

CORPORATE GOVERNANCE AND COLLUSIVE BEHAVIOR

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This chapter examines the relationship between corporate governance and competition, particularly with regard to cartel formation, and discusses how corporate governance and firm agency problems affect optimal law enforcement against cartels, both in terms of sanctions and leniency policies. Many of the conclusions appear applicable, with minor changes, to nonantitrust forms of collusion, such as collusion between auditors and management, and more generally to corporate and organized crime.

1. Introduction

Only in the case of perfect competition is the optimality of decentralized exchange guaranteed by the fundamental theorems of welfare economics. Unfortunately, few real world industries are even somewhat close to the ideal definition of perfect competition. Most industries are oligopolistic, and many of them are subject to sophisticated strategic behavior that may lead firms to curb competition and monopolize markets, that is, to maximize industry profits while reducing social welfare. A sound competition policy is therefore often required to avoid the potential social welfare losses linked to collusive behavior.

As with any other public policy, a sound competition policy means an effective competition policy, that is, a policy implemented by well-informed regulators endowed with sufficient sanctioning power to deter violations. Antitrust authorities need to know which factors signal the presence of, or simply facilitate, anticompetitive behavior, while legislators need to know how to structure a legal environment that obtains competition-enhancing effects at the lowest possible cost.

Corporate governance factors directly shape firms' objectives and choices and therefore play a crucial role in determining a firm's attitudes towards competition and anticompetitive behavior. Corporate governance factors also determine who are the "key players" in a firm's decision to behave anticompetitively. Corporate governance therefore must be a consideration in fashioning an effective competition policy.

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This chapter examines the relationship between corporate governance and cartel formation and examines how corporate governance factors affect the optimal enforcement of antitrust law against cartels in terms of detection, sanctions, and leniency policies. Section 2 introduces the issue by briefly reviewing the current knowledge on the complex relationship between corporate governance and product market competition generally. Section 3 discusses corporate governance practices that are likely to facilitate cartel formation collusive behavior in particular. Section 4 examines how antitrust law enforcement against cartels should be adapted in the light of corporate governance issues. Section 5 briefly concludes by highlighting the relevance of the discussion for other forms of corporate or organized crime, like corruption, earnings management, and management-auditor collusion.

2. Corporate governance and competition

As used in this chapter, the term “corporate governance” means the set of institutional arrangements that keep a firm’s agency problems under control and lead managers to pursue shareholders’ interests rather than their own goals.¹ The relationship between corporate governance and competition is rather complex, but crucial.

Competition and corporate governance. Competition is typically regarded as the main force that disciplines firms by keeping them responsive to their markets, inducing them to adopt efficient practices (including good corporate governance arrangements) and encouraging them to maximize efficiency.² Theoretical work has identified a number of channels through which product market competition tends to improve corporate governance and performance, including:

- *Firm selection:* Effective competition ensures that a larger fraction of demand is served by the most efficient firms through the “survival of the fittest.” When effective competition exists, less efficient firms tend to be driven out of the market by more efficient incumbents or entrants, ensuring greater efficiency in the long run, including in the realm of firms’ corporate governance practices.³
- *The exit threat for managers:* Effective competition forces firm managers to manage the firm efficiently to ensure the firm’s survival and thereby to avoid

1. For an up-to-date, in-depth treatment, see JEAN TIROLE, *THE THEORY OF CORPORATE FINANCE* (2005). For surveys of the literature regarding corporate governance, see, e.g., Andrei Shleifer & Robert Vishny, *A Survey of Corporate Governance*, 52 *J. FINANCE* 737 (1997), and Marco Becht, Patrick Bolton & Alisa Roell, *Corporate Governance and Control* (National Bureau of Economic Research, Working Paper No. 9371, 2002).

2. Franklin Allen & Douglas Gale, *Corporate Governance and Competition*, in *CORPORATE GOVERNANCE, THEORETICAL AND EMPIRICAL PERSPECTIVES* (Xavier Vives ed., 2000), make this point very convincingly as well as reviews and discusses most previous work on the subject.

3. See Philippe Aghion & Mark Schankerman, *On the Welfare Effects and Political Economy of Competition-Enhancing Policies*, 114 *ECON. J.* 804 (2004); Jan Boone, *Competitive Pressure: The Effects on Investments in Process and Product Innovation*, 31 *RAND J. ECON.* 549 (2000); A. Alchian, *Uncertainty, Evolution and Economic Theory*, 58 *J. POL. ECON.* 211 (1950).

losing their jobs. Inefficient management, for example, can drive the firm into bankruptcy⁴ or make the firm into a target of a hostile acquisition.⁵

- *Relative performance evaluation*: The presence of competitors allows for comparisons of managerial performance among competing firms, sharpening incentives through yardstick competition and eliciting higher managerial effort.⁶
- *Rents reduction*: Intense competition reduces a firm's profit, free cash flow, and corporate rents in general, reducing the "temptation" for managerial misbehavior.⁷ When competition keeps firms "lean and hungry," there is little that opportunistic managers can embezzle or waste.

Empirical evidence shows a positive effect of competition on firm performance and innovation. Several firm-level studies have found evidence of positive effects of product market competition on productivity performance.⁸ Other studies have found that product market competition and good corporate governance (financial pressure) improve firms' performance in terms of productivity growth, and that the two forces tend to be substitutes, though the former has a stronger effect.⁹ However, these two forces are potential substitutes only from a productivity point of view. From a general welfare point of view, in most cases lack of competition will tend to raise prices, reduce output, and harm consumers.

Notwithstanding these tendencies, economic theory cannot offer unambiguous predictions on the general relation between competition and firm performance. As first noted by Schumpeter, small market shares and lack of market power may reduce

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4. See, e.g., Michael Raith, *Competition, Risk and Managerial Incentives*, 93 AM. ECON. REV. 1425 (2003); Klaus Schmidt, *Managerial Incentives and Product Market Competition*, 64 REV. ECON. STUD. 191 (1997); Oliver D. Hart, *The Market Mechanism as an Incentive Scheme*, 14 BELL J. ECON. 366 (1983).
 5. Competition in the market for corporate control is a relatively novel phenomenon that, when present, may reinforce or substitute for product market competition. See, e.g., H.G. Manne, *Mergers and the Market for Corporate Control*, 73 J. POL. ECON. 110 (1965).
 6. See, e.g., Andrei Shleifer, *A Theory of Yardstick Competition*, 16 RAND J. ECON. 319 (1985); Barry Nalebuff & Joseph Stiglitz, *Information, Competition and Markets*, 73 AM. ECON. REV. 278 (1983); Oliver D. Hart, *supra* note 4.
 7. See Xavier Vives, *Corporate Governance: Does it Matter?*, in CORPORATE GOVERNANCE: THEORETICAL AND EMPIRICAL PERSPECTIVES I (Xavier Vives ed., 2000); Michael Jensen, *Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers*, 76 AM. ECON. REV. 323 (1986).
 8. See, e.g., Richard Blundell, R. Griffith & J. Van Reenen, *Market Share, Market Value and Innovation in a Panel of British Manufacturing Firms*, 66 REV. ECON. STUD. 529 (1999); Stephen J. Nickell, *Competition and Corporate Performance*, 104 J. POL. ECON. 724 (1996); Martin Baily & Hans Gersbach, *Efficiency in Manufacturing and the Need for Global Competition*, in BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 307 (Martin Neil Baily, Peter C. Reiss & Clifford Winston eds., 1995).
 9. Silke Januszewski, Jens F. Kolke & Joachim K. Winter, *Product Market Competition, Corporate Governance and Firm Performance: An Empirical Analysis for Germany*, 56 RES. ECON. 299 (2002), confirm the strong effect of product market competition on German firms' productivity improvements but find no effect of corporate governance variables. Comparable results for transition and developing economies are found in I. Grosfeld & T. Tressel, *Competition and Corporate Governance: Substitutes or Complements? Evidence from the Warsaw Stock Exchange*, 10 ECON. TRANSITION (2002); Stephen Nickell, *What Makes Firms Perform Well?*, 41 EUR. ECON. REV. 783 (1997).

incentives to invest in the search for productivity-enhancing innovation.¹⁰ Indeed, recent studies find an inverted-U relationship between competition and innovation: at low levels of product market competition, an increase in competition fosters innovation, while at already high levels of competition a further increase hinders innovation.¹¹ From an antitrust perspective, the interesting part of the parameter space is where cartels may substantially reduce competition, i.e., the first part of the inverted-U relationship; there, competition unambiguously increases innovation and performance. Moreover, when strong competition substantially increases the likelihood of bankruptcy, managers' incentives to act in the firm's interests may decrease.¹² Both negative effects, however, are likely to matter the most when the market is highly competitive. They are less relevant from a cartel deterrence perspective, since cartels are intended to hinder competition.

Corporate governance and competition. Corporate governance variables may also, in return, influence the degree of competition in a product market.

A firm's behavior is determined by the objective function of those who control it. In the real world, many interacting factors determine the final shape of the objective function of those who control the firms. The most important among these factors are the central elements of corporate governance: managerial incentives, ownership, and debt structure. For example, early managerial theories of the firm stressed that, when ownership is separated from control, firms tend to pursue objectives different from profit maximization.¹³ With limited liability, debt may directly affect the intensity of oligopolistic competition¹⁴ and that financial constraints, linked to credit market imperfections, may lure more liquid rivals into predatory strategies, as suggested by the "deep pockets" argument.¹⁵

More recent work has highlighted how poor corporate governance arrangements or rules may reduce competition by establishing *financial barriers to entry* in product

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10. See, e.g., Daron Acemoglu & Joshua Linn, *Market Size in Innovation: Theory and Evidence from the Pharmaceutical Industry*, 119 Q.J. ECON. 1049 (2004); Xavier Vives, *Innovation and Competitive Pressure* (Centre for Economic Policy Research, Discussion Paper No. 4369, 2004); Philippe Aghion & Peter Howitt, *A Schumpeterian Perspective on Growth and Competition*, in 2 ADVANCES IN ECONOMICS AND ECONOMETRICS: THEORY AND APPLICATIONS (David M. Kreps & Kruskal F. Wallis eds., 1997).
 11. See Philippe Aghion, Nicholas Bloom, Richard Blundell, Rachel Griffith & Peter Howitt, *Competition and Innovation: An Inverted-U Relationship* (Institute for Fiscal Studies, Working Paper No. 0204, 2002).
 12. See, e.g., Klaus Schmidt, *Managerial Incentives and Product Market Competition*, 64 REV. ECON. STUD. 191 (1997).
 13. See Michael Jensen & William Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 J. FIN. ECON. 305 (1976); ROBERT MARRIS, *THE ECONOMIC THEORY OF MANAGERIAL CAPITALISM* (1964); OLIVER WILLIAMSON, *MANAGERIAL DISCRETION AND BUSINESS BEHAVIOR* (1964); RICHARD M. CYERT & JAMES G. MARCH, *A BEHAVIORAL THEORY OF THE FIRM* (1963); William Baumol, *On the Theory of Oligopoly*, 25 ECONOMICA 187 (1958); HERBERT SIMON, *ADMINISTRATIVE BEHAVIOR* (2d ed. 1957).
 14. See James Brander & Tracy Lewis, *Oligopoly and Financial Structure: The Limited Liability Effect*, 76 AM. ECON. REV. 956 (1986).
 15. See, e.g., Patrick Bolton & David Sharfstein, *A Theory of Predation Based on Agency Problems in Financial Contracting*, 80 AM. ECON. REV. 93 (1990).

markets. It has been shown that financial intermediaries with substantial monopoly power have incentives and means to restrict entry in downstream product markets of potential competitors of their borrowers;¹⁶ that agency costs in the equity and debt markets may interact to reduce financially constrained entrepreneurs' ability to start new firms, increasing concentration and reducing competition in product markets;¹⁷ and that deep-pocket incumbents may lobby to maintain poor corporate governance rules that amplify agency problems in financial markets and protect their incumbency rents from potential entrants.¹⁸

3. Corporate governance and cartel formation

It is well known that contracts with third parties may have important strategic effects. Corporate governance variables, like managerial incentive schemes and financial arrangements, are contracts with third parties from the point of view of competitors.¹⁹ There is a considerable amount of empirical evidence on managerial incentives, ownership, and debt structures. This section briefly discusses the empirically observed corporate governance arrangements that are likely to facilitate cartel formation and maintenance.

3.1. Managerial incentives, stock options, and collusion

Recent empirical work on detected and successfully prosecuted cartels shows that the decision to form a cartel is typically taken at the very top level of the firm hierarchy and is then implemented by issuing instructions to lower level managers that try to hide the collusive arrangement.²⁰ Since top managers are compensated using various types of

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16. See Sudipto Battacharya & Gabriella Chiesa, *Proprietary Information, Financial Intermediation and Research Incentives*, 4 J. FIN. INTERMEDIATION 328 (1995); Thomas Hellman & Marco Da Rin, *Banks as Catalysts for Industrialization*, 11 J. FIN. INTERMEDIATION 366 (2002); Giacinta Cestone & Lucy White, *Anti-Competitive Financial Contracting: The Design of Financial Claims*, 58 J. FIN. 2109 (2003). Robust supporting evidence can be found in Nicola Cetorelli & Philipp Strahan, *Finance as a Barrier to Entry: Bank Competition and Industry Structure in Local U.S. Markets*, 61 J. FIN. 437 (2006).
 17. See, e.g., Paolo Fulghieri & Matti Suominen, *Does Bad Corporate Governance Lead to Too Little Competition? Corporate Governance, Capital Structure, and Industry Concentration* (ECGI Working Paper No. 74/2005, Mar. 2005).
 18. See, e.g., Enrico Perotti & Paolo Volpin, *Lobbying on Entry* (Working Paper, Sept. 2006); Marco Pagano & Paolo Volpin, *Shareholder Protection, Stock Market Development, and Politics*, 4 J. EUR. ECON. ASS'N 315 (2006). Raghuran Rajan & Luigi Zingales, *The Great Reversals: The Politics of Financial Development in the 20th Century*, 69 J. FIN. ECON. 5 (2003), confirms the importance of this effect, showing that over the last century investor protection correlates with trade openness. This suggests that import liberalization, by dissipating incumbents' rents, reduces their hostility to better investor protection and paves the way for financial development. See Abdul Abiad & Ashoka Mody, *Financial Reform: What Shakes It? What Shapes It?*, 95 AM. ECON. REV. 66 (2005).
 19. THOMAS SCHELLING, *THE STRATEGY OF CONFLICT* (1960), provides an insightful, although informal, analysis. Steffen Lippert & Giancarlo Spagnolo, *Networks of Relations and Social Capital* (Centre for Economic Policy Research, Discussion Paper No. 5078, 2005), recently showed that Schelling's insight also applies to implicit or relational contracts sustained by repeated interaction, such as long-term supply relationships.
 20. See Joe Harrington, *How Do Cartels Operate?*, 2 FOUND. & TRENDS IN MICROECONOMICS 1 (2006).

incentive schemes, it is important to understand why and how these schemes may drive top managers to form collusive agreements.

Managerial incentives and bonuses. Although several empirical studies of managerial compensation were conducted in the 1980s, the empirical literature on managerial incentives exploded in the 1990s.²¹ To understand how the objectives of real world top managers influence firms' anticompetitive attitudes, one can introduce top managers' incentive schemes, bonus contracts as observed in empirical studies, in a supergame-theoretic model of dynamic competition. This kind of analysis shows that when managers have a preference for smooth time-paths of profits (as revealed by the empirical evidence on earnings management and income smoothing) and when their employment contracts have capped incentive provisions (such as common "bonus plans" or termination contracts with substantial incumbency rents), manager-led firms can sustain collusive agreements much more easily than profit-maximizing ones.²² The reason is that capped incentives make managers' objective function strictly concave in each period profits, hence managers' marginal utility from higher profits decreasing. This reduces managers' evaluation of gains from unilaterally defecting from the collusively agreed strategies and increases their evaluation of losses from a price war following a defection.

This finding leads to a complementary question: Do stock-based incentives, like stock options, induce a more competitive attitude in managers, so that concerns about tacit collusion and social welfare can be reduced? To answer this question, one should keep focus on stock-based compensation plans as commonly designed in the real world: relatively liquid plans awarding stock-based bonuses vesting in a number of consecutive years (typically four), after which a new plan is established.²³ This kind of incentive can also be introduced in a classical model of repeated oligopoly to evaluate their effects on collusive behavior. It turns out that as long as the stock market has perfect foresight, some dividends are distributed, and incentives are paid more than once or are deferred, compensation packages related to stock price greatly facilitate collusion.²⁴ The reason is that stock-related incentives link managers' *present* compensation to the stock market's expectations about the firms' *future* profitability. When a breach of a tacit collusive agreement occurs and is detected by competitors, the stock market anticipates the negative effect of the breach on firms' future profitability linked to the forthcoming competitive/price-war phase and immediately discounts it on the stock price, thus reducing managers' short-run gains from any deviation.²⁵ When stock-based incentives

21. See, e.g., Michael Jensen & Kevin Murphy, *Performance Pay and Top-Management Incentives*, 98 J. POL. ECON. 225 (1990) (presenting the provocative thesis that CEOs' compensation contracts had little incentive power). For an excellent survey, see Kevin Murphy, *Executive Compensation*, in 3 HANDBOOK OF LABOR ECONOMICS 2485 (Orley Ashenfelter & David Card eds., 1999).

22. See Giancarlo Spagnolo, *Managerial Incentives and Collusive Behavior*, 49 EUR. ECON. REV. 1501 (2005).

23. Stacey R. Kole, *The Complexity of Compensation Contracts*, 43 J. FIN. ECON. 79 (1997).

24. Giancarlo Spagnolo, *Stock-Related Compensation and Product-Market Competition*, 31 RAND J. ECON. 22 (2000).

25. In addition, a defection from a cartel could signal declining future industry profits to an imperfectly informed stock market, as it is well known that cartels are harder to sustain (hence defections are more

are deferred, the first procollusive effect is reinforced by the fact that the already limited beneficial effect of short-run gains from deviation on the stock price may be completely gone at the time the manager receives the bonus. Delegation of control to managers under deferred stock-related compensation plans allows owners to support the collusive agreement at any level of discount factor. Note that this result is independent of whether managerial contracts are short or long term.

Stock options, short-termism, governance, and collusion. In the two decades before the burst of the stock market bubble, the level and pay-performance sensitivity of top managers' compensation increased enormously, particularly in the United States, because of a wave of adoption of stock-related incentives, such as stock option plans.²⁶ Stock options are now regarded by some observers as one of the main causes behind the many recent episodes of corporate fraud and earnings manipulation, including Enron and WorldCom. There is currently a lively debate among financial economists and legal experts trying to clarify how and why the increase in stock-based compensation led to such widespread managerial misbehavior.²⁷

The result mentioned earlier—that real world stock-related compensation may strongly stabilize cartels—appears puzzling when contrasted to the literature on stock-based managerial compensation. There appears common agreement in this literature that stock options induced managerial “short-termism.” This should lead managers to focus extensively on short-term results. One might expect that this would have the effect of destabilizing cartels by increasing managers' valuation of short-term gains from unilaterally defecting from collusive strategies relative to future long-term losses from the price wars triggered by defections once detected by partner cartel members. How can stock options give managers a short-term perspective in terms of financial performance and a long-term one in terms of collusive behavior?

There are at least two answers to this question. First, a time span of, say, five years, is often considered short term for a firm's financial performance. But this is a very long time for cartels, whose average estimated total duration is about five years.²⁸ Therefore, the short-termism is not likely to hinder the procollusive effect of stock-related compensation. In other words, the short-term objectives of firm managers discussed in the finance literature are sufficiently long term—if compared to the average lifetime of cartels—to allow the mechanisms described before making stock options procollusive.

frequent) in declining industries. This would further depress the stock price and reinforce the procollusive effect of stock-related compensation.

26. See Brian Hall & Jeffrey Liebman, *Are CEOs Really Paid Like Bureaucrats?*, 113 Q.J. ECON. 653 (1998).
27. See, e.g., Patrick Bolton, Josè Scheinkman & Wei Xiong, *Pay for Short-Term Performance: Executive Compensation in Speculative Markets*, 30 J. CORP. L. 721 (2005); LUCIAN BEBCHUCK & JESSE FRIED, *PAY WITHOUT PERFORMANCE: THE UNFULFILLED PROMISE OF EXECUTIVE COMPENSATION* (2004); Oren Bar-Gill & Lucian Arye Bebchuk, *Misreporting Corporate Performance* (Harvard Law School, Discussion Paper No. 400, June 2003); Patrick Bolton, Josè Scheinkman & Wei Xiong, *Executive Compensation and Short-Termist Behavior in Speculative Markets* (National Bureau of Economic Research, Working Paper No. W9722, 2003).
28. Margaret C. Levenstein & Valerie Y. Suslow, *What Determines Cartel Success?*, 64 J. ECON. LITERATURE 43 (2006); John M. Connor, *Private International Cartels: Effectiveness, Welfare, and Anticartel Enforcement* (Purdue Agricultural Economics, Working Paper No. 03-12, 2003).

Second, and more fundamentally, to positively affect the stock price and CEO compensation, the exceptional earnings from a secret price cut or from any other unilateral defection from a collusive strategy must be publicly disclosed. And while it typically takes time for the many dispersed investors to fully update expectations and incorporate the effect of the exceptional reported earnings in the stock price,²⁹ the increase in reported income and sales can readily be observed by suspicious partner cartelists who can react with a price war, driving down the stock price. The origin and effects of price wars are well understood by media and markets. Moreover, a price war can suggest a prior collusive arrangement and draw attention from relevant competition authorities.³⁰

In conclusion, the separation of ownership and control with managers under the most commonly observed managerial incentive contracts—bonus contracts and stock options—may substantially facilitate tacit collusion among firms, at least in the sense of discouraging defection once the collusive arrangement is in place. Paradoxically, “high powered” stock-based incentives, besides being probably at the root of the many recent episodes of earnings management and corporate mismanagement, are no guarantee of competitive behavior and may in fact tend to facilitate collusive behavior by making cartels more stable.

3.2. *Cross-ownership, pyramids, and networks*

Firms can effect their incentives to compete or to collude also by changing their ownership or financial structures. Passive investments, interlocking directorates, pyramidal groups, and debt relationships may all act as collusion facilitating devices.

Passive investments and competition. Firms or firm owners may acquire their rivals’ stocks, thereby acquiring the right to a percentage of their rivals’ profits. If by doing so they gain (possibly joint) control or influence over the other company, they are likely to be subject to merger control review. However, passive investments that do not alter the control structure of the companies involved are empirically much less likely to be subject to antitrust scrutiny.³¹ Such passive financial interest may nonetheless affect the market conduct of the involved firms, leading to a less competitive market outcome.

In a static Cournot game,³² where firms sell substitute products, any modification of the ownership structure whereby a firm’s controller, i.e., the firm’s controlling shareholders, raises its interest in a rival firm reduces the equilibrium market output. In

29. See Gur Huberman & Tomer Regev, *Contagious Speculation and a Cure for Cancer: A Nonevent That Made Prices Soar*, 56 J. FIN. 387 (2001), for an example of how slowly the stock market can react to important news about possible future earnings.

30. Jonathan Laing, *Big Mac Wednesday: McDonald’s Price War Battle Plan Casts a Pall Over Fast-Food Stocks*, BARRON’S, Mar. 3, 1997, at 14.

31. Examples of such passive investments are Microsoft’s acquisition of nonvoting stock of Apple and Northwest Airlines’s acquisition of 14% of the common stock of Continental Airlines. For a discussion of these and several other cases, see David Gilo, *Passive Investment*, which appears as Chapter 67 in this book, and David Gilo, *The Anticompetitive Effect of Passive Investment*, 99 MICH. L. REV. 1 (2000).

32. See Robert Reynolds & Bruce Snapp, *The Competitive Effects of Partial Equity Interests and Joint Ventures*, 4 INT’L J. INDUS. ORG. 141 (1986).

principle, n firms can secure themselves the monopoly profit, without any collusive agreement. This occurs if each controller owns $1/n$ of all competing firms. The intuition for these results is straightforward. A partial cross-ownership arrangement changes players' payoff functions. A firm's controller payoff with a financial interest in a rival depends also on the level of profit gained by the latter. Any decision that has a negative impact on the rival's profit (such as increasing output) will be carried out up to the point where the marginal gain stemming from its own profits equals the marginal loss stemming from the reduction of profits of the competing firm. If controllers do not hold financial interests in rival firms, the latter value is always zero. With completely separate ownership, competitive strategies entail private negative effects that are external. The acquisition of a financial interest partially internalizes the external effects of aggressive competitive strategies. If all controllers have an equal share of the profits of all firms in the market, the consequences of their market decisions are fully internalized and the monopoly outcome prevails.³³

This result is robust to different model specifications.³⁴ However, it would be wrong to conclude that passive investments *always* have harmful consequences such that they would warrant a per se antitrust prohibition. Like mergers, in some cases they are motivated by different reasons than lessening competition, since long-term partial ownership arrangements may be useful in aligning the incentives of firms involved in alliances or joint ventures when these projects require ex ante relationship-specific investments. Corporate equity ownership stakes, together with product market relationships in research and development-intensive industries, may lead to improvements in operating performance and a substantial increase in investment expenditures by target firms.³⁵

Most of the formal literature on cross-ownership has focused on static games. Very few models study the impact of cross-ownership on the sustainability of a collusive equilibrium in infinitely repeated games.³⁶ In a repeated Cournot game, the ability of passive investments to generate collusive effects is ambiguous.³⁷ This ambiguity stems

33. These results are still valid, to a large extent, if the passive investment in rivals is made by other firms rather than other firms' controllers. The distinction between the two arrangements is discussed in Paolo Buccirossi, *Facilitating Practices*, in HANDBOOK OF ANTITRUST ECONOMICS (P. Buccirossi ed., 2007).

34. See Erik Dietzenbacher, Bert Smid & Bjorn Volkerink, *Horizontal Integration in the Dutch Financial Sector*, 18 INT'L J. INDUS. ORG. 1223 (2000); David Reitman, *Partial Ownership Arrangements and the Potential for Collusion*, 42 J. INDUS. ECON. 313 (1994); Friedel Bolle & Werner Güth, *Competition Among Mutually Dependent Sellers*, 148 J. INSTITUTIONAL & THEORETICAL ECON. 209 (1992); David Flath, *Horizontal Shareholding Interlocks*, 13 MANAGERIAL & DECISION ECON. 75 (1992); David Flath, *When Is It Rational for Firms to Acquire Silent Interests in Rivals?*, 9 INT'L J. INDUS. ORG. 573 (1991).

35. See Jeffrey Allen & Gordon M. Phillips, *Corporate Equity Ownership, Strategic Alliances and Product Market Relationships*, 55 J. FIN. 2791 (2000), for an empirical study showing that partial ownership arrangements might be useful to consolidate other market relationships which require specific investments.

36. See David A. Malueg, *Collusive Behavior and Partial Ownership of Rivals*, 10 INT'L J. INDUS. ORG. 27 (1992); David Gilo, Yossi Moshe & Yossi Spiegel, *Partial Cross Ownership and Tacit Collusion*, 37 RAND J. ECON. 81 (2006).

37. This result is obtained by Malueg, *supra* note 36.

from the fact that partial ownership reduces the incentive to deviate from a collusive agreement, as the deviating firm bears part of the costs imposed on rivals; but it also softens market competition, reducing the severity of punishment associated with abandoning collusion and returning to competition, as is often the case in practice.

If we consider a market with homogeneous products and homogeneous good Bertrand competition, crisper results emerge.³⁸ The acquisition by a *firm* of some shares of a competitor never hinders collusion and in fact relaxes the incentive constraint for the acquiring firm and for all the firms with a direct or indirect interest in the acquiring firm. This model also shows that such ownership arrangements affect the ability of firms to collude only if they lower the critical discount factor of the firm with the highest incentive to deviate, that is, the industry maverick. Competition authorities are often suspicious if an industry leader gains control over a maverick, as this may render collusion more likely. However, when an investment is passive so that the acquirer cannot directly influence the decisions of the target firm, and only the incentives of the parties to the transaction are modified, the risk of a coordinated effect arises if the role of the maverick in the transaction is reversed, i.e., if it is the maverick that invests in competing firms. If the maverick does not hold equity interests in any rival firms, its incentive to deviate is not changed by other share transactions that may take place in the industry.

Interlocking directorates and pyramids. Cross-shareholding may be coupled with cross-board membership, giving rise to interlocking directorates that may create the potential for coordinated anticompetitive practices. One possible effect may be to improve the flow of information between firms. Improved knowledge of rivals' intentions, even when it stems from casual discussions that do not affect payoffs directly, may significantly help firms in solving the coordination problem of reaching a collusive equilibrium.³⁹ Better and swifter knowledge of competitors' conduct helps firms monitor one another, thus facilitating the enforcement of a collusive scheme.⁴⁰ However, interlocking directorates may also improve contracting relationships.⁴¹ Moreover, information sharing in an oligopoly market may reduce market uncertainty so as to improve business decisions and, in some circumstances, increase welfare.⁴²

38. Gilo et al., *supra* note 36, have developed this model. Kai-Uwe Kühn & Michael S. Rimler, *The Comparative Statics of Collusion Models* (Centre for Economic Policy Research, Discussion Paper No. 5742, July 2006), show that the negative effects of cross-ownership on deviation payoffs tend to dominate, even when there are countervailing effects on the strength of the punishment phase.

39. Joseph Farrell & Matthew Rabin, *Cheap Talk*, 10 J. ECON. PERSP. 103 (1996), provide a nontechnical survey of games with cheap talk. The implications for competition policy of information-sharing arrangements and of different forms of direct communication among firms are discussed by Kai-Uwe Kühn, *Fighting Collusion by Regulating Communication between Firms*, 16 ECON. POL'Y 167 (2001).

40. See XAVIER VIVES, *OLIGOPOLY PRICING: OLD IDEAS AND NEW TOOLS* (1999); KAI-UWE KÜHN & XAVIER VIVES, *INFORMATION EXCHANGES AMONG FIRMS AND THEIR IMPACT ON COMPETITION* (1995).

41. See David F. Schoorman, Max H. Bazerman & Robert S. Atkin, *Interlocking Directorates: A Strategy for Reducing Environmental Uncertainty*, 6 ACAD. MGMT. REV. 243 (1981).

42. A statement of general validity on the welfare properties of information sharing in an oligopoly market is not possible, as the outcome depends, in a rather complex way, on the mode of competition (price versus quantity), the type of uncertainty (demand versus costs), and on whether firms' strategies are

Of course, the collusive risks are much higher if cross-ownership or interlocking directorates involve horizontal competitors. Early concerns about the competitive effect of interlocking directorates between competing firms led largely to their prohibition in Section 8 of the 1914 Clayton Act, although there are some significant exceptions, especially for small firms and firms that do not substantially overlap.⁴³ Vertically related firms, on the other hand, are more likely to pursue efficiency goals through such arrangements. However, there are situations in which a nexus of vertical arrangements may have relevant horizontal effects. Indeed, pyramidal ownership structures may determine indirect cross-ownership and control, completely disguising its presence.⁴⁴ Whether this has implications for market competition is a subject not yet investigated, but it is evident that pyramidal ownership arrangements pose several problems for a rigorous competition policy. First, they hinder a straightforward application of merger regulation in which the notion of control plays a central role. Second, they may create less competitive environments leading to less efficient market equilibria. Third, they can facilitate collusion by providing more aligned incentives, improving monitoring, and increasing the scope for punishing cheaters.

Debtholders, stakeholders, and other procollusive relationships. Powerful “informed lenders” often exert control on their borrowers, for example, ensuring a board seat on the debtor’s board. This board member can then be informed of the debtor’s long-term strategies, and possibly coordinate the lender’s own strategies with those of the debtor, as was common at the turn of the century.⁴⁵ This suggests that findings discussed earlier in this chapter with regard to passive and controlling investments in rivals, pyramids, and interlocking directorates may also apply to concentrated debt stakes in the hands of third parties, such as banks or funds. Indeed, although the implication of most established theories on the effects of financial structure on product market competition—the “deep pocket” (or predation) theory and the limited liability theory—is that debt should lead either the leveraged firms or their competitors to behave

complements or substitutes. See, e.g., Xavier Vives, *Duopoly Information Equilibrium: Cournot and Bertrand*, 34 J. ECON. THEORY 71 (1984); Esther Gal-Or, *Information Sharing in Oligopoly*, 53 ECONOMETRICA 329 (1985); Esther Gal-Or, *Information Transmission—Cournot and Bertrand Equilibria*, 53 REV. ECON. STUD. 85 (1986); Lode Li, *Cournot Oligopoly with Information Sharing*, 16 RAND J. ECON. 521 (1985); Carl Shapiro, *Exchange of Cost Information in Oligopoly*, 53 REV. ECON. STUD. 433 (1986); Sakai Yasuhiro, *Cournot and Bertrand Equilibria under Imperfect Information*, 46 J. ECON. 213 (1986); Alison J. Kirby, *Trade Associations as Information Exchange Mechanisms*, 19 RAND J. ECON. 138 (1998); Michael Raith, *A General Model of Information Sharing in Oligopoly*, 71 J. ECON. THEORY 260 (1996).

43. 15 U.S.C. § 19.

44. Rafael La Porta, Florencio López-de-Silanes & Andrei Shleifer, *Corporate Ownership Around the World*, 54 J. FIN. 471 (1999), document the large diffusion of this ownership structure especially in those countries with weak legal protection of minority shareholders.

45. Bradford De Long, *Did J. P. Morgan’s Men Add Value?: An Economist’s Perspective on Financial Capitalism, 1991*, in *INSIDE THE BUSINESS ENTERPRISE: HISTORICAL PERSPECTIVES ON THE USE OF INFORMATION* 205-36 (Peter Temin ed., 1992). Miguel Cantillo Simon, *The Rise and Fall of Bank Control in the United States: 1890-1939*, 88 AM. ECON. REV. 1077 (1998), demonstrates that at the time of “financial capitalism,” J.P. Morgan men on railways boards coordinated their decision making, resulting in substantial monopoly profits.

more aggressively, empirical work has shown that in concentrated industries high leverage tends to result in a reduction in competition.⁴⁶

A recent explanation for this reduction derives from the interaction between capital structure, managerial incentives, and the ability of firms to form and sustain cartels.⁴⁷ If shareholders can commit against strategic default by hiring a manager with a valuable reputation (i.e., with much to lose from bankruptcy), bank debt may end up enhancing a firm's ability to "behave prudently" and collude in product markets. Analogous commitments to debtholder-friendly behavior through commonly observed bonus schemes have even stronger procollusive effects that add to the effect of managers' reputations. Common or "allied" lenders can increase their rents by controlling the choice of managers and their incentives in downstream oligopolies. They can make the choice of "prudent" managers credible. A very similar procollusive effect may be obtained through other common or related stakeholders, such as industry-wide trade unions.⁴⁸

Even when credit markets are competitive and firms have multiple lenders, by choosing at least one common lender, or a common set of allied lenders, oligopolistic firms can credibly commit to form and sustain collusive agreements that would not be otherwise feasible. When there is no common lender, independent lenders may still be able to monopolize otherwise competitive downstream product markets by having agents on the boards of the firms they are not financing, for example, through information networks composed of indirectly interlocking directorates, each monitoring the borrowers of the competing banks. These links through lenders may be hard to identify because they may also go through *pyramidal* debt structures which are not subject to merger regulation's disclosure rules. Collusive networks can be obtained with links other than interlocking directors, ownership, or debt relationships; informal long-term collaborative relationships of any kind, including supply relationships in intermediate goods markets, can indirectly link apparently unrelated firms or CEOs.⁴⁹

46. See Judith Chevalier, *Capital Structure and Product Market Competition: Empirical Evidence from the Supermarket Industry*, 85 AM. ECON. REV. 415 (1995); Gordon Phillips, *Increased Debt and Industry Product Markets: An Empirical Analysis*, 37 J. FIN. ECON. 189 (1995); Dan Kovenock & Gordon Phillips, *Capital Structure and Product Market Rivalry: How Do We Reconcile Theory and Evidence*, 85 AM. ECON. REV. 403 (1995); D. Kovenock & G.M. Phillips, *Capital Structure and Product Market Behavior: An Examination of Plant Exit and Investment Decisions*, 10 REV. FIN. STUD. 767 (1997); Nicola Cetorelli, *Does Bank Concentration Lead to Concentration in Industrial Sectors?* (Federal Reserve Bank of Chicago, Working Paper No. 2001-01, Mar. 2001).

47. See Giancarlo Spagnolo, *Debt as a Credible Collusive Device* (Stockholm School of Economics, Working Paper No. 349, 2001). Vojislav Maksimovic, *Capital Structure in Repeated Oligopolies*, 19 RAND J. ECON. 389 (1988), first addressed the relation between leverage and collusion, showing that debt may hinder collusion by allowing firm owners to defect from the collusive agreement and leave the firm bankrupt in the middle of a price war to debtholders. Spagnolo builds on that model by introducing managers and relations between lenders and obtains the opposite result, showing that powerful lenders that exert some control on borrowers have the incentives to cause them to coordinate and to monopolize downstream industries.

48. See Spagnolo, *supra* note 47; Paul Heidhues, *Employers' Associations, Industry-wide Unions, and Competition (Competitiveness and Industrial Change)*, Discussion Paper No. FS IV 00-11, Aug. 2000.

49. See Steffen Lippert & Giancarlo Spagnolo, *Networks of Relations and Social Capital* (Centre for Economic Policy Research, Discussion Paper No. 5078, 2005).

Multiproduct firms at different levels of the production chain, meeting in different input, geographical, or product markets, may form connected networks of relationships that facilitate coordination and enforce collusion between apparently unrelated competing firms by creating procollusive *indirect multimarket contact* where no direct multimarket contact appears present.

In conclusion, two primary points should be emphasized. First, forms of partial (joint) or pyramidal ownership and debt arrangements, directly or indirectly interlocking directorates, and other closed networks of relationships, may facilitate anticompetitive behavior and should be reviewed for such effects by the relevant antitrust authorities. Second, while such arrangements may lead to both unilateral and coordinated anticompetitive effects, they may also serve the goal of protecting specific investments from opportunistic behavior, especially in research and development-intensive industries. Therefore, the most appropriate regime under which to evaluate such arrangements is one similar to that under which mergers are evaluated.

4. Corporate governance and antitrust law enforcement

A popular aphorism states that “corporations don’t misbehave, people do.” But people make their decisions on the basis of their preferences and incentives, and the latter are largely determined by the contractual arrangements that shape principal-agent relationships within the firm. Therefore, law enforcement against cartels and other forms of corporate crime raises several issues related to corporate governance. They hinge on two fundamental and intertwined questions: (1) Who should be liable for antitrust infringement? (2) Who should monitor agents’ behavior? This section briefly presents the answers provided by the law and economics literature so far and then discusses how the recent introduction of leniency and whistleblower reward programs may affect them.

Corporate and individual liability. One of the main differences between European and U.S. antitrust laws is that in the European Union typically only corporate entities can be held liable for violations of antitrust laws,⁵⁰ whereas in the United States responsible employees as well as their corporations can be subject to criminal liability and individually sanctioned for the corporation’s antitrust violations. This raises a question as to why antitrust laws should provide for both individual and corporate liability, or, if it is determined that a dual responsibility regime is not necessary, whether it is firms or individuals that should be subject to publicly enforced sanctions.

The modern economic analysis of public enforcement against individual crimes, initiated by the seminal contribution of Gary Becker,⁵¹ identifies a simple rule that calls for the imposition of an expected sanction equal to the harm caused by the wrongful act. This sanction maximizes social welfare as it discourages only inefficient crimes. The transposition of the Becker rule in the antitrust setting needs several adjustments. In the

50. Certain national legislations (e.g., United Kingdom, Ireland) also provide for criminal sanctions against individuals who violate anticartel provisions. Moreover, for some forms of collusion, such as bid rigging in public procurement auctions, corporate liability is coupled with individual criminal sanctions in most European jurisdictions.

51. Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169 (1968).

case of individual crimes, the same person who decides whether to commit the crime also enjoys the benefits of his conduct. By contrast, corporate wrongful acts typically stem from principal-agent relationships in which the decision to behave illegally may depend on decisions made by more than one subject, i.e., the principal(s) and the agent(s), and in which both the decisions of the principal(s) and that of the agent(s) may affect the payoff of the other subject. The relevant questions when considering sanctions for violations of the law then are two-fold: (1) How can the law impose sanctions that target those who benefit from the illicit conduct? (2) How can the enforcement system be structured to direct penalties toward the subjects who have the actual responsibility for deciding the firm's conduct? The answer to both questions depends on three factors: (1) the level of the optimal fine, (2) the maximum fine that can be imposed (which in turn depends on subjects' ability to pay), and (3) the way principals and agents may discipline their relationship.

If we assume that (A1) the level of the fine is such that a firm as a whole is better off if it behaves legally, (A2) there are no insolvency concerns, and (A3) through compensation contracts and/or indemnification managers and other stakeholders can allocate the burden of the sanction among themselves as they wish, then the choice between individual and corporate liability is irrelevant as any type of regime combining sanctions on employees and corporations, including those in which only employees or only firms are sanctioned, can yield an optimal enforcement. However, if one or more of these assumptions is violated, the optimal public enforcement of anticartel norms may require an interior solution of both individual and corporate liability.

For the sake of simplicity, let us assume that cartels are always inefficient as the harm (consumer and deadweight loss) always exceeds the collusive extra profits,⁵² and therefore the level of the sanctions should be sufficient to prevent any cartel formation. According to the prevailing literature that does not take into account the effects of leniency programs,⁵³ this would require the laws to set an expected sanction equal to the expected collusive gain, so that cartels are unprofitable in expectation. Back-of-the-envelope calculations show that, given current resources of law enforcement agencies and absent leniency programs, the Beckerian optimal fine may be above most firms' ability to pay, so that in many jurisdictions actual fines are insufficient to discourage the formation of cartels.⁵⁴

52. This assumption is usually made in the literature on antitrust law enforcement. See, e.g., Gregory J. Werden & Marilyn J. Simon, *Why Price Fixers Should Go to Prison*, 32 ANTITRUST BULL. 917 (1987). However, although naked price fixing is a per se antitrust violation in many jurisdictions, it is important to keep in mind that there are circumstances in which competition harms consumers and a cartel can be beneficial from a social welfare point of view. See, e.g., Calzolari Giacomo & G. Spagnolo, *Reputation and Collusion in Procurement* (Working Paper, 2006); Rachel E. Kranton, *Competition and the Incentive to Produce High Quality*, 70 ECONOMICA 385 (2003); Paolo Buccirossi, *A Search Model Where Consumers Choose Quantity Based on Expected Price*, 51 J. INDUS. ECON. 429 (2003); Joseph E. Stiglitz, *Imperfect Information in the Product Market*, in 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 771 (Richard Schmalensee & Robert Willig eds., 1989); William H. Landes, *Optimal Sanctions for Antitrust Violations*, 50 U. CHI. L. REV. 652 (1983).

53. See, e.g., Werden & Simon, *supra* note 52.

54. See *id.*; W.P.J. Wils, *Does the Effective Enforcement of Articles 81 and 82 EC Require Not Only Fines on Undertaking But Also Individual Penalties, In Particular Imprisonment?*, in EUROPEAN

Empirical research shows that even in the many cases where optimal Beckerian fines could easily be paid by wrongdoing firms, courts and antitrust agencies impose much smaller fines, and further reduce them when a firm's ability to pay appears lower.⁵⁵ This latter practice of "adapting" the level of fines to firms' different ability to pay is inefficient in terms of law enforcement and dangerous from an economic point of view. For example, such a policy may undermine cartel deterrence, by allowing colluding firms to partially or entirely avoid fines by distributing more dividends and issuing more debt (thereby reducing their apparent ability to pay), and create additional inefficiencies in production due to the suboptimal capital structure these firms are led to maintain.⁵⁶

Going back to the problem of liability, because either assumption (A1) or assumption (A2) above can be violated, following the Beckerian approach the optimal sanction policy would also require nonpecuniary sanctions (i.e., imprisonment), therefore requiring that individuals who have violated the law are also held liable.⁵⁷

If firms are liable and able to pay the optimal fine, a different reason for holding employees liable comes from a possible violation of assumption (A3). Provided that managers cannot be perfectly monitored and that they personally benefit from forming a cartel, if the sanction that the firm can impose on them for breaching the law is limited, so that their expected net benefit from the cartel is still positive, then even if shareholders want their managers to act legally, they may not be able to provide them with the right incentives to do so.⁵⁸ The relevant condition holds either if the sanction that is needed to discourage managers from forming cartels exceeds their individual

COMPETITION LAW ANNUAL 2001: EFFECTIVE PRIVATE ENFORCEMENT OF EC ANTITRUST LAW 411 (Claus Dieter Ehlermann & Isabela Atanasiu eds., 2003); RICHARD A. POSNER, ANTITRUST LAW (2d ed. 2001); U.K. DEPARTMENT OF TRADE AND INDUSTRY, A WORLD CLASS COMPETITION REGIME (2001). For an international perspective, see JOHN M. CONNOR, PRIVATE INTERNATIONAL CARTELS: EFFECTIVENESS, WELFARE, AND ANTICARTEL ENFORCEMENT (2003).

55. See, e.g., Catherine Craycraft, Joseph L. Craycraft & Joseph C. Gallo, *Antitrust Sanctions and a Firm's Ability to Pay*, 12 REV. INDUS. ORG. 171 (1997).
56. Regulation of securities issues may also be required. See Yeon-Koo Che & Kathrin Spier, *Strategic Judgment Proofness* (Northwestern University Center for the Study of Industrial Organization, Working Paper No. 0081, June 2006); Paolo Buccirossi & Giancarlo Spagnolo, *Antitrust Sanctions in the Presence of Leniency Programs*, 4 CONCURRENCES 23 (2006); Paolo Buccirossi & Giancarlo Spagnolo, *Optimal Fines in the Era of Whistleblowers: Should Price Fixers Still Go to Prison?*, in THE POLITICAL ECONOMY OF ANTITRUST ch. 4 (V. Goshal & J. Stennek eds., 2007) [hereinafter Buccirossi & Giancarlo, *Optimal Fines*].
57. This argument is clearly and forcefully made by Werden & Simon, *supra* note 52. A new argument for targeting employees has been advanced by Wallace P. Mullin & Christopher M. Snyder, *Targeting Employees for Corporate Crime and Forbidding Their Indemnification* (Working Paper, Apr. 2005). Mullin and Snyder argue that because criminal firms must pay higher wages to induce their employees to commit the crime, guilty employees will be richer than innocent ones, are less protected by limited liability, and will therefore pay higher fines. *Id.* Accounting for total fines (on firm and employee), this self-selection effect on fines increases deterrence.
58. Mitchell A. Polinsky & Steven Shavell, *Should Employees Be Subject to Fines and Imprisonment Given the Existence of Corporate Liability?*, 13 INT'L REV. L. & ECON. 239 (1993), formalize this argument in the context of corporate tort. A possible solution to this problem is for the firm to improve its sanctioning power by paying a higher salary to the manager (i.e., an efficiency wage), conditioned on no infringements. However, this may entail higher production costs that also lead to allocative inefficiencies.

wealth and sufficient sanctions can thus be imposed only through imprisonment (something a firm clearly cannot do), or if a firm faces a limit on the magnitude of the pecuniary penalty it can impose on its employees and the optimal sanction calls for a fine above the firm's limit. In both cases, since the state does not face the same limits as the firm, individual liability may be needed in order to prevent cartel formation.

More generally, the extent to which manager would react to penalties imposed on the company depends on the extent to which the manager participates in the cash flow right of the company's equity, that is, on his equity stake or on the elasticity of his compensation scheme to the company's profits. This creates an immediate connection between the effectiveness of penalties and the quality of corporate governance since a key dimension of corporate governance is the alignment of the manager to the shareholder interests induced by the magnitude of his equity stake (or equivalent incentive compensation schemes).⁵⁹

If individual liability is needed to prevent cartel formation, one must determine whether individual liability alone would be sufficient to prevent the illegal behavior. Individual liability may not suffice if the wrongful act causes social harm or private benefits such that, given the probability of detection, the optimal sanction is above the maximum that can be imposed on individuals (violation of assumption A2).⁶⁰ If, in order to solve insolvency problems, individual sanctions are below the optimal level, assumption (A1) is violated, and since the expected fine is below the expected gain, principals may be willing to indemnify managers. In order to restore cartel deterrence, the only solution is to improve the enforcer's sanctioning power by holding companies liable as well.

Public and private monitoring. Monitoring a firm's conduct essentially means monitoring the behavior of its agents. Both public enforcement bodies and firms can monitor agents. Therefore, in setting a public enforcement mechanism, we must understand its impact on the level of monitoring carried out within the boundaries of the firm, with the aim of minimizing total social cost. To do so, we must also take into account the incentives for firms to adopt ex ante and ex post policing measures and to report agents' misconduct.⁶¹

Firm incentives depend above all on the expected profits stemming from its actions and internal organization, which in turn depend on the level of the sanctions and the rules for their imposition. In the following analysis, we assume that the expected *level* of the sanction makes the illegal conduct unprofitable ex ante. When the opposite is true, costly internal monitoring that prevents managers' misconduct will never be seriously implemented. Similarly, individual liability alone may remove incentives for

59. This is why Giovanni Immordino & Marco Pagano, *Optimal Auditing Standards* (Centre for Studies in Economics & Finance, Working Paper No. 133, 2005), find that corporate governance and auditing quality regulation and enforcement tend to be complementary. Their argument applies with little modification to our context.

60. See, e.g., Jennifer Arlen & Reinier Kraakman, *Controlling Corporate Misconduct: An Analysis of Corporate Liability Regimes*, 72 N.Y.U. L. REV. 687 (1997).

61. See *id.* (providing an informal analysis of this topic); John Lott, *Corporate Criminal Liability*, in *ENCYCLOPEDIA OF LAW AND ECONOMICS* (Boudewijn Bouckaert & Gerrit De Geest eds., 1999).

corporations to monitor crime *ex ante* because principals, who must decide the level of internal monitoring, would not be directly penalized.⁶²

The choice of sanctions for violations among strict corporate liability, a duty-based liability, or a composite regime will have an impact on the level of monitoring in which a firm will engage. Strict corporate liability, while providing firms with the optimal incentive to adopt preventive measures, has perverse effects on *ex post* policing measures insofar as it increases the expected liability for undeterred misconduct.⁶³ Internal policing measures affect a firm's expected liability in two ways. On the one hand, they increase agents' expected (internal) sanction, and, by deterring some misdeeds, they reduce the firm's expected liability ("deterrent effect"). On the other hand, they may increase the probability that the government will detect and sanction undeterred illegal conduct, thereby increasing the firm's expected liability ("liability enhancement effect"). Strict corporate liability therefore creates a credibility problem for policing measures that may nullify the deterrent effect. Indeed, the *ex ante* threat of implementing policing measures is not credible if, once the misconduct has taken place, the firm has no incentive to undertake *ex post* actions. Hence, given this credibility problem, the "liability enhancement effect" is likely to dominate.

A duty-based liability regime, in which corporations are liable only if they fail to satisfy a legal duty, restores the incentive for optimal monitoring. However, the application of a pure duty-based regime assumes the possibility of defining a verifiable internal policing standard that is socially efficient as it decreases the probability of a cartel so that its expected benefits outweigh its cost. Identifying such a standard is, at best, extremely difficult. Verifying its actual implementation is probably harder.

A mixed regime may combine some desirable features of both strict and duty-based liability. In particular, "composite liability" is a regime that imposes duty-based liability in order to induce internal monitoring, upon a base of strict liability aimed at deterring collusion. In this regime, a full default sanction may be reduced if the firm is able to prove that it implemented effective *ex ante* and *ex post* policing measures. If the mitigation factor is sufficiently high, then the firm has an incentive to introduce a compliance program, carry out investigations to detect agents' violations and report the misconduct once detected. Note, however, that although, in principle, this mixed regime can reach some seemingly conflicting goals, it may also impose high administrative costs due to the difficulty judges may face in determining whether the duty was effectively satisfied. For the same reason, it would be subject to the discretionary power of prosecutors and prone to judicial errors. Thanks to the multiagent properties of

62. This is shown in a formal model by Instefjord Norvald, Patricia Jackson & William Perraudin, *Security Fraud*, 13 *ECON. POL'Y* 585 (1998), who describe an infinite hierarchical chain of agents that have to decide whether to commit fraud and the amount of effort to exert to monitor their subordinates. Norvald et al. find that imposing strong penalties on the wrongdoer has no impact on the prevalence of fraud because, in equilibrium, it reduces the amount of internal monitoring. The authors conclude that regulators should care as much or more about incentives to monitor as they do about disincentives to commit fraud. Rewarding managers who identify actual or potential control problems, and reducing the costs they face in monitoring, are both likely to be effective policies.

63. See Jennifer Arlen, *The Potentially Perverse Effects of Corporate Criminal Liability*, 23 *J. LEGAL STUD.* 832 (1994).

cartels, leniency and bounty programs may provide a feasible way out, as will be explained in the next subsection.

Agency, leniency, and whistleblowers. The above arguments implicitly assume that there are no leniency programs, and that cartels can be only deterred by increasing expected sanctions up to a level that renders participating in a cartel unprofitable in expectation (rendering conspirators' "participation constraints" no longer satisfied). However, the modern theory of collusion, beginning with Stigler,⁶⁴ demonstrates that cartels are successful only if participants have sufficient incentives to adhere to the agreed market conduct, rather than undercutting one another with secret price cuts. In other words, to be successful coconspirators must be able to limit or eliminate opportunism within the cartel. Cartels, therefore, can be undermined by shaping the law enforcement policy to encourage firms to behave opportunistically with respect to their coconspirators and undercut the collusive agreement. The recent introduction of leniency programs in many jurisdictions is intended to do exactly this. Well-designed leniency programs can destabilize profitable cartels by making more severe the free-rider problem that plagues all legally non-enforceable cartels.

Leniency programs reduce sanctions against the first cartel participant that reports the cartel to the enforcement authority and then assists in the prosecution of its coconspirators.⁶⁵ The effectiveness of these programs in destabilizing and deterring cartels can be reinforced by the offer of a reward, financed by part or all of the fines paid by the convicted partners, to the wrongdoer that first self-reports.⁶⁶ Contrary to what some commentators continue to suggest,⁶⁷ the proposed schemes, if correctly designed,

64. George Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44 (1964).

65. Leniency programs were first formally analyzed within an appropriately dynamic model by Massimo Motta & Michele Polo, *Leniency Programs and Cartel Prosecution*, 21 INT'L J. INDUS. ORG. 347 (2003), who focused on their ability to facilitate prosecution. For a detailed comparative discussion of research on these programs, see Giancarlo Spagnolo, *Leniency and Whistleblowers in Antitrust*, in HANDBOOK OF ANTITRUST ECONOMICS ch. 4 (Paolo Buccirossi ed., 2007).

66. See, e.g., Giancarlo Spagnolo, *Optimal Leniency Programs* (Fondazione Eni Enrico Mattei, Working Paper No. 42.00, 2000); Buccirossi Paolo & Giancarlo Spagnolo, *Leniency Policies and Illegal Transactions*, 90 J. PUB. ECON. 1281 (2006); Cecile Aubert, Patrick Rey & William Kovacic, *The Impact of Leniency Programs on Cartels*, 24 INT'L J. INDUS. ORG. 1241 (2006). See also Luigi Zingales, *Want to Stop Corporate Fraud? Pay Off Those Whistle-Blowers*, WASH. POST, Jan. 19, 2004, who proposed similar schemes to deter financial frauds, and Alexander Dyck, Adair Morse, & Luigi Zingales, *Who Blows the Whistle on Corporate Fraud?* (CEPR Dp 6126, 2007), who find that financial rewards increase employees' reports of financial frauds without increasing frivolous suits, while the protection offered by the Sarbanes-Oxley Act without financial rewards do not increase such reports. Rewards for whistleblowers have been successfully used to fight other forms of multi-agent crime, for example, terrorism and government fraud under the U.S. False Claim Act. The authors believe that the main efficiency-enhancing potential of optimally designed leniency and whistleblower programs is not in terms of improved prosecution, but in their ability to *directly* deter. Thus, cartel formation is prevented, thereby avoiding costly prosecution entirely, by "undermining trust" among would-be conspirators with the threat that one of them could then cheat on partners by self-reporting and turning the others into the prosecutors.

67. This mistake is made again, for example, in Wouter Wils, *Leniency in Antitrust Enforcement: Theory and Practice*, 30 WORLD COMPETITION § VI.E.1 (Mar. 2007). It is unfortunate that this mistake is still around in the European antitrust debate, even though the issue was already clarified in the first paper analyzing rewards. See Spagnolo, *supra* note 66.

could *not* be exploited by groups of agents that take turns with self-reporting. In such schemes, the reward is financed by the sum of the fines paid by the rest of the convicted wrongdoers, so that the former is smaller than the latter. Hence, a group taking turns with self-reporting would lose money.

In the Beckerian single-agent, single-crime model, a subject has to decide whether to commit a crime or not, and, if leniency for self-reporting is offered, whether to self-report after committing the crime. In cartels and other multi-agent crimes, wrongdoers may profit from cheating on one another, and collaboration is sustained by the prospect of future gains from further misconduct or by the threat of revenge. Therefore, subjects have additional options, including that of cheating on partner wrongdoers and self-reporting, thus turning in coconspirators to avoid legal sanctions and, possibly, revenge (e.g., when coconspirators end up in jail).

Once leniency/bounty programs and incentive constraints enter the picture, the level of the optimal fine required to deter a cartel changes dramatically. By modifying the payoff attached to the course of action not available in the Beckerian setting, leniency ensures that a much lower fine is needed to deter multiagent crimes. Simulation studies show that if rewards are feasible and appropriately designed, cartel deterrence may require a sanction not higher than 10 percent of the optimal gain-based Beckerian fine.⁶⁸ Given this level of the optimal fine, below firms' typical ability to pay, corporate liability is likely to provide shareholders and other stakeholders with the correct incentives to avoid misconduct by their managers.⁶⁹

Importantly, firms are composed of numerous individuals with potentially different objectives. This is the cause of significant principal-agent problems, which leniency and whistleblower programs may exploit to further improve cartel deterrence. In the United States in particular, both corporations and individual employees are potentially liable if involved in a cartel, and it is possible to apply for either individual or corporate leniency.⁷⁰ Individual and corporate liability accompanied by individual and corporate leniency programs inflate the governance problems of firms involved in a cartel, increasing deterrence through higher agency costs of collusion. Individual applications are never observed, but this does not imply that individual leniency is ineffective. It is not directly used, but it is a credible threat in the hands of individual whistleblowers that

68. Buccirosi & Spagnolo, *Optimal Fines*, *supra* note 56 (demonstrating this result using simulations under many different parameter configurations).

69. If rewards are allowed, principals do not face the constraints identified in Mitchell A. Polinsky & Steven Shavell, *Should Employees Be Subject to Fines and Imprisonment Given the Existence of Corporate Liability?*, 13 INT'L REV. L. & ECON. 239 (1993), to replicate these incentives in managers' compensation. If fines are sufficiently high and the leniency/reward program sufficiently generous with first-in applicants, the program can, in theory, reach a *first best* in which monitoring, both external and internal, becomes redundant. See Giancarlo Spagnolo, *Divide et Impera: Optimal Leniency Programs* (Centre for Economic Policy Research, Discussion Paper No. 4840, 2004).

70. If an individual manager applies alone for leniency under the Individual Leniency Policy (ILP) and all conditions are met, sanctions are waived only for the applying individual. If, instead, a firm applies for leniency under the Corporate Leniency Program (CLP) and meets all the necessary conditions, then sanctions are waived for the firm and all its managers, employees, and directors.

pushes corporations to apply for corporate leniency before its managers apply individually.⁷¹

Rewards for individual employees that blow the whistle on their own firm have an analogous deterrence effect that also goes through an increase in agency costs for firms involved in a cartel.⁷² A colluding firm must increase pay to employees informed of the firm's misbehavior to prevent the employees from reporting information under an individual leniency program, and these rents increase enormously if employees are entitled to a reward for reporting a cartel. This improves cartel deterrence by directly increasing the cost of collusion. Also, there may be complementarities in deterrence between whistleblowers' bounty schemes and corporate leniency programs, in the sense that together they further increase the incentive to defect from collusive strategies. When defecting from a cartel in the presence of a bounty scheme a firm would still have to compensate its informed employees to prevent them from reporting. With both rewards for whistleblowers and a corporate leniency program, firms could defect from collusion and report, avoiding the payment of additional rents to informed employees. This further increases the attractiveness of defecting from collusion, so that the impact on cartels is even stronger than the impact that individual bounty schemes or corporate leniency programs alone would have.

Of course, these schemes may imply additional costs and will certainly do so (as would any other legal intervention) if they are not appropriately designed and implemented. Insofar as costs grow only for firms that collude, the costs promote cartel deterrence. For example, colluding firms may inefficiently reduce the number of employees retained in order to reduce the rents needed to buy employees' silence. There may also be an increase in administrative costs of law enforcement, but if these schemes are properly designed and implemented, the size of the increase is likely to be small compared to possible additional deterrence effects. For example, it has been argued that rewards to whistleblowers would substantially increase law enforcement costs by stimulating information fabrication to cash undue rewards. This pessimistic forecast, certainly justified for badly designed schemes, does not seem to be empirically borne out by the U.S. experience with the False Claim Act, a well-designed reward scheme carefully implemented by the Department of Justice and the courts. Under this scheme, individuals reporting fraud to the federal government are entitled to up to 30 percent of all funds recovered (which can turn out to be a significant sum of money), and no serious information fabrication problem has emerged. Moreover, problems of information fabrication can be directly addressed by increasing sanctions against this

71. Scott D. Hammond, Director of Criminal Enforcement, Antitrust Div., U.S. Dep't of Justice, Cornerstones of an Effective Leniency Program (Nov. 22, 2004), <http://www.usdoj.gov/atrp/public/speeches/206611.pdf>, argues that the possible "race to the courthouse" between individual employees and corporations is a powerful incentive for firms to self-report under the Corporate Leniency Program. For formal analyses of this aspect, see Aubert et al., *supra* note 66; Phillip Festerling, Cartel Prosecution and Leniency Programs: Corporate versus Individual Leniency (Aarhus University Department of Economics, Working Paper No. 2005-20, Sept. 2005). See also Guido Friebel & Sergei Guriev, Earnings Manipulation and Incentives in Firms (Centre for Economic Policy Research, Discussion Paper No. 4850, 2005).

72. See Aubert et al., *supra* note 66.

very practice. In addition, in fabricated cartel cases, accused companies would most likely go to great lengths to prove their innocence. Therefore, information fabricants would face the companies' attorneys who would doubtless be poised to fight a long legal battle to prove their client's innocence. Thus, deterring information fabrication in this arena appears to be an achievable task.

It appears worth noting that individual leniency programs in antitrust, and the debate about the possible introduction of rewards, are typically directed at employees involved in the anticompetitive action. Rewards schemes for whistleblowers in other fields of law enforcement, such as the False Claim Act, are instead typically directed to employees that are aware of, but took no part in the illegal activity (the incentives to fabricate information are similar in the two cases, so it makes sense to look at one experience to learn about the other). It would be wise to discuss the possible introduction of these second type or reward for whistleblowers also in antitrust.

Other possible social costs of these "high powered" legal incentive schemes are linked to the possibility of Type I errors, that is, erroneous convictions of innocent firms and individuals.⁷³ Frequent Type I errors and large penalties and rewards could substantially increase costs for noncolluding firms acting "at the border" but within legality, who may be led to distort their investment, employment, and organizational policies to minimize the risk that their legal activity would be mistakenly taken for an illegal one. For example, firms cooperating with competitors in nonanticompetitive ways (for example, in certain research and development or production joint ventures) may be induced to spend excessive resources on internal monitoring/compliance programs or to abandon altogether procompetitive joint ventures with competitors. These additional costs would then likely be passed on to consumers.⁷⁴ It may be, though, that in most advanced countries, a strict application of the rule of law and the high standard of proof required in criminal cases make Type I overdeterrence errors less likely than Type II underdeterrence errors. This is particularly true for companies and white collar employees who typically have sufficient resources to defend themselves vigorously. Still, it is possible that, to maximize efficiency, the standard of proof should be raised when introducing rewards schemes and similar high powered incentives. It is also likely that courts themselves will tend to increase the standard of proof when rewards are at stake.⁷⁵

In sum, agency costs and related governance problems are crucial determinants of the efficient design of antitrust law enforcement. Cartels are typically formed and run by

73. See Bruce Kobayashi, *Antitrust, Agency and Amnesty: An Economic Analysis of the Criminal Enforcement of the Antitrust Laws Against Corporations* (George Mason University Law and Economics, Working Paper No. 02-04, 2002).

74. On the costs of antitrust law enforcement when Type I errors are numerous, see *id.*; Aubert et al., *supra* note 66 (identifying several situations in which innocent firms may decide to adopt inefficient organizational decisions in order to reduce the risk of being convicted for collusion). See also Terry Dworkin & Janet Near, *A Better Statutory Approach to Whistleblowing*, 7 *BUS. ETHICS Q.* 1 (1997) (arguing that whistleblowing may contribute to an environment of mistrust and uncertainty and has a negative effect on organizational efficiency).

75. See P. Buccrossi, G. Palumbo & G. Spagnolo, *Whistleblowers and Corporate Fraud* (Laboratorio di economica, antitrust, regolamentazione and Bank of Italy, Working Paper, 2005) (addressing this question theoretically).

top managers (most often CEOs). A sanction policy must affect their incentives. This can be accomplished indirectly by imposing sanctions on firms. Individual liability is necessary if either the optimal enforcement policy requires the imposition of nonpecuniary sanctions, or the principal-agent relationship cannot be governed so as to lead agents to efficiently pursue the principal's goals. Internal monitoring can prevent the formation of cartels. Composite liability regimes may provide the right incentives to monitor managers' behavior. However, they have high administrative costs and are prone to judicial errors. Leniency and whistleblower programs can be designed to maximize agency problems and related governance costs for cartels and individual firms that participate in them (as well as for other criminal organizations), greatly improving the effectiveness of antitrust law enforcement (deterrence) and simultaneously reducing its cost.

5. Conclusions

The peculiar characteristics of cartels that are important for the optimal design of law enforcement are: (1) multiple agents are involved; (2) there is scope for moral-hazard, free riding, and profitable cheating in general within the group of wrongdoers; and (3) explicit contracts that limit opportunism cannot be enforced because the underlying activity itself is illegal. These three characteristics, at the core of the "governance problem" inherent in cartels, are also typical of other multiple-agent infringements, including collusion between auditors and management or regulators and regulated firms; large-scale corruption and fraud; mafia, terrorism, and analogous forms of organized crime; and most kinds of illegal trade. As with cartels, all of these multiple-agent illegal activities cannot rely on explicit contracts enforced by the legal system. Therefore, to limit internal moral hazard and prevent "hold up," the arrangements must take the form of long-term, dynamic criminal *relationships*, where reputational considerations and implicit contracts substitute for explicit contracting.

Public policy against cartels and other forms of corporate and organized crime can take advantage of their essential features and fight them by undermining the stability of the implicit agreements on which they are based. However, agents also need to cooperate in order to pursue welfare-enhancing projects, and implicit contracts are often needed to this end as well. Because it is not always possible to perfectly separate the good from the evil, we must be aware that preventing the formation of these implicit agreements, in some situations, may cause more harm than good.