduct has not only important economic and social implications but also managerial implications for the different stakeholders of firms (e.g., shareholders, employees, public authorities, buyers, suppliers, and final consumers). It is particularly important for stakeholders who face information asymmetries—such as shareholders monitoring their companies, firms seeking trading partners, or firms considering a merger or an acquisition—to be able to detect those firms engaged in wrongdoing. An involvement with firms participating in misbehavior may have disastrous consequences, ranging from financial penalties to a loss of reputation and exclusions from future exchange (Jonsson, Greve, & Fujiwara-Greve, 2009; Sullivan, Haunschild, & Page, 2007). As we suggested in our study, diversity may explain an important part of the outcomes of collective misconduct. We believe that attempts to reduce misconduct will be more successful if informed by an understanding of how firms can sustain such secret activities for a long time. Therefore, understanding and categorizing diversity into different groups may help stakeholders to identify the sustainability of collective misconduct. We believe this understanding represents a necessary first step in preventing the formation of groups that are particularly likely to seek to profit from collective misconduct and in focusing attention on specific groups of firms to monitor their activities.

Our study may also help to manage diversity in contexts of secrecy. We have shown why a unidimensional analysis of diversity in collective misconduct may obscure the specific conditions under which diversity can have beneficial or detrimental effects on longevity. In addition to situations of misconduct, firms often have a strategic interest in developing activities in secret. Secrecy that protects value, prevents the copying and imitation of important and emerging intellectual property by rivals, or delays competitive retaliation provides competitive advantage (Dufresne & Offstein, 2008; Hannah, 2007). Consider, for instance, the large set of subcontractors, OEM suppliers, and accessory makers that address Apple or Samsung's rollouts of new smartphones. That large collective typically needs to work together for one to two years on a particular version of a phone with a very high emphasis on maintaining secrecy or security regarding the phones' design and internal mechanisms until it is released for sale to the public. Such an example also clearly underscores the need for a central authority that has great power for enforcing the concealment of information. In addition, this management of diversity should not only be conducted as a function of the diversity within a group of firms but also consider the objective of the collective activity. In particular, our study in the context of cartels shows that certain dimensions of diversity, such as a high level of separation in uncertainty avoidance between partners, may become a liability. Thus, in accordance with recent research on organizational diversity (Joshi & Roh, 2009), we argue that diversity research should move beyond a debate regarding the potential benefits or costs of diversity and further highlight the inherent context dependence of diversity effects.

Limitations and Suggestions for Future Research

The main limitations of our study are twofold. The first relates to the "usual suspects": endogeneity and selection issues. In this regard, studying the longevity of cartels not only helps investigate the mechanisms of secrecy but also alleviates endogeneity and selection bias issues that could have emerged with an alternative dependent variable (such as cartel profitability). However, the generalization of our findings remains limited by the nature of the sample. Because we used prosecution decisions delivered

against cartels, although we observe the true level of misconduct in the industry that experiences a cartel (i.e., which firms participate in the cartel), we studied only those cartels that were detected by the European antitrust authorities. Thus, our sample may be biased because of its dependency on prosecution as a sample selection criterion (Levenstein & Suslow, 2006). This is a traditional limitation in the research on misconduct, in which empirical studies must rely on cases of misconduct that have been detected and reported publicly (Brenner, 2011; Greve et al., 2010). As noted by Faulkner et al. (2003: 841):

> ... whatever sample we draw to show that a cartel failed, that sample would only be a sample of "failed" cartels because "the successful" ones avoided detection. Additionally, how could we possibly discover the successful cartels that even the Justice Department and F.B.I cannot detect?

In addition, prior research on misconduct has suggested that there is no reason to suspect that undetected misconduct differs from detected cases of misconduct and that the nature of the bias is unclear (e.g., Brenner, 2011; Clinard, Yeager, Brissette, Petrashek, & Harries, 1979). In our case, our sample does not account for cartels that have so far successfully managed to escape from antitrust authorities and nor does it account for cartels that failed and were dissolved without ever being caught. Furthermore, future research may examine the generalizability of our findings in other contexts. We invite, in particular, further studies to test our theoretical framework for other forms of collective misconduct, such as mafias and drug cartels. As the boundaries between legal and illegal activities are directly influenced by the legal context and norms and values regarding illegal activities differ between countries (Palmer, 2008), opportunities also exist to validate our findings in other legal, cultural, and institutional environments.

The second limitation is due to data constraints on our independent variables. In particular, data constraints prevented us from incorporating the structure and intermediary objectives of the cartels (such as the establishment of market-sharing, quantity-fixing, and/or price-fixing mechanisms) as a mediating factor of the effect of diversity on cartel operations.[6] We also acknowledge that future research may need to study additional aspects of diversity between firms or at another level of analysis. For instance, it could be interesting to extend our work with a study of the internal diversity of managers within each firm involved in collective organizational misconduct. We observe many opportunities here to build bridges between our study of collective organizational misconduct among firms and the vast literature on top management-team diversity. We also specifically encourage scholars to consider how diversity operates and interacts at different levels of analysis; for instance, by combining the individual, firm, and network dimensions. The multilevel analysis of diversity is an exciting area for future research both with misconduct-related and nonmisconduct-related outcomes (e.g., innovation, basic task or financial goal attainment, and returns to stakeholders).

Overall, this study provides theoretical arguments and empirical evidence of the distinct influence of different facets of diversity on cartels' longevity. Given the economic and social impact of organizational misconduct, we hope that this study encourages more research by management scholars on the diversity in the coordinated misconduct.

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APPENDIX A

ROBUSTNESS CHECKS

We performed several robustness checks to examine the sensitivity of our results (all detailed results are available from the authors on request). Alternative specifications did not affect our main findings. The robustness checks were grouped into three categories: (1) alternative measurements of diversity, (2) additional control variables, and (3) selection bias issues.

Alternative Measurements of Diversity

Harrison and Klein (2007) proposed two possible calculation modes for each aspect of diversity. We tested alternative computations of our diversity variables, and the results were similar. For *Variety of age-based experience*, rather than using the entropy of the firms' ages, we used the Blau (1977) index. We also used an alternative measure of *Variety of age-based experience* based on the different types of firms' industry diversification experience. Prior research has suggested that a firm's industry diversification strategy is related to the type of information to which it can obtain access (Qian et al., 2010). In accordance with Varadarajan and Ramanujam's (1987) method, we distinguished four types of firms: firms with very low diversification, related-diversified firms, unrelated-diversified firms, and firms with very high diversification. Such a categorization resulted from the crossing of two dimensions: the broad-spectrum diversification and the mean narrow-spectrum diversification. The broad-spectrum diversification is equal to the number of two-digit NAICS categories in which a firm operates (data source: Amadeus and Orbis). The mean narrow-spectrum diversification is computed as the number of four-digit NAICS categories in which a firm participates divided by the number of two-digit NAICS categories in which the firm operates. The alternative variable, *Variety of age-based experience*, based on the entropy value of firms' industry diversification, provided estimates that are consistent with our previous results. Note that the results were, however, more sensitive to the specification adopted. We also tested alternative sets of age intervals. The results were qualitatively similar with sets of age intervals such as [1, 10], [11, 20], [21, 30] ... [101, +[or [1, 20], [21, 40], [41, 60] ... [101, +[. For *Separation in uncertainty avoidance*, we replaced the average Euclidian measure of uncertainty avoidance index with its standard deviation measure. For *Power disparity*, we substituted the calculation of a Gini coefficient with that of a coefficient of variation of firm size. Furthermore, to conserve a high

degree of variance of the power disparity measure, we decided not to log the size variable in our main table. Nevertheless, we checked the robustness of results when the size is logged for the variable *Power disparity* and *Average firm size*. These results were similar.

Additional Control Variables

Because of the relatively limited number of observations in our sample, we used a parsimonious specification in our main models. We then conducted a series of tests to control for additional factors that are likely to impact cartel longevity. We replaced the variable *Leniency reform* for the 2002 reform in the European leniency program with a set of year dummies to control for macroeconomic shocks specific to each time period, or added more observable control variables at the industry (such as the industry growth rate; source: Amadeus), country (e.g., the average geographical distance or time zone difference between cartel members; source: the Centre d'Études Prospectives et d'Informations Internationales database), or cartel level. At the cartel level, we controlled for the share of affiliates (i.e., cartel participants belonging to the same group) in a cartel, or, for instance, for the market organization mode of the cartel (i.e., the establishment of market-sharing, quantity-fixing, and/or price-fixing mechanisms; source: *Official Journal of the European Commission*). The main results were robust.

Selection Bias Issues

Because the decision of firms to be engaged in a cartel could be endogenous and self-selected, there may be a selection issue (Shaver, 1998). If forming a cartel was not a random process and, instead, was determined by non-observable characteristics of firms that also influenced their survival outcomes, our estimates could have been biased. In our case, not all firms in an industry decided to join a cartel. As a robustness check, based on Pan and Schaubel (2008), we followed three steps. First, we estimated the probability of a firm participating in a cartel. In our first-step estimation, we selected different variables. At the firm level, we included the firm's size, age, profitability, and liquidity variables. We also controlled for the fact of whether the firm is listed or not and for the ownership concentration (computed as the inverse value of shareholder number). At the industry level, we controlled for the industry concentration index. At the country level, in addition to the leniency reform dummy, the country's quality of institutions, and the uncertainty avoidance index, we considered the role of religion by referring to data on religious adherence taken from Barro and McCleary's (2003) study. Finally, industry, year, and country dummies were also included in the estimation. All time-varying explanatory variables were lagged by one year. Second, from the first-stage estimation, we obtained a score at the firm level. Based on these firm-level scores, we calculated a score at the cartel level. The cartel-based score is equal to the *average* score of all cartel members making up the cartel. Third, we ran a weighted Cox proportional hazards model in which the weight assigned to each cartel was equal to the inverse of the cartel-based score noted in stage 2 (i.e., the average estimated probability of firm-level cartel participation for each cartel). Our results at the second stage were robust to the addition of other variables in the participation likelihood estimation. We also tested a two-year lag structure in the participation likelihood estimation. In all cases, our main results were unchanged.