

The Supportive Factors of Firms' Collusive Behavior: Empirical Evidence from Cartels in the European Union

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Abstract

While cartels can be highly detrimental to society and create important economic and social costs for different stakeholders, the literature on organization studies has focused very little on cartels to date. In particular, we still do not know much about firms' reasons for taking part in cartels. In this study, we build on the rational choice perspective in organizational misconduct to investigate the conditions supporting firms' collusive behavior. We organize our theoretical arguments around the factors related to motivation and opportunity. Using a sample of cartels in the European Union, our empirical analysis gives evidence for our main arguments: the propensity to participate to a cartel is supported not only by the characteristics of the firm, but also by internal factors interacting with the attributes of the environment in which the firm is embedded. Implications for firms and policy makers are discussed.

Keywords

cartels, motivation-opportunity factors, organizational misconduct, rational choice

People of the same trade seldom meet together, even for merriment or diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices.

Adam Smith, 1776

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Introduction

While cartels have most likely been in existence since the very first steps of the market economy (Smith, 1776), recent evidence suggests the growing importance of cartels discovered by antitrust authorities since the 1990s (Connor, 2004, 2009). The recent fine imposed by the European Antitrust Commission on Procter & Gamble, Unilever, and Henkel is a case in point. The three firms were fined €315 million because of their involvement in an illegal agreement regarding household laundry detergent in eight European countries (Tait & Wilson, 2011).

Cartels are defined as “associations of independent firms in the same industry that are formed to increase their joint profits by restricting their competitive activities” (Lipczynski & Wilson, 2001, p. 59). Contrary to lawful partnerships, agreements between cartel members on, for instance, production or pricing aim to reduce competition in the industry and are therefore generally illegal today (Martin, 2010; Utton, 2011).¹ Cartels can indeed be highly detrimental to society. Cartels create important economic and social costs for different stakeholders. Instead of competing with each other, cartel members rely on each other’s agreed course of action. As a result, these agreements reduce the member firms’ incentives to provide new or better products and services at competitive prices. Their clients (other businesses or final consumers) end up paying more for lower quality (Martin, 2010). Final consumers see their welfare decreased² and businesses suffer from more expensive inputs.³ By artificially decreasing the natural level of competition in the market, cartels decrease the overall competitiveness not only of the cartelized industry but also of other industries. The damage to customers and other businesses can thus be substantial, as cartels can last over long periods of time (Utton, 2011).

Despite these economic and social impacts, the literature on organization studies has focused very little on cartels to date. In particular, the literature in organization studies has not directly considered the factors supporting firms’ collusive behavior. Our aim is to help bridge this gap. In this study, we examine the factors supporting the participation of firms in cartels by drawing upon the literature on organizational misconduct (OM). This body of literature has sought to explain why organizational actors resort to misconduct. However, the OM literature has mostly focused on individuals’ misconduct or misconduct within firms without directly considering misconduct between firms. For instance, many works within OM have studied top management fraud or white-collar crimes through insider trading, corruption, or financial statement fraud (e.g., Moberg, 1997; Zahra, Priem, & Rasheed, 2005). Here, we build on the rational choice perspective in organizational misconduct (Cornish & Clarke, 1986; Shover & Bryant, 1993) to analyze the participation of firms in cartels. We argue that firms assess the potential payoffs and risks of participating (or not) in a cartel and that critical factors may support or undermine this decision. We organize our theoretical arguments around the factors related to motivation and opportunity (Ashforth & Anand, 2003; Coleman, 1998; Pinto, Leana, & Pil, 2008) to investigate the conditions supporting firms’ collusive behavior. Motivation includes the factors that prompt firms to act in particular ways, while opportunity refers to the context that makes a possible course of action feasible (Ashforth & Anand, 2003; McKendall & Wagner, 1997). Within this motivation-opportunity framework, we not only study how the characteristics of the firm may support the firm’s collusive behavior but also examine how these internal factors interact with the attributes of the environment in which the firm is embedded.

Using a sample of firms involved in cartels in the European Union, we consider the role of factors related to motivation and opportunity to explain the likelihood of a firm entering a cartel. We find that the lower the performance of the firm (as measured by its return on assets), the more likely it will be engaged in a cartel. This source of motivation is, however, negatively moderated by the level of the industry growth rate. Opportunity also matters. The size of the firm (proxied by its total

assets) increases the likelihood of its taking part in illegal activity, with this type of effect being negatively moderated by the level of concentration in the industry. We therefore confirm our arguments that internal (i.e., firm-level) and external (i.e., industry-level) factors interact. We finally observe that the quality of the institutions within a given country (as measured by the Heritage Foundation) reduces the likelihood of participation.

This study has a number of important implications. First, we contribute to organizational misconduct research by studying the factors that support firms' participation in collusive behavior. Our theoretical framework extends the traditional motivation-opportunity approach by bringing together individual and collective factors. Our analysis suggests a combination of misconduct drivers both inside and outside the firm. We specifically suggest that because cartels are a form of misconduct involving a collective decision between firms, external collective factors come to moderate organizational factors. Second, we extend the previous research on interorganizational relationships. While the study of cartels has remained virtually unexplored in the organizational studies literature, we gain a better understanding of interorganizational relationships by suggesting a set of factors that support firms' participation in illegal activities with external partners.

Theoretical Background

Despite the societal importance of this issue, as we mentioned in the introduction, the organization literature has very seldom discussed cartel behavior. While scholars have devoted substantial attention to individual misconduct (e.g., Vardi & Wiener, 1996; Zhang, Bartol, Smith, Pfarrer, & Khanin, 2008), workplace crimes (e.g., Vadera & Pratt, 2013), and organizational wrongdoing (Mishina, Dykes, Block, & Pollock, 2010; Pinto et al., 2008), to the best of our knowledge, only a few papers in this body of literature have studied cartels.⁴ Morgan (2009) analyzed changes in the control of cartels in Europe and the managerial implications of this new regulatory environment, while Brenner (2011) studied the issue of cartel self-disclosure in the framework of leniency programs. In a recent review of the literature, Greve, Palmer, and Pozner (2010) confirmed this relative lack of research on misconduct, especially in alliances and networks. The study of the structure of price-fixing networks in the heavy electrical equipment industry by Baker and Faulkner (1993) stands as an exception. They show how the structure of the cartel network is driven by the need to maximize concealment, contingent on the information-processing needs imposed by the characteristics of a product and its market. Thus, we still do not know much about the factors supporting some firms and not others to be part of a cartel within an industry. Given the lack of both theoretical and empirical studies in this area, we suggest leveraging the rational choice perspective within organizational misconduct to obtain a better understanding of firms' participation in cartels.

The rational choice perspective in organizational misconduct

The causes of organizational misconduct have been analyzed from many different angles (see Palmer, 2012, for a recent review). One of the major approaches to explaining organizational misconduct draws on the rational choice theory. While this approach has long been a dominant paradigm in economics, in recent decades it has become widely used by other social scientists to understand how incentives and constraints affect behavior and, in particular, misconduct. This perspective is premised on the utilitarian belief that actions are based on a conscious evaluation of the utility of acting in a particular way (Piquero & Tibbetts, 2002; Tunnell, 1992). The rational choice approach of organizational wrongdoing assumes that actors calculate the costs and benefits of pursuing a wrongful course of action and only decide to pursue the action if they conclude that the likely benefits of the wrongdoing outweigh its potential costs (Cornish & Clarke, 1986; Opp,

1997). The actors thus engage in “an assessment, however crude or incomplete, of options and the potential risks and payoffs of each” (Shover & Bryant, 1993, p. 153). Rational choice, therefore, focuses on the incentives to commit crime and on how criminal choices are structured by the social environment and the situational variables. If Clarke and Cornish (1985) were the first scholars to offer a conception of crime as the outcome of rational decisions, the rational choice approach has since been applied to a wide range of crimes, including robbery, drug use, vandalism, and white-collar crime (e.g., Clarke & Felson, 1993; Piquero & Tibbetts, 2002).

Despite the many interesting insights offered by the literature on organizational misconduct, the antecedents of organizational misconduct and illegal actions in interorganizational relationships are still largely unexplained. In this study, our goal is to draw upon the rational choice perspective in organizational misconduct to suggest that some factors support a firm’s participation in cartels within the same industry. Although we recognize that the actual decisions within a firm are made by individuals, our interest is not in studying the managers’ decision-making processes. Instead, our focus in this study is on the choice made by a firm to participate or not in a cartel (see Zaheer, McEvily, & Perrone, 1998, for a discussion about interorganizational decisions). We organize our theoretical arguments around the motivation and opportunity factors. Motivation refers to the incentives and pressure needed to commit fraud, and opportunity refers to the situation that enables the fraud to occur (Coleman, 1987). This distinction between motivation and opportunity factors has been widely used in the literature on organizational misconduct (e.g., Ashforth & Anand, 2003; Coleman, 1995; Coleman & Ramos, 1998; Pinto et al., 2008). However, the prior research has not leveraged this theoretical framework to explore cartels as a form of collective misconduct. While the prior literature has not studied the factors supporting firms’ participation in collusive behavior, we propose starting from the motivation-opportunity model and extending it. Aside from developing arguments at the interorganizational level, we extend this theoretical framework by considering both the internal and the external factors behind firms’ participation in cartels and how these two factors interact with each other.

Hypotheses Development

The motivations to take part in a cartel

Within a context of organizational misconduct, motivations refer to the factors that arouse and direct behavior (McKendall & Wagner, 1997; Vardi & Wiener, 1996). Motivations include the incentives stemming from unfulfilled needs, desires, or deficiencies that spur corrective actions. Drawing upon the prior literature in organizational misconduct, we suggest different motivational factors that could explain the likelihood of a firm participating (or not) in a cartel. As defined above, cartels are voluntary, private arrangements among independent firms aiming to reduce or eliminate competition (Utton, 2011). In a cartel, competing firms coordinate their behavior to mimic the actions of a monopoly and thereby increase their profits (Martin, 2010). The firms do so by collectively raising prices, reducing the overall output, or dividing the markets. Collusion enables rival firms to obtain greater individual profits than they could when acting separately.

The rational choice perspective suggests that firms make decisions about how they should act by comparing the costs and benefits of different courses of action. We argue that higher performing firms are relatively less likely to engage in acts of misconduct than lower performing firms (Klein & Leffler, 1981; Mishina et al., 2010) because high-performing firms have relatively less to gain from engaging in a cartel. Moreover, the process of establishing a cartel presents more significant risks for high-performing firms, thereby increasing the actual costs of misconduct for these organizations. The discovery of misconduct such as involvement in a cartel would damage the

reputational capital of these firms (Fombrun, 1996), undermine their legitimacy (Oliver, 1992), and cause stakeholders to question the future performance of the organization (Kreps & Wilson, 1982). In this regard, highly performing firms often suffer greater negative impacts stemming from the discovery of misconduct than lower performing firms (Kreps & Wilson, 1982; Rhee & Haunschild, 2006).

In addition, as a sociological extension of the rational choice perspective (Greve et al., 2010; Palmer, 2012), the strain theory holds that actors unable to achieve their aspirations by conventional means experience strain and may seek to relieve this strain by using deviant means to achieve their desired ends (Zhang et al., 2008). There is considerable evidence that strain caused by underachievement leads to misconduct at different levels (Agnew, Piquero, & Cullen, 2009; Vaughan, 1999), including organization-level goals (Greve et al., 2010; Simpson, 2002). Thus, low-performing organizations are the most likely offenders (Agnew et al., 2009; Vaughan, 1999). Because poor performance pressures firms to find alternative sources for their resources or to cut costs in ways that may not be lawful (Baucus & Near, 1991; Cochran & Nigh, 1987), low performance has been one of the most frequently posited antecedents of corporate illegality (Clinard, Yeager, Brissette, Petrashek, & Harries, 1979; Finney & Lesieur, 1982). By combining the arguments about a lower likelihood for high-performing firms and a higher likelihood for low-performing firms to participate in a cartel, we suggest the following:

Hypothesis 1: The lower the firm's performance, the more likely the firm will take part in a cartel.

We turn now to a key factor likely to moderate firms' motivation to participate in a cartel. Although the firm's level of performance may affect the firm's propensity to join a cartel, industry variables are also likely to have a major effect by creating conditions that pressure, encourage, or enable cartels. To analyze how internal and external factors may interact, we suggest a moderating influence from industry growth on the relationship between the firm's performance and the likelihood of its participation in a cartel.

According to the rational choice logic, firms consider alternative courses of action with an eye to determining whether the benefits their choices generate outweigh the costs they entail. When making the choice whether to participate in a cartel, the environment may create external conditions of pressure (Baucus, 1994; Szwajkowski, 1985), and previous research has suggested that environmental scarcity affects organizational behavior (Pfeffer & Salancik, 1978). Environmental pressure refers to the stress firms in an industry face when they attempt to cope with constraints or challenges from the external environment (Baucus, 1994). Firms operating in industries with low growth must manage uncertainty to meet performance goals. Low levels of reward in an industry affect firms by increasing competition for dwindling resources (Park & Mezas, 2005). In such circumstances, low-performing firms in particular are often encouraged to take action to reduce that uncertainty (March & Simon, 1958), including engaging in illegal activities when they experience difficulties in acquiring the resources necessary for their survival (Baucus & Baucus, 1997; Staw & Szwajkowski, 1975). Internal motivations to enter cartels can thus be reinforced when the industry growth is lower.

Furthermore, by definition the formation of a cartel implies that more than one firm is motivated to misbehave. This feature of organizational misconduct between firms has not been considered in prior studies focusing on individual motivation factors. The collective dimension of misconduct that is associated with a cartel has been largely ignored. A single low-performing firm in a fast-growing industry may have difficulty finding partners motivated enough to take the

risk of developing a cartel. A fast-growing industry environment may therefore limit the ability of low-performing firms to create a cartel. In contrast, a context of low industry growth means it is more difficult for a set of firms to find the resources to grow (Rajagopalan, Rasheed, & Datta, 1993; Van Witteloostuijn & Boone, 2006), but it is relatively easier to find partners willing to engage in collective illegal actions. Therefore, relatively low organizational performance combined with low industry growth produces both more pressure for firms in an industry to take illegal actions and more possibilities to find partners to take part in collective misconduct. Thus, the *combined* effect of internal and external motives creates an even stronger force leading to engagement in cartels. Hence:

Hypothesis 2: The relationship between the firm's performance and the likelihood of its participation in a cartel is negatively moderated by industry growth.

Opportunities to enter cartels

The rational choice perspective argues that wrongdoers make discrete decisions to engage in wrongful behavior and are especially influenced by the opportunities facing them (Cornish & Clarke, 1986; Piquero & Tibbetts, 2002). Whereas motivations refer to the incitement of behavior, opportunities mean the presence of a favorable combination of circumstances that make a particular course of action possible (McKendall & Wagner 1997). The opportunity to engage in cartels arises when the conditions needed to engage in collusive behaviors are present and when firms can break laws and expect, with reasonable confidence, to avoid detection or gain significant net remuneration. Hence, the research on opportunity (e.g., Erickson, Hanlon, & Maydew, 2004; Wells, 2004) explores the factors that provide sufficient ease or rewards to be conducive to corporate illegality. Among the circumstances shaping these opportunities, we make a distinction between the internal and external circumstances influencing the likelihood that a firm will participate in a cartel.

The opportunities for entering a cartel are influenced by a set of internal challenges for the firm. As an interorganizational relationship, a cartel implies collaborative efforts among competitive organizations and thus necessarily involves a group dimension (Baker & Faulkner, 1993). To successfully coordinate their strategies in a cartel, firms in an industry must orchestrate their actions and solve four major problems (Martin, 2010; Utton, 2011). First, as in any partnership, firms face search and negotiation (*ex ante*) costs. These information collection issues in cartels have been studied, for example, by Levenstein (1996) in the bromine industry and by Genesove and Mullin (2001) in the sugar industry. Firms must also reach an agreement regarding the nature of the cartel (e.g., pricing, output, or market sharing). However, contrary to lawful partnerships, the agreement deal used in a cartel needs to be hidden from the affected parties (mostly the customers) and the antitrust authorities. Second, such agreements—written or not—are generally illegal today and are therefore not enforceable in court, as cartel agreements do not bind parties. Firms must therefore find a way to enforce *ex post* their agreement to limit opportunistic behavior from the other cartel members and deter them from cheating by, for instance, not respecting the agreement and undercutting the price to attract more customers. Third, once in place, cartels may be complex and costly to manage (Levenstein & Suslow, 2006), all the more because secret collaboration is critical in such interorganizational endeavors. Firms must collectively agree to secrecy when developing their collective action. In the case of the vitamin cartel in the 1990s involving well-known industrial companies such as Hoffmann-La Roche, Aventis, and BASF,⁵ Joe Klein, the assistant Attorney General of the US Department of Justice, explained that “conspirators are large, sophisticated

firms that spent millions of dollars and thousands of employee hours to implement and hide their cartel for a decade” (Klein, 2000, p. 3). For instance, cartel participants often need to develop internal reporting and information systems. Many cartels develop hierarchical organizations or joint sales agencies to affect cartel policies (Hughes & Barbezat, 1996), as in the electrical equipment cartel of the 1950s studied by Baker and Faulkner (1993). A final challenge for cartels is to prevent entry (or expansion) by non-cartel firms, because the entry (or expansion) of these firms introduces more competition in the industry, reducing the benefits of cartel membership and thereby destabilizing the cartel (Levenstein & Suslow, 2011).

Thus, opportunities to enter a cartel are likely to be directly related to the firm’s size. Large firms tend to have more resources to develop internal capabilities (Pisano, 1990), to benefit from economies of scale and scope (DuBois, Toyne, & Oliff, 1993; Kobrin, 1991), and to shape government policy in ways favorable to them (Hillman, Keim, & Schuler, 2004; Oliver & Holzinger, 2008). Large firms are therefore more able to benefit from a cartel because they can more easily overcome organizational issues than small firms (Levenstein & Suslow, 2006) by allocating greater dedicated resources and recouping the specific investments that are necessary for the cartel to function. Large firms may also more easily initiate a cartel and serve as leaders for the group of cartel firms (Hagedoorn, 1995). They are also more likely to exert influence on their smaller partners and decide most issues by fiat (Boone & Hendriks, 2009). In addition, large firms have a higher ability to absorb legal expenses, court fees, punitive awards, and similar costs of illegality (Yeager, 1986; McKendall & Wagner, 1997), especially in the case of the detection and prosecution of their cartel (Brenner, 2011). Lastly, large firms can take action directed at non-cartel firms, such as initiating anti-dumping complaints for the purpose of preventing non-cartel firms from undercutting the artificially increased cartel price (Heeb, Kovacic, Marshall, & Marx, 2009). Through such actions, large firms are more likely to increase the potential benefits and the attractiveness of participating in a cartel. Therefore, we hypothesize as follows:

Hypothesis 3: There is a positive relationship between the firm’s size and the likelihood of its participation in a cartel.

In contrast to organizational misconduct by a single organization, such as in the cases of Enron (Premeaux, 2009) or WorldCom (Unerman & O’Dwyer, 2004), we have previously noted that cartels involve a collective decision by several firms to engage in collusive behavior.

If the rational choice approach suggests that firms are likely to pursue misconduct if they conclude that the likely benefits of the wrongdoing outweigh its potential costs (Cornish & Clarke, 1986; Tunnell, 1992), we suggest that collective factors may tip the balance and moderate the firm’s opportunities to take part in a cartel. We now turn our focus to the level of industry concentration.

The level of industry concentration reflects the degree to which a few companies dominate an industry. In a highly concentrated industry, coordination and monitoring costs are relatively reduced because of the small number of firms. Both ex ante organization costs (e.g., selection and negotiation costs with other firms) and ex post costs (e.g., monitoring and enforcement costs) are likely to be lower in a highly concentrated industry, thereby facilitating collusion practices between different firms (Clinard et al., 1979). In a highly concentrated industry, it is therefore relatively less challenging for a firm to take part in a cartel. It is easier to agree on anti-competitive practices if the colluding firms control a majority of the market share because there is less need to worry about the non-participating firms (Martin, 2010). The risk of business-stealing effects—that is, the likelihood that once the cartel restricts its output the non-participating firms will increase their

production and therefore their market share to the detriment of the cartel members—is reduced in concentrated industries. Finally, it is easier for firms in a highly concentrated industry—compared with industries with many firms—to coordinate their efforts to influence regulators and escape public scrutiny (McKendall & Wagner, 1997; Zahra et al., 2005). Knowledge about the availability of cartel opportunities and the specific techniques necessary to execute them are likely to spread more easily in a concentrated industry (Coleman, 1995). As a result, we argue that the influence of the firm's size, which reflects both the overall firm's resources and its ability to recoup fixed investments in the cartel, becomes less important when the industry concentration is higher. When only a few firms operate in an industry, the size of the firm is less likely to influence the firm's decision to be engaged in a cartel. However, when many firms compete in the same industry, cartel operations are more difficult and require substantial coordination efforts from cartel members. Only relatively large firms can manage such challenges and would therefore be willing to take part in cartels. Thus, we suggest the following:

Hypothesis 4: The relationship between the firm's size and the likelihood of its participation in a cartel is negatively moderated by the level of industry concentration.

Consistent with the rational choice perspective, the primary reason behind cartel participation is that if a firm is more profitable by itself than it is in a cartel, it will not join a cartel. Firms' opportunities to take part in a cartel are influenced by the probability of detection and conviction and the punishment involved, compared with the expected additional profits for the firm if it joins a cartel (Martin, 2010). The risk perceived by the cartel participants is strongly shaped by the institutions in which they are embedded. Institutions provide a framework through which firms engage in economic exchange using a set of rules (North, 1990). These "rules of the game" include both the laws and the regulations that govern economic activity in a country (Scott, 1995). Institutions represent shared understandings by firms about enforced prescriptions concerning what actions and outcomes are required, prohibited, or permitted (Ostrom, 2005). Institutions also promote or constrain particular actions and structure the economic, legal, and political relationship in a country (Oh & Oetzel, 2011). Furthermore, institutions support the effective functioning of the market mechanisms and facilitate transactions between firms (Meyer, Estrin, Bhaumik, & Peng, 2009; North, 1990). As a result, institutions shape business conduct, affect firms' strategic choices, and have a major impact on the effectiveness of firms' strategies (Lu & Ma, 2008; Peng, 2003; Wan & Hoskisson, 2003).

While the literature on institutions spans many subfields and many disciplines, we focus here on the quality of the country's institutions in the firm's environment and how the quality influences the opportunity for misconduct. We specifically argue that strong institutions are likely to deter firms from taking the risk of engaging in collusive behaviors. Better institutional quality discourages firms from engaging in cartels through efficient law enforcement (Treisman, 2000), stable political processes (Lederman, Loayza, & Soares, 2005), democratization (Treisman, 2000), excellent freedom of press (Lederman et al., 2005), or balanced decentralization (Treisman, 2000). Better institutions provide, in general, greater transparency about business partners and their likely behavior (Bevan, Estrin, & Meyer, 2004; Meyer et al., 2009). For instance, it has been shown that "well-established market institutions, characterized by clear and transparent rules, fully functioning checks and balances, and a robust competitive environment reduce incentives for corruption" (Mudambi, Navarra, & Delios, 2012, p. 491). In a high-quality institutional context, it is also likely that a larger segment of society (e.g., customers, competitors, or suppliers) would be aware of the possible existence of cartels and the damage they cause within society and may, therefore, be more

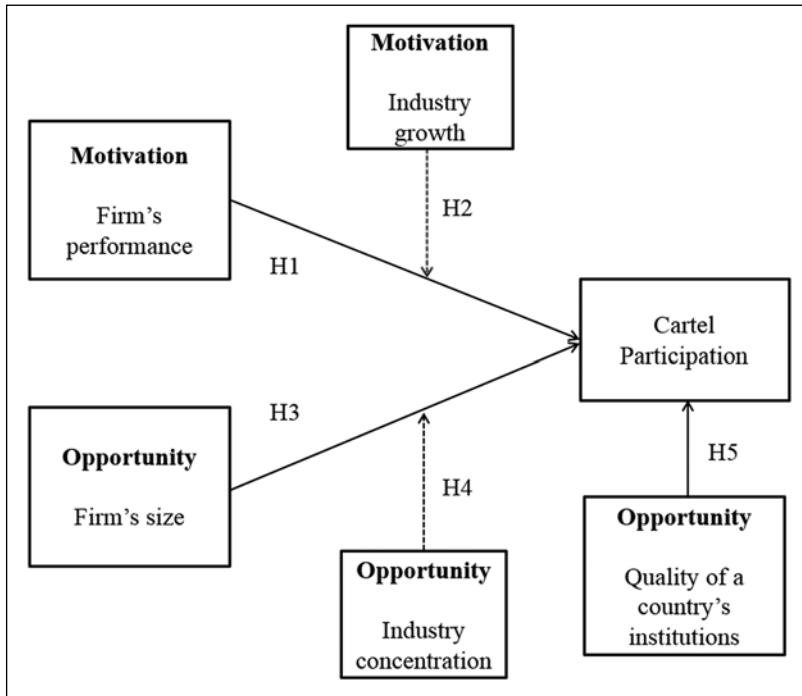


Figure 1. Model of factors supporting firms' collusive behavior.

likely to mobilize and help antitrust investigations. In sum, institutions as external constraints are critical to dissuade illegal acts such as cartels. We thus suggest the following:

Hypothesis 5: There is a negative relationship between the quality of a country's institutions and the likelihood of the firm's participation in a cartel.

Our general model is illustrated in Figure 1.

Data and Methods

In this study, our aim is to examine the factors supporting firms' participation in cartels. To this end, we collected information on the cartels that were prosecuted by the European Commission between 2001 and 2011. Below, we first explain the characteristics of this institutional framework. We then present our data sample and our econometric methods. Finally, we introduce our variables and measurements.

Institutional framework

Competition policy has been a pillar of the European Union (EU) since its birth in 1957. This policy has the double objective of guaranteeing free and fair competition in Europe and promoting economic integration. The European Commission (EC)—and, within the EC, the Directorate General (DG) for Competition—is responsible for enforcing the European antitrust regime in

cooperation with European national jurisdictions.⁶ The EC can act on a complaint by a third party (such as competitors, customers, and employees; see Brenner, 2009) or on its own initiative. The EC is both a prosecutor and a judge because it combines the investigation and decision-making functions. Since 2000, the EU has launched a vast program designed to modernize the European antitrust regime and make it more effective. Both the institutional framework and substantive laws have been reformed. In this task, the EC has been endowed with new powers in terms of investigation, sanction, and decision-making. Competition authorities have also received more human and financial resources.

The fight against cartels is at the top of the DG for Competition's agenda (OECD, 2005). 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 competition (European Commission, 2011).⁷ In addition to inspections, the EC⁸ has two primary competition policy instruments for enforcing EU competition laws and deterring firms from forming a cartel. First, the EC can impose substantial fines that could represent up to 10% of the total turnover in the case of infringement. Second, the EU has implemented a leniency program since 1996 whereby companies that help provide information about a cartel in which they participated might receive full or partial immunity from fines. This program underwent a major revision in 2002 to make it more transparent and credible in the eyes of companies, thereby enhancing the effectiveness of cartel enforcement (European Commission, 2002, 2006; Morgan, 2009; OECD, 2005).

Data sample

We collected information on the cartels that were prosecuted by the DG for Competition within the EC between 2001 and 2011 (in the conclusion, we discuss this traditional limitation in the research on misconduct where the empirical studies must rely on cases that have been detected). We focused on this 10-year period because of the availability of data. This period is characterized by an increased number of cartels investigated by the DG for Competition as a result of an improvement in the anti-cartel enforcement policy. For these cartels, the public and non-confidential version of the decision was released and reported in the *Official Journal of the European Union*.⁹ This type of archival data offers the advantage of limiting many problems from the retrospective biases or lapses of memory that are often associated with perceptual measures from a survey instrument (Golden, 1992).

A firm's participation in a cartel is a very rare event across the entire range of firms established in Europe across all industries. This rarity makes random sampling infeasible. In addition, randomly selecting from the range of firms ignores the fact that the firm's actual involvement in a cartel provides most of the information for the estimation of the antecedents of cartel participation (Lancaster & Imbens, 1996; Sorenson & Fleming, 2004).¹⁰ To overcome this issue, we used a case-control design (Holford, 2002). The controls should be representative of the population at risk of becoming cases (Schlesselman, 1982). In our empirical context, the controls should be firms that could have been engaged in a cartel but did not (Aharonson, Baum & Feldman, 2007). Following some prior studies in organizational misconduct (e.g., Baucus & Baucus, 1997; Harris & Bromiley, 2007; Schnatterly, 2003), we first included all firms that have engaged in misconduct (i.e., cartel activity). We then associated these participants in a cartel with the non-participants based on the nature of the industry and the firm's size. First, we identified the cartel's industry. In 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, we used the finest-grained industry classification available: the NAICS (North American Industry Classification System) at a 6-digit classification. We then employed the Amadeus database (Bureau Van Dijk) as a complementary source of information to

find data on all firms in these industries. The Amadeus database provides comparable financial information on the balance sheets and profit-and-loss accounts for public and private firms based in Europe from 1997. Second, we removed all micro- and small-sized enterprises, because the cartel participants are of relatively large size. Using the official EU definition, we only included the non-participant firms that have, on average, at least 10 million euros in total assets.

Our final sample with information available on explanatory variables consists of 149 firms located in 26 European countries participating in 41 cartels and 5,560 non-participating firms in their respective industries.

Econometric methods

As mentioned above, among all existing firms only a very few are actually involved in a cartel. Cartel involvement can therefore be considered a rare event. This rarity raises specific econometric concerns: with a low ratio of cartel participation (i.e., realized events), standard logistic regression techniques (such as a logit regression) tend to undermine the accuracy of the estimates (Caliendo, Fossen & Kritikos, 2009; Fabling, Grimes, & Sanderson, 2012; King & Zeng, 2001; Schildt & Laamanen, 2006; Wagner, 2004). In our case, the use of such standard techniques would underestimate the likelihood of cartel participation. Thus, to improve the predictability of cartel membership occurrence, we combine the case-control design previously described with the rare events logistic regression method (King & Zeng, 2001; Sorenson & Stuart, 2001). We implement the relogit procedure for STATA developed by Tomz, King, and Zeng (2002).

This method has been employed in the management literature to address rare events such as dyadic alliance realization or patent citation (see, e.g., Singh, 2007; Sorenson & Fleming, 2004; Sorenson & Stuart, 2001; Wang & Zajac, 2007). This econometric method offers two primary advantages: first, as we have just mentioned, standard logit models yield biased estimates in the case of a rare event; both the coefficients and the associated probabilities are underestimated. The rare events logistic regression corrects for this type of bias and provides more efficient estimators (Caliendo et al., 2009; Fabling et al., 2012). Second, the rare events logistic regression complements the case-control approach (Aharonson et al., 2007; Sorenson & Stuart, 2001). With a case-control method, realized events (i.e., firms that participate in a cartel) are oversampled relative to their true proportion in the population. The rare events logistic regression method accounts for the fact that the proportion of realized events in the sample does not correspond to the proportion of realized events in the population (King & Zeng, 2001). Oversampling can be adjusted by using either a prior correction or a weighted exogenous sampling maximum likelihood estimator.¹¹ In our analysis, we implement the prior correction procedure. The prior correction method is more appropriate when there is uncertainty in the proportion of events in the population (Fabling et al., 2012). Note, finally, that this rare events logistic regression method always computes robust standard errors. Robust standard errors are computed without the assumption of independence across observations, giving more conservative estimates for the coefficients' statistical significance (see Trapido, 2007).

In addition, following prior research (see, e.g., Aggarwal & Hsu, 2009; Benner & Tushman, 2002; Chang & Xu, 2008; Zelter, Henisz, & Holburn, 2009; Phelps, 2010), all time-varying explanatory variables are lagged by one year to alleviate concerns about reverse causality.

Variables and measurements

Dependent variable. We tracked each firm based in a European country established in an industry concerned with cartel practices from 1997 onward using the Amadeus data. For this period, we

identified which firms were involved in a cartel and over which period.¹² To this end, we used the information on cartel participation provided in the report by the European Commission. For all the years a firm takes part in a cartel, between the beginning and the end of that participation, the variable *Participation* has a value of 1. For firms that are not involved in a cartel in a given year, the variable *Participation* has a value of 0.

Independent variables. Hereafter, all firm- and industry-level variables were computed using the Amadeus dataset. All monetary variables are expressed in thousands of euros and are deflated using the GDP deflator (source: World Bank's World Development Indicators, 2011).

At the firm level, as a measure of firm-level performance (variable *Firm Performance*), we first included the accounting profitability ratio, that is the return on assets (ROA), in our estimation. ROA is a widely used measure in management (Richard, Devinney, Yip, & Johnson, 2009). Return is measured as "earnings before interest, taxes, depreciation and amortization" (EBITDA) normalized with the amount for the total assets of a firm. This indicator provides information on the company's operating profit before non-operating expenses (such as interest) and non-cash charges (depreciation and amortization). This indicator allows us to eliminate the influence of financing and accounting decisions (e.g., Qian, Khoury, Peng, & Qian, 2010). The variable *Firm Size* was measured as the logarithmic value of the firm's total assets (e.g., Waddock & Graves, 1997).

At the European industry level, we calculated the Herfindahl–Hirschmann index as an indicator of industry concentration (variable *Industry Concentration*).¹³ The firms' market shares were squared and then summed across industries. We also constructed the variable *Industry Growth Rate*, which accounts for the growth rate in industry sales.

Finally, at the country level, following previous research (He, Brouters, & Filatotchev, 2013; Meyer et al., 2009) we considered the quality of institutions (variable *Quality of Country Institutions*) using the Economic Freedom index (source: Heritage Foundation, 2011).¹⁴

Control variables. We checked for the different variables likely to influence business behavior and the decision to join a cartel. First, the prior literature on organizational misconduct has highlighted the role of age (Zahra et al., 2005). We thus checked the age of the firm (variable *Firm Age*) measured as the number of years a firm has been in business (logarithmic value). Second, because financial problems may drive a firm to take higher risks in its operational decisions (e.g., Fiegenbaum & Thomas, 1986), we also took into account the liquidity of the firm (*Firm Liquidity Ratio*) as measured by the ratio of the difference between current assets and inventories and current liabilities. This ratio captures a firm's ability to meet its short-term obligations and the corporate funds available to managers for investment. Third, we included the market share of the firm (variable-*Firm Market Share*) as a measure of the firm's market power and dominant position (Martin, 2010) in a given industry, calculated at the European level.

We also checked for unobservable factors that could influence the decision of a firm to be engaged in a cartel. We include in all estimations the year, country, and industry dummies to control respectively for the macroeconomic shocks common to each time period and the permanent unobserved differences across countries and industries.

Results

Descriptive statistics and cross-correlations of our primary explanatory variables are provided in Table 1. The variance inflation factors are below the recommended ceiling of 10 (with the maximum of 4.92 for the full model), indicating no multi-collinearity problems.

Table 1. Summary statistics and correlation matrix.

	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8
1 Firm Age	2.918	0.925	1.098	5.832	1.000							
2 Firm Liquidity Ratio	1.197	0.717	0.387	2.986	0.061	1.000						
3 Firm Market Share	0.007	0.034	0.000	0.748	0.077	0.002	1.000					
4 Firm Performance	0.105	0.080	-0.012	0.249	0.001	0.169	-0.029	1.000				
5 Industry Growth Rate	0.031	0.113	-0.161	0.255	-0.023	-0.023	-0.025	0.017	1.000			
6 Firm Size	10.627	1.427	8.923	18.644	0.137	0.043	0.341	-0.083	-0.035	1.000		
7 Industry Concentration	0.095	0.141	0.002	0.598	-0.010	-0.005	0.150	-0.012	0.207	0.002	1.000	
8 Quality of Country Institution	65.918	6.491	48.700	81.200	0.022	0.083	-0.027	0.031	-0.054	0.123	0.010	1.000

First, we perform a T-test on the equality of means of the independent variables for participants and non-participants.¹⁵ The T-test reveals significant differences between the participants and non-participants for our independent variables. The firms engaged in cartels are larger ($M = 12.427$; $SD = 2.212$) than the non-participants ($M = 10.567$; $SD = 1.353$). This difference is statistically significant ($t(22,223) = -35.219$; $p < 0.001$). The participants are also likely to have a lower performance ($M = 0.084$; $SD = 0.074$) than the non-participants ($M = 0.106$; $SD = 0.080$), and this difference is statistically significant ($t(22,223) = 7.342$; $p < 0.001$). The participants tend to operate in more concentrated industries ($M = 0.192$; $SD = 0.185$) than the non-participants ($M = 0.092$; $SD = 0.138$); this difference is also statistically significant ($t(22,223) = -18.885$; $p < 0.001$). The participants' industries are also characterized by lower growth ($M = 0.019$; $SD = 0.126$) than those of non-participants ($M = 0.031$; $SD = 0.112$), the difference being statistically significant ($t(22,223) = 2.855$; $p < 0.001$). Finally, the participating firms tend to be established in a country with lower quality institutions ($M = 65.256$; $SD = 5.478$) than the non-participating firms ($M = 65.940$; $SD = 6.521$). This difference is statistically significant ($t(22,223) = 2.774$; $p < 0.001$).

The rare events logistic regression results are reported in Table 2.¹⁶ We proceed as follows. To evaluate the consistency and robustness of our findings across estimations, we first show a baseline model (Model 1 of Table 2) comprising control variables only. We then augment this baseline model by separately adding each of our independent variables (Models 2 to 6) and finally present the full model (Model 7).

The baseline Model 1 shows that the firms with relatively larger market share (7.516 ; $p < 0.001$) are more likely to participate in cartels. Model 1 also suggests that firms with a relatively high liquidity ratio are less likely to participate in cartels (-0.226 ; $p < 0.001$). These results are consistent with the prior research on organizational misconduct, which showed that firms with fewer slack resources are more likely to engage in illegal actions (Staw & Szwajkowski, 1975). We also found that relatively older firms (0.258 ; $p < 0.001$) tend to participate more in cartels. Such findings may be explained by the required experience necessary to organize a complex partnership such as a cartel. These three control variables are also significant in the full Model 7, but the variables *Firm Age* and *Firm Liquidity Ratio* are significant to a lesser extent (at 10% and 1%, respectively).

In Models 2 and 7, we find empirical support for Hypothesis 1. Hypothesis 1 predicts that a firm is more likely to participate in a cartel if it is a relatively low-performing firm. The coefficient estimate for the firm performance variable is negative and significant in Model 2 (-5.384 ; $p < 0.001$) and Model 7 (-2.391 ; $p < 0.001$). Hypothesis 2 posits that the relationship between the firm's performance and the likelihood of its participation in a cartel is negatively moderated by low industry growth. The negative and significant interaction of firm performance with industry growth in Models 3 and 7 provides support for this hypothesis. This interactive variable has a 1% significance level in Model 3 (-11.49 ; $p < 0.01$) and Model 7 (-9.471 ; $p < 0.01$). We plot the interaction result to illustrate the moderating effect of industry growth in Figure 2, where the X-axis represents the firm performance, and the Y-axis accounts for the likelihood that a firm participates in a cartel. For illustration purposes, we create a dummy variable to distinguish between the cases with a high (1) versus low (0) level of industry growth based on a mean split of the sample. It can be seen that the cartel participation likelihood increases with a lower level of firm performance (from the right to the left of the X-axis). The cartel participation likelihood shows, however, a greater increase for a low industry growth rate than for a high industry growth rate.

Hypothesis 3 proposes that there is a positive relationship between the firm's size and the likelihood of its participation in a cartel. The sign on this variable is positive and significant in Models 4 and 7 (Model 4: 0.522 ; $p < 0.001$; Model 7: 0.603 ; $p < 0.001$), providing strong support for Hypothesis 3. Hypothesis 4 suggests that this positive relationship between the firm's size and the

Table 2. Antecedents of cartel participation.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Firm Age	0.258*** (0.0518)	0.247*** (0.0492)	0.248*** (0.0492)	0.0736† (0.0432)	0.0757† (0.0438)	0.255*** (0.0526)	0.0785† (0.0442)
Firm Liquidity Ratio	-0.226*** (0.0641)	-0.153* (0.0622)	-0.149* (0.0621)	-0.231*** (0.0630)	-0.229*** (0.0633)	-0.216*** (0.0644)	-0.197** (0.0617)
Firm Market Share	7.516*** (0.902)	7.402*** (0.898)	7.448*** (0.908)	4.420*** (0.667)	3.849*** (0.645)	7.773*** (0.941)	4.692*** (0.669)
Firm Performance		-5.384*** (0.618)	-4.238*** (0.747)				-2.391*** (0.717)
Industry Growth Rate			0.707 (0.501)				-0.273 (0.472)
Firm Performance * Industry Growth			-11.49** (4.434)				-9.471** (3.668)
Firm Size				0.522*** (0.0281)	0.658*** (0.0328)		0.603*** (0.0313)
Industry Concentration					11.11*** (1.193)		10.40*** (1.162)
Firm Size * Industry Concentration					-0.785*** (0.108)		-0.765*** (0.109)
Quality of Country Institutions						-0.0318** (0.0112)	-0.0459*** (0.0114)
Constant	-6.815*** (0.323)	-6.415*** (0.314)	-6.539*** (0.318)	-11.83*** (0.426)	-13.77*** (0.474)	-6.117*** (0.741)	-10.12*** (0.805)
Observations	22225	22225	22225	22225	22225	22225	22225

Robust standard errors in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$. Industry, country and year dummies are included in each regression. The rare events logistic regression method is applied.

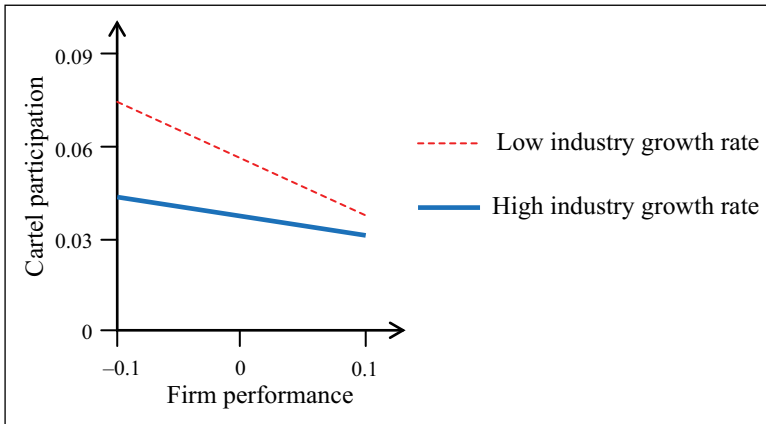


Figure 2. The effect of firm performance on cartel participation by level of industry growth rate.

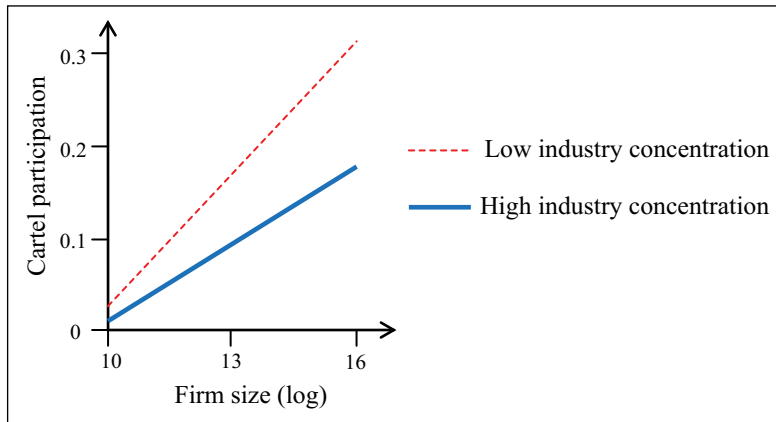


Figure 3. The effect of firm size on cartel participation by level of industry concentration.

likelihood of its participation in a cartel is likely to be negatively moderated by a high level of industry concentration. In support of Hypothesis 4, the coefficient estimate for the interaction between firm size and industry concentration is negative and significant in Model 5 (-0.785 ; $p < 0.001$) and Model 7 (-0.765 ; $p < 0.001$). We illustrate this significant moderating effect of industry concentration in Figure 3, where the X-axis represents the firm size and the Y-axis is the likelihood that a firm is engaged in a cartel. We execute a mean split of the sample to distinguish between industries with a high (1) versus low (0) level of concentration. This figure shows that the likelihood of cartel participation increases with a greater firm size (from the left to the right of the X-axis). The rise in the likelihood of cartel participation is, however, stronger for a low than a high industry concentration.

We then predicted in Hypothesis 5 that there is a negative relationship between the quality of a country's institutions and the likelihood of the firm's participation in a cartel. Models 6 and 7 provide consistent support for Hypothesis 5 (Model 6: -0.0318 ; $p < 0.01$; Model 7: -0.0459 ; $p < 0.001$).

Supplementary analyses

This section outlines different robustness tests (detailed results are available from the authors). We group these tests into three broad categories of concern.

First, we further investigate the role of the quality of institutions as an opportunity factor in cartel participation. In addition to our variable *Quality of Country Institutions*, we included in our estimation a time-varying indicator of the overall quality of the EU countries' institutions. This indicator was computed as the average value (by year) of the Economic Freedom index of all European countries (source: Heritage Foundation, 2011). We found that both the quality of country institutions and the average value of the quality of European countries' institutions significantly reduce the propensity of firms to be engaged in a cartel. As explained in the Institutional Framework section, the leniency program is considered to be a major antitrust instrument to fight cartels. This program saw a major reform in 2002. To account for the potential effect of this reform and the subsequent increased effectiveness of the leniency program, we replaced the set of year dummies with a dummy variable that takes a value of 1 after 2002 and 0 before that year. This variable was negative and significant. We also examined whether the results presented above extend to alternative measures for the quality of the country's institutions. The research on institutions suggests alternative measures of institutional quality (e.g., Cuervo-Cazurra & Genc, 2008). We therefore replaced the Economic Freedom index using different variables: (a) voice and accountability, (b) regulatory quality, and (c) government effectiveness from the Worldwide Governance Indicators (source: World Bank, 2010). Results were similar.

The second robustness check concerns the investigation of potential biases that might affect the results and interpretations. To increase the ratio of cartel participation (i.e., realized events), we executed a set of supplementary analyses. First, we dropped from our sample the non-participant firms that are established in a European country where no firms in the industry were involved in the cartel. We found similar results using this alternative approach. Second, we proceeded differently by keeping all cartel participants and adding a smaller group of non-participating firms that were randomly drawn. The results were robust when we included 20 non-participating firms for each cartel participant (Fabling, Grimes, & Sanderson, 2012). To further alleviate possible reverse causality issues, we used a two-year lag for all our explanatory variables. The findings were similar. This additional test further alleviates the concern that endogeneity issues confound the results.

Third, as an additional check, we re-ran all the regressions using a weight-based correction with the rare events logistic regression method. Again, the results were qualitatively similar to the reported results.

Discussion

The primary objective of this study was to investigate the factors that support firms' collusive behavior. Drawing on the rational choice perspective in organizational misconduct, we developed a theoretical framework organized around factors related to motivation and opportunity. Our analysis has provided broad empirical support for our predictions. Specifically, we first find that a firm's participation in a cartel is more likely if it is a low-performing firm. However, this relationship is negatively moderated by low industry growth. Second, from our distinction between internal and external opportunities for participation, our results suggest that there is a positive relationship between the firm's size and the likelihood of its participation in a cartel. We also find support for our argument that this positive relationship is negatively moderated by a high level of industry concentration. Third, our findings suggest that higher quality country institutions are associated

with a lower likelihood of the firm's participation in a cartel. These findings have both theoretical and managerial implications.

Theoretical implications

We advance the organizational misconduct research by arguing that a set of mechanisms influences the likelihood of a firm's participation in a cartel. Although the past literature has also incorporated particular firm and industry factors to explain firms' organizational misconduct (e.g., Baucus & Near, 1991; McKendall & Wagner, 1997), our theoretical understanding of these factors remains limited. As summarized by Geis, Meier, and Salinger (1995, p. 97): "In regard to establishing whether a particular business will violate an antitrust law at a particular time, the current theories would appear to do only slightly better, if at all so, than those people who throw darts at stock charts." For instance, Baucus and Near (1991, pp. 15–16)—studying Fortune 500 firms convicted by the courts—note that "although [they] expected industry to be a strong predictor of corporate illegality, there was no theoretical basis for predicting which industries would be more likely to engage in illegal behavior." In the same way, McKendall and Wagner—examining firms' violations of environmental laws—observe that "it seems questionable whether any sort of relationship is likely between industry concentration and other types of corporate illegality" (1997, p. 626). The lack of relevance of industry factors in these studies is, however, not surprising because Baucus and Near (1991) and McKendall and Wagner (1997) focused on single organizations. Similarly, prior research on organizational misconduct in general has tended to focus on misconduct by single individuals or organizations (Vadera & Pratt, 2013; Vardi & Wiener, 1996; Zahra et al., 2005). We extend these works by studying the phenomenon of cartels that involves a group dimension. By drawing upon the rational choice theory, we suggest that firms assess the potential payoffs and risks of participating (or not) in a cartel and that motivation and opportunity factors may support or undermine this decision. We specifically note that the industry context may create conditions that pressure, encourage, or enable cartels and thereby interacts with the firms' motivations to participate in cartels. Hence, our study offers new insights into the different facets of firms' motivations to participate in interorganizational misconduct. In addition, we argue that the firms' collusive behavior is supported by a set of factors related to opportunities that could also be interacting with the industry environment. Our study complements the prior research on organizational misconduct with arguments and findings that opportunities inside and outside of firms influence their participation in these interorganizational illegal activities.

Furthermore, very little work has attempted to study the collective dimension of organizational misconduct. The few studies that have attempted to do so (Ashforth & Anand, 2003; Brief, Buttram, & Dukerich, 2001) have stressed the organization of misconduct between individuals *within* a firm and not *between* firms. Interorganizational misconduct has received only very limited attention within the organization studies literature. While individual-level theories of misconduct usually assume that organizational participants take part in illegal activities as independent actors (Greve et al., 2010), in cartels firms engage in wrongdoing in conjunction with other firms. Cartels involve the intentional orchestration of collective efforts between independent firms and thus add a group dimension to the wrongdoing. Compared with misconduct by single actors, our study 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) bears the sole responsibility for the misconduct. The wrongdoer does not have to coordinate his/her/its actions with others. In contrast, the group of firms must collectively observe secrecy when developing their collective action. Each participating firm, then, faces the risk that another firm may not respect the collective secret and may break the agreement. In addition to this risk of betrayal, failures in coordination among members may

increase the risk of being detected. This dimension leads us to discuss how our study also contributes to the literature on interorganizational relationships.

Our arguments and results also have important theoretical implications for the literature on interorganizational partnerships. While most scholarly works do not recognize the differences in nature between legal and illegal partnerships, we contribute to the more diverse theoretical approaches to interorganizational relationships (e.g., Combs, Michael, & Castrogiovanni, 2004).

While most interorganizational partnerships face the double challenge of aligning actions and preventing opportunistic behavior between partners (Gulati, Wohlgezogen, & Zhelyazkov, 2012; Lumineau & Quelin, 2012; Malhotra & Lumineau, 2011), illegal partnerships distinguish themselves by the concealment issue. Firms involved in cartels not only have to bring together the partners' contributions, they also have to maintain secrecy when working together across organizational boundaries. In fact, as previously mentioned, each participating firm faces the risk that another firm may not respect the collective secret and may break the agreement. While a direct comparison between legal and illegal partnerships is beyond the scope of this study, we see many opportunities to systematically explore the similarities and possible differences between these two types of partnerships.

As we have suggested, the organization of cartels—and, more broadly, secret organizations—relies on a particular rationale. For instance, while the literature has traditionally shown the role institutions play in supporting the formation of interorganizational relationships (e.g., Vasudeva, Spencer, & Teegen, 2013), our arguments and findings suggest a different logic. High-quality institutions deter firms from participating in cartels. The central element of secrecy may also mean that the organization of secret interorganizational partnerships differs from the organization of lawful activities (Baker & Faulkner, 1993). We see here opportunities to extend our study by analyzing the specific requirements of illegal collaborations in terms of information-sharing, feedback, and decision-making mechanisms to maintain secrecy.

In addition, the prior research on lawful partnerships may be driven by data availability and the bandwagon effects between scholars to focus on what are considered the most salient topics (Lumineau & Henderson, 2012; Parmigiani & Rivera-Santos, 2011). Because most knowledge about interorganizational partnerships, alliances, and joint ventures is based on the studies of lawful practices, our current understanding of this organizational form may be overly influenced by the features of the most studied forms of partnerships. We suggest that the study of cartels can yield important theoretical insights into our understanding of interorganizational relationships. It would be particularly interesting to better understand whether illegal collaborations are qualitatively different from legal collaborations or whether they differ gradually. Such endeavors may be the starting point for specific theories to explain illegal partnerships.

We see, in particular, a need for research that investigates the extent to which the antecedents of alliance and partnership formation overlap for legal versus illegal relationships. The literature on interorganizational partnership formation—i.e., alliances, mergers, acquisitions, joint ventures, or consortia—is large and spans many theoretical perspectives, ranging from transaction costs (Williamson, 1975) to power maximization (Pfeffer & Salancik, 1978), social embeddedness (Gulati, 1995), resources (Eisenhardt & Schoonhoven, 1996), and knowledge (Grant & Baden-Fuller, 2004). However, this literature has not focused on the potential specific drivers of illegal partnerships. As such, our theoretical framework indicating the role of motivation and opportunity factors may be a first step in this direction.

Future research could also study whether organizations that participate in cartels also collaborate legally. Because some firms may combine operations in the formal economy with underground activities, we suggest going beyond a mere distinction between legal and illegal organizations (such as mafias or drug cartels). Further investigations along these lines could redefine the

boundary conditions of the existing theoretical frameworks on, for instance, organizational mechanisms, types of interdependence, and contract enforcement in interorganizational partnerships.

Managerial implications

Because cartels can severely disrupt market forces and hurt non-participating firms, shareholders, consumers, and society as a whole (Morgan, 2009), our study carries important managerial and public policy implications.

While participating in cartels may have disastrous consequences for firms, ranging from financial penalties to the loss of reputation and exclusion from future exchange, our framework of motivation and opportunity factors can make it easier to identify collusive behaviors. As such, this framework may help managers facing information asymmetries—such as headquarters managing their subsidiaries, shareholders monitoring their companies, firms looking for trading partners, or firms considering a merger or an acquisition—to be aware of the primary factors behind cartel participation so they are better able to detect the firms engaged in cartels. Moreover, it may assist firms to develop corporate social responsibility policies, for instance, by providing a guideline to prevent anti-competitive practices. It may also foster business ethics within firms by raising awareness of potential issues and define responsible practices with competitors and customers.

Furthermore, our study has important implications for policy makers. To be effective, competition requires firms to act independently of others but be subject to the competitive pressure other firms exert. Cartels formed by firms aim to restrict market competition (Martin, 2010). Because it would be extremely costly for antitrust agencies to monitor every firm, the identification of markers conducive to collusive activities is a good way to focus attention on suspects. Antitrust agencies may particularly benefit from extending their screening approach to consider insights into how firms make real strategic decisions to participate in cartels. Recognizing these factors is crucial for the design of more effective behavioral control strategies. Our framework may thus help regulation agencies allocate their limited resources and direct their investigations toward the most suspicious firms.

Limitations and Conclusion

The primary limitation of our study relates to the nature of our sample. Because we used cartels' prosecution decisions, we observed only those cartels that were detected by the European competition authorities. Our sample may thus be biased due to its dependency on prosecution as a sample selection criterion (Levenstein & Suslow, 2006). This limitation is traditional for research on misconduct, where empirical studies must rely on cases of misconduct that have been detected and reported publicly (Brenner, 2011; Greve et al., 2010). However, the prior research on misconduct has suggested that there is no reason to suspect that undetected misconduct differs from detected cases of misconduct (e.g., Clinard et al., 1979).

Future research might examine the generalizability of our findings in other contexts. Because the boundaries between legal and illegal activities are directly influenced by the legal context and because norms and values regarding illegal activities differ between countries, opportunities exist to validate our findings in other legal, cultural, historical, and institutional environments.

This study provides theoretical arguments and empirical evidence for a set of motivation and opportunity factors to explain firms' participation in cartels. Given the economic and social impact of collusive activities, we hope this study will encourage more research by organization studies scholars on the antecedents of illegal interorganizational partnerships.

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Notes

1. First, as has been noted by the literature on law and society (e.g., Maher, 2011; Stephan, 2010), Rhine economies such as the Netherlands and Germany have long considered cartels to be both useful and beneficial for their nations' prosperity. Second, legal cartels may exist for two reasons. First, there may be a specific objective of the cartel, as in the case of export cartels—that is, when groups of exporters are allowed to work jointly when selling products (Bertrand & Ivaldi, 2007) or when cartels aim to restructure a declining industry (Coate & Kleit, 1991). Second, there may be exceptional historical circumstances, such as the cartels in Nazi Germany (Newman, 1948) or in Japan during the pre-World War II period (Nakazawa & Weiss, 1989). Today, these types of legal cartels are nevertheless exceptions. As noted by Connor (2004, p. 241): "Nations in nearly every corner of the world have adopted antitrust laws, and virtually all of these laws make price fixing illegal under most circumstances (Wells, 2002)." According to the Allen & Overy law firm (2013), in 2013 more than 115 countries thus far have adopted legal measures to fight against cartels.
2. For instance, Weisburd, Wheeler, Waring, and Bode (1991, p. 98) note that "successful price-fixing conspiracies may victimize thousands of consumers without their even becoming aware that a crime has been committed", and Braithwaite and Pettit (1990, p. 186) observe: "Consider the tetracycline class action allegations that as a result of an illegal price-fixing conspiracy a large proportion of the population of the United States and the whole world suffered artificially high prices during the 1950s and 1960s whenever they consumed broad-spectrum antibiotics. The many people in the Third World who died because they could not afford the new wonder drugs would never have conceived of themselves as having been victims of the antitrust laws" (cited in Geis et al., 1995, p. 76).
3. Connor and Lande (2006) estimated that cartels in the US overcharge, that is, they set a price over the competition price, an average of 18% to 37%. Such figures range between 28% and 54% in the EU.
4. Despite its rich tradition of research on cartels, the industrial organization literature has not directly studied the factors leading firms to participate or not in a cartel within an industry. The industrial organization perspective has largely overlooked the heterogeneity of company behavior within the same industry. Most of the attention has been focused on the industry and/or the cartel as a unit of analysis (see Levenstein & Suslow, 2006 and Martin, 2010 for reviews).
5. This cartel was severely sanctioned in 1999 by US antitrust authorities with total fines of approximately US \$900 million (Connor, 2004).
6. National authorities and courts play an important role in enforcing European antitrust rules (European Commission, 2011). These authorities may be called upon to apply Article 101 (e.g., in the case of private civil actions) and are required to apply EU competition rules when addressing cartels that affect the functioning of the European market. The European Competition Network, a network of EU competition authorities, helps to ensure the homogeneity, effectiveness, and consistency of the application of EU rules.
7. Article 101 of the Treaty on the Functioning of the European Union (European Commission, 2011) states: "The following shall be prohibited as incompatible with the internal market: all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the common market, and in particular those which: (a) directly or indirectly fix purchase or selling prices or any other trading conditions; (b) limit or control production, markets, technical development, or investment; (c) share markets or sources of supply; (d) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage; (e) make the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts."

8. There have been differences in antitrust regimes between countries, in particular between the EU and the US, for political, institutional, or historical reasons (e.g., Bertrand & Ivaldi, 2007; Möschel, 2007). The first competition regime goes back to the US laws at the end of the 19th century with the enactment of the Sherman Act in 1890. Differences in antitrust laws, however, have always been less important regarding cartels than other antitrust subjects (such as vertical contractual restraints or abuse of dominance; see Fox, 1997; Kovacic, 2007). Moreover, although some differences in antitrust regimes still persist (for instance, European antitrust authorities cannot impose criminal sanctions, unlike US antitrust authorities), these differences have decreased dramatically over time through the sharing of best practices and the continuous harmonization of rules as promoted by international institutions such as the OECD or the ICN—the International Competition Network (Bertrand & Ivaldi, 2007; Kovacic, 2007).
9. See <http://eur-lex.europa.eu/JOIndex.do>.
10. Realized events provide most of the information when estimating the antecedents of an event's likelihood. Non-events carry less information (King & Zeng, 2001; Singh, 2007; Sorenson & Stuart, 2001).
11. Prior correction adjusts the intercept term of the estimated model, while the weighted exogenous sampling maximum likelihood estimator weighs the likelihood function according to the proportion of events in the population (Beneish, 1999).
12. We followed the cohort of participating and non-participating firms over time in a given industry until the year in which the cartel was discovered and terminated.
13. The higher the Herfindahl–Hirschmann index, the higher the industry concentration. The maximum value for this index is 1 (i.e., monopoly position).
14. This variable is time varying. The higher the index, the higher the quality of the country's institutions. For the entire data sample composed of all countries around the world, this variable has a mean of 58.76 and a standard deviation of 12.03.
15. We report the mean (hereafter denoted M), standard deviation (SD), t statistic and degrees of freedom (t(d.f.)), and the significance level (p).
16. Following recent research (e.g., Echambadi & Hess, 2007), we did not mean center our variables, as it does not change the overall measures of fit.

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