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International Cartel Enforcement: Lessons from the 1990s

Simon J. Evenett, Margaret C. Levenstein, and Valerie Y. Suslow[1]

ABSTRACT:

The enforcement record of the 1990s has demonstrated that private international cartels are neither relics of the past nor do they always fall quickly under the weight of their own incentive problems. Of a sample of forty such cartels prosecuted by the United States and European Union in the 1990s, twenty-four lasted at least four years. And for the twenty cartels in this sample where sales data are available, the annual worldwide turnover in the affected products exceeded US$30billion. Prevailing national competition policies are oriented towards addressing harm done in domestic markets, and in some cases merely prohibit cartels without taking strong enforcement measures. In this paper we propose a series of reforms to national policies and steps to enhance international cooperation that will strengthen the deterrents against international cartelization. Furthermore, aggressive prosecution of cartels must be complemented by vigilance in other areas of competition policy. If not, firms will respond to the enhanced deterrents to cartelization by merging or by taking other measures that lessen competitive pressures.

1. INTRODUCTION

In its 1997 Annual Report, the World Trade Organization (WTO) highlighted the growing significance of international cartels for policymakers, noting "there are some indications that a

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growing proportion of cartel agreements are international in scope."[2] Increasing trade liberalization may, by increasing competition in formerly protected national markets, have increased firms' incentive to participate in cartels. These cartels undermine international integration and decrease the benefits of liberalization to consumers. International cartels may also undermine political support for liberalization if citizens believe that private barriers to trade are simply replacing government-created ones.

Our analysis of recent investigations and prosecutions of international cartels yields two findings. First, cartels are neither relics of the past nor do they always fall quickly under the weight of their own incentive problems. Even where cheating eventually undermines a cartel, consumers may have been burdened by years of increased prices, and enduring barriers to entry have often been created by strategic cartel behavior. Second, aggressive prosecution of cartels can deter collusion, but only where sufficient international cooperation exists to gather evidence and prosecute offenders so that cartel participants actually have something to fear.

In what follows we argue for a more comprehensive approach to attacking distortionary cartels in the international marketplace. Prevailing national anti-cartel policies are oriented towards addressing the harm done in domestic markets, and in some cases merely prohibit cartels without taking strong enforcement measures. In this paper we propose reforms to national policies and to international cooperative arrangements that will strengthen the deterrents against international cartels and reduce the strategic creation of entry deterrents.

Section 2 of this paper discusses three types of international cartels. Section 3 examines two types of international cartels that were active over the last decade: illegal "hard core" cartels and legal export cartels. We provide an overview of the prevalence and characteristics of these cartels and discuss the long-term effects of cartel-created barriers to entry. In Section 4 we examine the deterrent effect of current national competition laws, and in section 5 we assess the recent experience with bilateral cooperation in international cartel investigations. Finally, in Section 6 we address the role that the WTO (or other international body) might play in promoting competition. We discuss other modifications to national competition

[2] WTO (1997), p. 40.

policies to the same effect. We argue that the criminalization of price-fixing is critical to deterring prospective international cartels and for gathering evidence to prosecute existing cartels. Furthermore, we argue these aggressive measures must be complemented by vigilance in other areas of competition policy, such as merger reviews and investigations of collaborative ventures between corporations. Otherwise, firms will respond to the enhanced deterrents to cartelization by combining with or acquiring rivals or by taking other measures that lessen competitive pressures.

2. TAXONOMY OF INTERNATIONAL CARTELS

a. Three Types of International Cartel

There are a wide variety of organizations that could plausibly be described as international cartels, and to structure the analysis in this paper we distinguish between three types: Type 1 are the so-called "hard core" cartels made up of private producers from at least two countries who cooperate to control prices or allocate shares in world markets. Type 2 are private export cartels where independent, non-state-related producers from one country take steps to fix prices or engage in market allocation in export markets, but not in their domestic market.[3] Type 3 are state run, export cartels.[4]

Although we briefly comment on policies toward export cartels, we restrict the greater part of our analysis to Type 1 cartels.[5]

b. The Basics of Cartel Performance and Implications for Antitrust Policy

The economic theory of cartels has two implications for antitrust policy that are particularly germane to this discussion. First, economic theory identifies the incentive to sell above

[3] Note, however, that not all export associations allocate market shares or fix prices. In his study of US firms which formed export associations that were reported under the Webb-Pomerene Act, Dick (1996) found that about twenty percent engaged in neither of these activities; their cooperation was limited to promotion and marketing.

[4] For a broader account of the different types of anticompetitive horizontal arrangements between firms (which is not focused exclusively on the international dimension) see Lande and Marvel (2000).

[5] State-run export cartels (Type 3 cartels) are motivated by a range of political as well as economic factors that distinguishes their behavior and effects from the profit-maximizing corporations that form private international cartels (Type 1 cartels) considered here.

agreed quotas, or below cartel prices, as a source of instability underlying all cartels. This has implications for how governments might allocate scarce antitrust resources, since one might want to identify which firms are most likely to be able to overcome the incentive to cheat and direct antitrust resources there. Unfortunately, economic theory does not identify deterministic relationships between industry or firm structure and cartel success. Rather, theoretical advances have established that an infinite number of outcomes are possible, ranging from perfectly competitive prices to perfect collusion.[6] In addition, the success or failure of a cartel in an industry is likely to depend on a host of factors, such as the legal environment, demand for the products in question, the terms of the cartel agreement, managerial skill, and industry history. Worse still, some of these factors are inherently unobservable. Aware of these difficulties, Sutton (1998) argues that a "bounds" approach should guide empirical analysis of cartels. This approach recognizes that there are certain *necessary but not sufficient* conditions for cartel success, which bound the circumstances under which successful cartelization can occur.[7] Outside of the bounds entry may be "too easy" or coordination "too difficult" for a cartel to survive in a particular industry. Inside the bounds, cartels may succeed. One implication of this view is that antitrust enforcement should focus its resources on industries inside these bounds.

All else equal, international cartel agreements are more likely to fall inside the bounds because national borders are a straightforward way to divide up international markets. The ability to monitor competitors increases the likelihood of cartel success—and firms in an international cartel can monitor exports and imports, using published trade and customs data. If these heightened incentives to cartelize outweigh any difficulties associated with organizing a conspiracy among members that have different cultures or languages, then this is an argument for focusing antitrust resources on international cartels.

The second implication of cartel theory for antitrust policy also stems from cartels' underlying fragility. A successful cartel must take actions to counteract the incentive to defect. Such actions include mechanisms to increase the cost to defection: making cheating more

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[6] See Sutton (1998) and Tirole (1988) for the relevant theoretical analyses.

observable; making cheating more difficult to undertake; creating mechanisms to punish cheating. Cartel agreements can also include mechanisms that increase the returns to cooperation, such as the creation of barriers to entry. The longer a cartel operates the more likely that it will establish industry practices or barriers that facilitate anticompetitive practices in the future. Barriers to entry created by the cartel, either through tariffs, patent pools, or distribution agreements will not necessarily disappear with the cartel's demise and may well limit future entry and stifle innovation. Firms may move beyond cartel conspiracies to outright mergers, achieving in essence a more stable and consolidated cartel. Therefore, in addition to the classic (static) deadweight losses, over time cartels are likely to distort resource allocation through other means.

Looking forward a little, in section 4 we describe how antitrust policy can take advantage of the ever-present incentive problems faced by cartel members. Measures can be taken to increase these members' incentives to defect, to limit the mechanisms by which cartels can punish defectors, and to prevent the creation of barriers to entry. And in the next section, the potential for strategic behavior by cartel members (during and even after a conspiracy has been terminated by competition authorities) suggests that a more collaborative approach to tackling international cartels is required than is currently employed.

3. CONTEMPORARY INTERNATIONAL CARTELS

a. "Type 1" International Cartels

(i) International Cartels: Prevalence, Formation, and Duration

There have been numerous recent international price-fixing prosecutions by the US Justice Department and the European Commission. From these, we have created a sample that we believe includes nearly all international cartels that were successfully prosecuted by the US or the EC for fixing prices during the 1990s.[8] These cartels operated in a variety of industries,

[7] See also Evenett and Suslow (2000) and Levenstein and Suslow (2002).

[8] In order to be included in the sample, a cartel must involve more than one producer; include firms from more than one country; have attempted to set prices or divide markets in more than one country; and begin or end in the 1990s.

including chemicals, metals, paper products, transportation, and services. Their members included some of the largest corporations in the world. The markets affected by these cartels have annual sales of well over $30 billion.[9]

There are forty cartels in the sample with members from over thirty countries (Table 1). The typical international cartel of the 1990s had firms from two or three countries. Some cartels included firms from four or five countries, and, in the cases of shipping cartels, as many as thirty countries. As expected, given that these are DOJ and EC cases, most of the alleged conspirators are European and US firms. It is not unusual, however, to find Japanese or South Korean participation.

Cartels, being secretive organizations, rarely announce their formation. Empirical research on cartel formation is therefore limited to evidence gathered from cartels operating in a legal (or tolerant) environment or from evidence collected in antitrust prosecutions. Theoretical research on the timing of cartel formation has focused on the effects of business cycles on cartel formation. The available evidence on the formation of the 1990s international cartels suggests that these cartels often were formed following a period of declining prices, but these price declines were not generally associated with macroeconomic fluctuations (Levenstein and Suslow 2001). Anecdotal industry evidence suggests that they were the result of increasing competition and market integration.[10]

Figure 1 shows the pattern in duration for 1990s sample of international cartels. The average duration of cartels in the 1990s sample of DOJ and EC prosecutions is 6 years.[11] Some of these cartels lasted for two decades before antitrust intervention. Other cartels lasted less than a year. Twenty-four of these forty cartels lasted for at least four years, certainly long enough

[9] Due to lack of data, this figure includes revenues for only about half of the industries in Table 1.

[10] Levenstein and Suslow (2002) reaches a similar conclusion when analyzing a different sample of international cartels. Most of the cases they study report cartel formation during a period of falling prices, but this is not always, or even usually, associated with falling demand.

[11] This measure probably understates the duration of these cartels as it reflects the public, legal record of the years for which the member firms were found or pled guilty to cartelization. The actual start of a cartel agreement may precede the starting date alleged in public documents because an antitrust authority may not have had strong enough evidence of a cartel's initial operations or the authorities may have chosen not to bring that evidence to court as part of a plea arrangement. For these two reasons our measure understates the actual

to have had a significant impact on consumers. This finding is consistent with conclusions drawn from other samples of cartels. Average duration is generally in years, not decades; there are cartels that do survive decades, others that can't get started, and many in between.

Levenstein and Suslow's (2002) survey of cross-section studies of historical international cartels comes to a similar conclusion. The mean cartel episode length in these studies varies from 4 to 8 years, with a range from one year to several decades. This high variance undoubtedly reflects both true variation in cartel longevity and scholars' selection bias for either very successful, long-lived cartels or those with an interesting history of on-again off-again episodes. Whatever the biases involved, it is clear that cartels are not "short" or "long" lived; they are both. There are also industries that followed the pattern of the Canadian oil industry, in which the failure to sustain collusion led to consolidation of the industry (Grant and Thille 2001). In the next section, we look at this issue and its antitrust implications more closely.

(ii) Strategies for Survival: Building Barriers to Entry and Deterring Defections

The potential profits associated with successful cartelization create a financial rationale for firms to devise means to overcome the short-term incentive to deviate from a cartel agreement; to frustrate entry by new firms; and to prevent detection by competition authorities. Some cartels have turned even to government policies to achieve their ends, employing anti-dumping laws, quotas, regulations, or import surveillance, and other forms of statistical reporting. Cartels have also employed a variety of private measures, including vertical restraints or the use of a common sales agent, patent pooling, joint ventures, and mergers (either during or after the conspiracy period).

For the most part, the public record on 1990s price-fixing cases does not discuss measures taken to block entry. Perhaps this is because such evidence is not necessary for a criminal conviction in the US, where price fixing is *per se* illegal. However, there are many examples

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duration of collusion. See Suslow (2001) for a fuller discussion of measuring the duration of international cartels.

of activities that may have been attempts to deter or block entry in these and other industries (Table 2).

Some cartels turned to government restrictions to block entry by outsiders.[12] For example, China has presented vigorous competition in the world citric acid industry, which is otherwise highly concentrated. US producers twice tried to use anti-dumping duties to insulate the US market from Chinese imports of citric acid, once during a cartel conspiracy and once after. Both times the petition was denied. Producers in the ferrosilicon cartel pursued similar tactics, using US anti-dumping duties to protect the cartel from Chinese and other imports (Table 2).[13]

Technological restrictions are also used to maintain cartel market power. For example, steel producers that were fixing the price of steel beams "restrict[ed] the flow of information . . . in order to freeze out any new competitors," according to Karl Van Miert, a former EC competition commissioner.[14] In another recent case, members of a graphite electrode cartel "agreed to restrict non-conspirator companies' access to certain graphite electrode manufacturing technology."[15] These cases build on a history of cartel attempts to restrict information about technology to create barriers to entry.[16]

Finally, there is case-specific evidence of the use of strategic alliances and joint ventures to limit or control entry. One of the most striking examples is in the Oil Country Tubular Goods (OCTG) market, which are the seamless steel pipes used in the oil and gas industry. In December 1999, the EC convicted four European and four Japanese steel manufacturers of price fixing. No evidence was found indicating that they blocked entry or potential entry into the OCTG market. However, since the breakup of the cartel, every member of the cartel has joined one of three international alliances. The largest of these, with a 25 percent market

[12]This section draws on research by the authors on a few cases selected from Table 2. See Levenstein and Suslow (2001).
[13] Pierce (2000) provides an account of the ferrosilicon case and more generally on how petitions for relief against dumping can, in his view, facilitate cartelization.
[14] "European Commission Fines Steel Makers $116.7 Million" *Wall Street Journal Europe* February 17, 1994.
[15] "Japanese Subsidiary Charged with International Conspiracy to Fix Prices for Graphite Electrodes in the US" US DOJ Press Release, February 23, 1998.
[16] See, for example, Reich (1992).

share of world OCTG, is led by Techint. Techint controls Dalmine, the Italian member of the cartel, Tamsa, a Mexican tube producer, and Siderca, an Argentine steel producer. They are known jointly as the DST group. Tamsa is currently under investigation by the Mexican Federal Competition Commission for abuse of monopoly power (in a case that appears unconnected to the EC charges). NKK, another leading producer and former cartel member, has formed an alliance with DST, as has a Canadian producer. Three of the Japanese ex-conspirators have formed an alliance in which they use a single joint sales agency. Mannesmann and Vallourec, the German and French cartel members, have formed a joint venture to which they have transferred all their OCTG production. They are also engaged in steel tube joint ventures with Corus (formerly British Steel), another former cartel member that has exited the OCTG market.

These kinds of activities might be particularly effective in limiting the entry of producers from developing countries. In several commodity chemicals markets, incumbent firms have been willing to accommodate Chinese entry since the break-up of a cartel, but they have done so by establishing joint ventures between former cartel participants and their Chinese competitors. These arrangements give Chinese producers access to the world market, but may do so at some cost to competition. Of course, both entrants and established producers could have other, welfare-enhancing motives for joint ventures, such as sharing technology, local market expertise, or capital. These explanations for joint ventures are not mutually exclusive, but joint ventures (and mergers) in industries known to have a history of international price fixing should be carefully scrutinized by regulatory authorities.[17]

We have presented evidence of anti-competitive actions taken by contemporary international cartels to create barriers to entry through mergers and joint ventures, and to manipulate certain governmental policy tools, such as protective tariffs and anti-dumping duties, either during or after a conspiracy. While some of these actions may be appropriate under certain circumstances, their appearance in an industry that has recently attempted to cartelize should raise concern about possible anti-competitive effects.

[17] There are several industries, including bromine and steel, that appear in both the 1990s cartel sample and the historical sample of a century before. See Levenstein (1997).

b. "Type 2" Export Cartels

(i) Legal Status

Export cartels are associations of firms that cooperate in the marketing and distribution of their product to foreign markets. The competition laws of virtually all countries exempt such export cartels from prosecution by domestic authorities. A summary of these exemptions is provided in Table 3. In some legislation, exemptions for export cartels are explicitly motivated by mercantilism: a desire to increase national exports and give national firms a competitive advantage relative to firms based in other countries. In most cases, however, this exemption is *implicit* in national competition laws, which cover only those activities affecting the domestic markets and typically export activities are presumed not to affect domestic markets. Several countries do, however, provide specific exemptions from domestic laws for cartels that would otherwise violate domestic laws as long as their activities are restricted to export markets. Japan, Mexico, and the United States all have such legislation. Japan and the US require that export cartels register with a governmental agency to receive an antitrust exemption. In most cases, however, no registration is required, so there is very limited information regarding the number or activities of export associations.

When the US passed the Webb-Pomerene Act in 1918, which exempts American export cartels from some of the U.S. legal provisions against cartelization, most of its trading partners did not prohibit cartels.[18] The US was then a relatively small player in many international markets, and those markets were effectively controlled by legal international cartels dominated by large European producers. Foreign cartels took actions to bar entry from non-members, but US firms were not allowed by US law to join these international cartels. US firms were therefore blocked from exporting to these markets. In such an environment, exemptions for export cartels were most likely export-promoting, even if they did not necessarily increase competition in foreign markets much.

[18] Subsequently, the Export Companies Trading Act of 1982 provided further legal exemptions to registered U.S. export cartels.

Presently, the likely effect of these exemptions for export cartels is to make it more difficult for national governments to exchange information and evidence regarding the activities of suspected international cartels. This is because nations are reluctant to provide information about those acts that their exporters engage in which they consider to be legal under their own laws. However, recent reforms of competition law in EC countries have restricted or eliminated export cartel exemptions in some member states. For example, Germany's new competition law explicitly omits its earlier provision for exemption and registration of export cartels. The UK's 1998 competition law omits mention of the Fair Trading Law's provisions for exemption and registration of export cartels.

Where countries have provided explicit exemptions for export cartels these do not appear to be widely used by international cartels. For example, there is no mention of the existence of a Webb-Pomerene Association in any of the recent international cartel convictions obtained by the US Justice Department.[19] The registration requirement may deter cartel participants from availing themselves of the exemption. Firms engaged in price-fixing may prefer secrecy to a limited immunity that might bring them to the attention of competition officials.

(ii) Prevalence of Export Cartels

Few countries require that firms organizing an export association formally register with the government (Table 3). It is therefore almost impossible to track the number of these associations internationally. In the US, however, the Webb-Pomerene and the Export Trading Company Acts require registration with a federal agency. The number of registered Webb-Pomerene associations in the US hit a peak of 62 in 1930, and has declined fairly steadily through the years.[20] By 1989 the number of Webb-Pomerene associations had declined to twenty-four. Put into context, this number is quite small and represents only a fraction of US trade. Dick reports that these associations covered 2.3% of US exports in 1962 and a mere 1.5% in 1976.[21] The limited information available from other countries shows a similar

[19] However, the European Commission took action against a cartel of U.S. wood pulp producers, whose cartel was registered in the U.S. under the Webb-Pomerene Act.
[20] Unfortunately, we have not been able to obtain data on the number of associations registered under the Export Trading Company Act.
[21] Dick (1992), p. 97.

pattern. The OECD reported in 1984 that between 1972 and 1982, the number of export cartels in the UK held constant, the number in Germany declined slightly, and the number in Japan declined markedly.[22]

(iii) Activities of Export Cartels

In some cases, exporting firms cooperate by engaging in price fixing: either agreeing to sell their exports at the same price or to sell them through a single, joint sales agency that will accomplish the same thing. Firms may also use cooperative export organizations to jointly market products. While the latter type of activity may lessen competition, it may also allow firms to achieve sufficient scale to participate in foreign markets. In many cases, this outcome is more pro-competitive than the mergers or joint ventures to which firms might otherwise turn to achieve the necessary scale for global competition. Consequently, policies toward export cartels ought to distinguish between the various motivations for cooperative export organizations.

Where countries do require reporting or registration of cooperative export organizations, it may be possible to determine which activities such organizations engage in. Several studies by Andrew Dick find that US Webb-Pomerene Associations had little anti-competitive effect in part because they also served to lower the cost of exporting.[23] One reason for the limited use of these associations by recent international cartels may be that they consist only of US exporters, with little ability to control other nation's markets.

(iv) Anti-Competitive Effects of Export Cartels

The anti-competitive impact of export cartels may be more significant in some markets or countries than others. For example, at a recent meeting of competition policy-makers at the OECD, some countries voiced concern "that export or import cartels could inflict [harm] on trade and market access … and argued that such cartels should lose any exemption they might enjoy from national competition law. Others … questioned the importance of such cases and argued that … such exemptions do not immunize such cartels from prosecution by the

[22] OECD (1984).

affected country. Others pointed out that affected countries might have difficulty obtaining the necessary evidence located abroad …"[24] A recent article in the *Journal of Competition Law and Policy* made a similar point, arguing that Mexico has been harmed by the activities of legal export cartels based in other countries. While prosecution of these cartels is possible under Mexican law the lack of cooperation from other countries means that information gathering is difficult and prosecution almost impossible.[25]

There is little mention of legal export cartels in recent reports on international antitrust from the OECD and the U.S. International Competition Policy Advisory Committee.[26] This suggests that certain leading members of the American antitrust community do not feel that this is an issue that severely affects consumers or those domestic producers who compete with foreign export cartels. The OECD's report on *Hard Core Cartels* "urges … reviews by competition authorities … of [export cartel] exclusions [but] does not regard further action in this area to be a priority in connection with its program for bringing about more effective action against hard core cartels" (OECD 2000a, p. 28).

Having laid out the main features of contemporary international cartels, and conveyed a sense of their prevalence in the 1990s, we now examine the effectiveness of current anti-cartel enforcement regimes.

4. THE DETERRENCE APPROACH TO INTERNATIONAL CARTEL ENFORCEMENT

Before assessing the recent increase in international cartel investigations, it will be useful to lay out—from a traditional "law and economics" perspective—the incentives supplied by national anti-cartel enforcement regimes and penalties.[27] This analysis will then motivate a discussion of the inadequacies of national anti-cartel enforcement in a world of many legal jurisdictions.

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[23] Dick (1992, 1996).
[24] "Summary" *OECD Journal of Competition Law and Policy* 1:4 (1999), p. 10.
[25] Wise (1999), p. 67.
[26] ICPAC (2000) and OECD (1999).
[27] For a recent exhaustive survey of the law and economics literature see Kaplow and Shavell (1998). Our discussion focuses on the incentives supplied by public enforcement practices. Private suits—brought for damages by cartel victims—that are permitted in some jurisdictions, may reinforce these incentives.

From the law and economics perspective the objective of anti-cartel laws should be to deter, and where necessary punish, firms who engage in this undesirable act.[28] Three characteristics of cartels are germane to understanding the incentives supplied by anti-cartel enforcement. First, cartels typically involve secret agreements between firms. Second, the objective of these agreements is to secure pecuniary gains for cartel members. Third, sustaining the cartel requires careful attention to crafting incentive compatible agreements between firms.

A group of firms will be *collectively* deterred from cartelizing a nation's markets if that countries' antitrust authority is expected to fine them *more than* the gains from participating in the cartel.[29] Assuming that the firms are risk neutral; there are no costs to the firms in defending themselves before a fine is imposed; the pecuniary gain from cartelization equals G; and the probability of the antitrust authority detecting and punishing the cartel equals p, then a fine f *that equals or exceeds* (G/p) will provide the necessary collective deterrent. An important insight is that even though cartel agreements are typically secret—and so the probability of detection and punishment p is low—so long as p is positive there exists a fine that will collectively deter cartelization.[30] Secrecy may impede investigations, but deterrence is still in principle feasible. These arguments may also provide a rationale for why some nations, such as the United States, Germany, and Switzerland, have made the maximum fines for cartel members a function of the pecuniary gain from their illicit activity.[31]

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[28] As a testament to the influence of this perspective it is worth noting that the Ministry of Commerce in New Zealand recently published a report on the effectiveness of the deterrence provided by that nation's enforcement practices and courts which was explicitly built on the lines of reasoning discussed in this section. See Ministry of Commerce, Government of New Zealand (1998).

[29] It is theoretically possible that a cartel agreement reduces the costs of its members. (Indeed, should such an agreement result in considerable reductions in the marginal costs of the parties to that agreement then, compared to a perfectly competitive benchmark, the formation of a cartel could be welfare improving.) Under these circumstances Landes (1983) demonstrated that the optimal fine should be based on the net harm to consumers, rather than on the total pecuniary gain to the cartel members. In the absence of such cost reductions, the net harm to consumers will exceed the pecuniary gain to cartel members, and so basing fines on the former could form the basis of an effective deterrent also.

[30] This simple calculation can be extended in a number of ways, see Government of New Zealand (1998). Perhaps the most important extension is to include enforcement costs, which leads to the finding that the optimal enforcement of cartels may result in some less distortionary cartels not being prosecuted. We thank Bob Hahn for reminding us of this point.

[31] Although this section focuses on the deterrent effect of state antitrust enforcement, it should be borne in mind that some jurisdictions permit private suits by those entities whose interests are hurt by a cartel. In principle, the expectation of damages won by those interests can act as a deterrent to cartelization too.

Antitrust officials have exploited the "incentive compatibility" problems faced by cartels through the introduction of corporate leniency programs. These programs—which offer reduced penalties to qualifying firms that come forward with evidence of cartel conduct—induce members to "defect" from cartel agreements. These programs have also been motivated by the observation that the successful prosecution of cartels typically requires evidence supplied by at least one co-conspirator.[32]

The US corporate leniency program, last revised in 1993, can be rationalized in these terms. Currently only the *first* firm to come forward with evidence about a currently uninvestigated cartel is *automatically* granted an amnesty from all US criminal penalties. This encourages a "winner takes all" dynamic, where members of an otherwise successful cartel each have an incentive to be the first to provide evidence to US authorities.[33] A second feature is that even if a firm is not the first to approach the US authorities, such a firm can gain a substantial reduction in penalties by admitting to cartel practices in *other* markets that are (at the time of the application for leniency) uninvestigated. This provision has set off a "domino" effect in which one cartel investigation can result in evidence for subsequent investigations. Since these changes, and others, were introduced the US has received on average one amnesty application per month, approximately twelve times the previous rate.

Jurisdictions differ considerably in whether they impose criminal penalties in cartel cases. In particular, few jurisdictions permit the incarceration of business executives responsible for cartelization.[34] US officials strongly believe that criminal penalties including the threat of incarceration are essential deterrents to cartelization.[35] How does a law and economics

[32] At the core of such leniency programs lies the incentive to give evidence in return for reduced (or even no) punishment for criminal acts. Some members of the Bar have pointed out that this incentive may well distort the information offered to enforcement authorities and the statements that former conspirators are willing to make in court. See "The World Gets Tough on Price Fixers," *New York Times*, June 3, 2001, section 3, pages 1ff.

[33] The German Bundeskartellant (Federal Cartel Office) revised their corporate leniency program in April 2000 to include such a provision too. Dr. Ulf Boge, President of the Bundeskartellant, argued in explicitly economic terms as follows: "By granting a total exemption from fines to the first firm that approaches us we want to induce the cartel members to compete with each other to defect from the cartel." See Bundeskartellant (2000).

[34] Although the criminality of cartel behavior has considerable implications for international cooperation and evidence sharing, the role of these sanctions as a deterrent is what concerns us presently.

[35] See, for example, Hammond (2000) who argues: "based on our experience, there is no greater deterrent to the commission of cartel activity than the risk of imprisonment for corporate officials. Corporate fines are simply not sufficient to deter would-be offenders. For example, in some cartels, such as the graphic electrodes cartel,

approach assess this claim? First, incarceration involves costly losses in and re-allocation of output: managers' productivity is less during their period of incarceration, and resources must be devoted to the construction and operation of prisons. If these were the sole considerations, then incarceration would be a less desirable alternative to fines. However, given the low probability of punishing a cartel and the sizeable gains from engaging in such behavior, the minimum fine that would deter a cartel may in fact bankrupt a firm or its senior executives. Bankrupting a firm that has been engaged in cartel behavior could actually reduce the number of suppliers to a market, resulting perversely in less competition and higher prices. Furthermore, personal bankruptcy laws bound from below what corporate executives can lose from anti-cartel enforcement. Incarceration may provide—through the loss of freedom, reputation, social standing, and earnings—the only remaining means to alter the incentives of corporate executives. This argument is particularly important because the use of stock options in executive compensation packages provides very strong incentives to senior executives to maximize firm earnings and stock market value.

The second "law and economics" argument is that incarceration is needed to reduce or eliminate the expected harm caused by repeat offenses. There may be legitimate concern that executives who have successfully arranged explicit agreements to carve up a market will, after the cartel is broken up, attempt some other form of anti-competitive practice. The imposition of fines alone may not induce a firm's shareholders to replace the offending executives, especially if the latter can convince shareholders that the fine was a "cost of doing business" and that the benefits from implicit collusion (which they expect to secure in a market that is well known to them) will soon flow. Here, a clean break with the past may be needed, with incarceration simultaneously removing the relevant executives from their posts and acting as a threat to incoming senior executives not to attempt re-cartelization. Antitrust officials must also weigh the stronger deterrent effect of incarceration against the higher levels of evidence that are required to secure criminal convictions. The threat of incarceration

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individuals personally pocketed millions of dollars as a result of their criminal activity. A corporate fine, no matter how punitive, is unlikely to deter such individuals." Mr. Scott Hammond is the Director of Criminal Enforcement at the US Department of Justice. In interpreting his remarks it is worth bearing in mind that the maximum fine under US law for individuals convicted in engaging in cartel behavior is $350,000 which given

exacerbates the difficulties that national antitrust officials face in securing evidence and testimony from cartel participants, which in terms of the framework outlined above effectively lowers the probability of detection and punishment p.

The law and economics perspective explains why national antitrust enforcement may be particularly ineffective in deterring international cartels. First, the ability of executives to organize cartels (including attending meetings and the writing and storing of agreements) in locations outside the direct jurisdiction of the national antitrust authority where the cartel's effects are felt can effectively reduce the probability of punishment p to zero. For example, in 1994 the US case against General Electric, which along with De Beers and several European firms were thought to be cartelizing the market for industrial diamonds, collapsed with the trial judge citing the inability of US enforcement authorities to secure the necessary evidence from abroad.[36] Second, constraints on the ability to collect evidence and to interview witnesses abroad imply that the probability of punishment p is lower than it might otherwise be. Increasing the fines f imposed may not, given the substantial reduction in p and the limits imposed by bankruptcy, be sufficient to deter cartelization. In sum, supplying the right deterrent is more difficult when conspirators can hatch their plans abroad.

Third, in a world of multiple markets the gain from cartelizing a single additional market may well exceed the cartel profits from that market alone. As the number of markets in which a cartel operates increases, each cartel member can be more successfully deterred from cheating on the cartel agreement in *any one market* by the threat of retaliation by other members in *all the markets* in which the cartel operates. This "multi-market effect" implies that the extension of an international cartel into a new market can raise prices in all of the markets a cartel operates in. Therefore, the fine that will deter cartelization of a new market must take account of the consequent increase in the cartel's total profits, not only on the extra profits being earned in the newly cartelized market. At present, even those antitrust authorities that base their fines on the illicit gains from cartelization do not consider the cartel's gains from outside their jurisdiction and so current practices are unlikely to deter multi-market cartels.

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recent trends in executive compensation is likely to be much less than the potential stock-option and other gains paid to an executive whose firm's profits have increased due to participating in a cartel.

Finally, the effectiveness of national leniency programs is compromised by firms' participation in cartel activities in many nations. A firm may be reluctant (to say the least) to apply for leniency in a single jurisdiction if that leaves them potentially exposed to penalties in other jurisdictions. Furthermore, even though a firm may be willing to offer evidence on cartel activities in many nations, a national antitrust authority will only value information on activities within its jurisdiction. Both factors reduce the benefits of seeking leniency.

5. RECENT TRENDS IN INTERNATIONAL CARTEL ENFORCEMENT

The 1990s saw a sea change in official attitudes towards cartel enforcement. At the start of the decade, only one industrial nation—the United States—was taking aggressive action against international cartels, and these actions were criticized by other governments as an improper extraterritorial application of domestic U.S. antitrust laws.[37] By decade's end, several high profile enforcement actions have convinced policymakers in other industrial countries that stronger measures against international cartels ought to be taken. Consequently, corporate leniency programs have been revised or introduced in several countries, international norms for and reforms of cartel enforcement have been proposed at the OECD, and bilateral cooperation developed between a few jurisdictions.

Much of this change had its origins in the events that followed the revision of the US corporate leniency program in 1993. As noted above, this revision led to a dramatic increase in international cartel prosecutions. Although US enforcement actions were motivated by their effects within US borders, the potential cross-border effects of these cartels and the substantial evidence proffered during leniency requests did not go unnoticed in other nations.[38] The European Commission introduced its own corporate leniency program—but its

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[36] Waller (2000).

[37] Concerns about extraterritorial applications of these US laws reached a point where several industrial countries actually passed "blocking statutes," whose intent was to prevent their antitrust authorities, police and other national investigative agencies, and firms from cooperating with US enforcement actions outside American borders. The changing attitudes of antitrust officials to extraterritoriality are detailed and then discussed in First (2001).

[38] US officials have, through speeches, interviews, and written articles, extensively discussed their enforcement record in this area. In part, this effort is motivated by the view that the deterrent effect of the US enforcement regime depends somewhat on its public profile. Many of these speeches can be downloaded from the web site of the Antitrust Division of the US Department of Justice (www.usdoj.gov/atr). A cynic might argue that the $1.7

success has been less impressive than its US counterpart in part because automatic amnesty is not assured to the first firm that reports cartel behavior.[39]

Although cartel enforcement has increased in both the EU and in Japan, investigations remain hampered in both jurisdictions, albeit for different reasons. It has proved too difficult to reconcile the underlying tenets of the Japanese legal code with the introduction of a corporate leniency program. This restricts the flow of information on cartel behavior to the Japanese Fair Trade Commission (JFTC), and is a source of considerable concern, as the JFTC appears to devote few resources to other means of uncovering cartels. That said, Japan (and Korea) have recently reduced the number of permitted exceptions to their anti-cartel laws.

More vigorous enforcement in the EU has been impeded by the inability of European Commission (EC) officials to search the private homes of business executives resident in Europe for evidence of cartel agreements. Worse still, European Community Law only allows civil sanctions on undertakings (such as firms). Individuals cannot be sanctioned for antitrust offenses under Community Law but can be subject to penalties under any relevant national laws. Even so, since the late 1980s the EC has prosecuted over twenty international cartels with fines rising to above 100 million ECUs in recent years.

Recognition of the difficulties faced by national anti-cartel authorities in investigating international cartels has led to several initiatives between governments and within the OECD. Recent experience suggests that there are two circumstances where bilateral cooperation offers the most promise (by raising the probability of an international cartel being punished). First, if a nation's laws make cartelization or conspiracies to cartelize criminal offenses, then that nation may be able to invoke the provisions of any Mutual Legal Assistance Treaties (MLATs) that it has signed with other nations. These treaties differ in scope (including coverage of antitrust offenses) and in the commitment to extend bilateral cooperation. The US-Canadian MLAT, signed in 1985, is perhaps the best example of how this form of bilateral cooperation has been effective in prosecuting international cartels (Waller 2000). Of

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billion of fines imposed by the U.S. federal antitrust authorities in the 1990s may well have encouraged overseas interest in cartel enforcement actions.

course, this mechanism is only available to those jurisdictions that have signed MLATs that cover antitrust matters.

The second route by which cooperation between national antitrust officials is effected is through explicit bilateral agreements on antitrust matters. This route is very much in its infancy, and is best characterized by the 1999 agreement between Australia and the US. This agreement provides for each party to the agreement to request assistance from the other party irrespective of whether the alleged corporate actions in question are criminal acts under the requested nation's law. The bilateral assistance envisaged at the time of signing includes providing, disclosing, exchanging, and discussing evidence as well as taking various steps to secure evidence from persons, undertakings, and other entities.[40] Even more recently, a working group of officials from competition policy authorities in the Nordic countries proposed enacting legislation to enable them to exchange pertinent information in cartel cases (OECD 2000a).

A critical stumbling block in most bilateral cooperative efforts is the exchange of business information or what many legal practitioners refer to as "confidential business information."[41] The fear that corporate secrets and future planning will, if shared with a foreign antitrust authority, be used inappropriately or leaked to rival firms has long resulted in many bilateral cooperation agreements on antitrust matters containing very restrictive provisions for the exchange of confidential business information and very broad understandings of what information is considered confidential. But cartel investigations typically refer to prior (and occasionally current) corporate practices; the evidence required is largely documentation of meetings and agreements between conspirators; prosecutions generally do not require

[39] It is noteworthy in this respect that the German and British competition policy authorities have chosen to revise their corporate leniency programs along US, not EC, lines.

[40] It should be noted that such assistance typically requires the use of enforcement resources in the requested countries. Therefore, the benefits of enhanced international cooperation should be compared to the opportunity costs of those resources in other activities, including domestic antitrust enforcement. Having said that if the purpose of a request for cooperation is to obtain information that another agency has collected, then sharing of such information between authorities may save resources in the requesting nation. For example, the Australian authorities requested and received case materials from the U.S. on the vitamins conspiracies—saving the former considerable time, effort, and expenditures (First, 2001).

[41] In the view of some this stumbling block has seriously circumscribed cooperation between the EC and US in cartel investigations, see Stark (2000) and Waller (2000).

reference to firms' forward-looking strategic plans. Thus, the fear that legal future plans will be exposed appears to be exaggerated.[42] Finally, existing international cooperation on tax and financial securities permits for far more exchange of business information than under bilateral antitrust agreements, especially when there is the suspicion that fraud or some other illegal act has taken place. The extension of cooperation to anti-trust matters can easily build on these existing practices.

Many of the recent reforms in national anti-cartel enforcement and in bilateral cooperation must be seen against the backdrop of significant and ongoing discussions at the OECD. In 1998 these discussions culminated in the Council of the OECD adopting a "Recommendation ...Concerning the Effective Action Against Hard Core Cartels."[43] The essence of this recommendation is two-fold: to call upon member nations to enact anti-cartel laws that can effectively deter cartelization and to lay out common principles to guide cooperation between antitrust authorities—cooperation which the Recommendation clearly endorses as in OECD members' interests. In 2000, the OECD issued another report documenting the steps taken since the Recommendation was adopted. This report noted that while some nations had eliminated exemptions to their cartel laws, revised corporate leniency programs, or allowed greater exchange of business information, less progress has been made on facilitating bilateral cooperation on cartel investigations than had been hoped. Nevertheless, these OECD initiatives demonstrate an emerging consensus on the undesirability of international cartels—which may well spur enhanced enforcement actions, both domestic and cross-border.

Taking together the conceptual concerns (raised in section 4) about the effectiveness of national enforcement measures against international cartels, and the promising yet nascent bilateral cooperation described above, we conclude that at present the cumulative effect of national enforcement systems is unlikely to provide sufficient deterrence to international cartels. Several options for reform are considered in the next section.

[42] A recent detailed analysis of the arguments advanced in support of restricting the exchange of business information in cartel investigation by the OECD came to a similar conclusion (OECD 2000a).
[43] This recommendation is reproduced in an appendix to OECD (2000a).

6. OPTIONS FOR REFORM

Any proposed reform to international cartel enforcement should be assessed, in large part, on the deterrent it provides to firms to cartelize markets in the first place. That deterrent's strength depends on the firms' perceptions of the probability of getting punished and the size of any expected penalty. Although the pecuniary gains from cartelization may result from raising prices across the globe, recent enforcement experience suggests that much of the evidence and many of the people responsible for international cartelization are to be found in the nations where the headquarters of globally-oriented firms are located. Table 1 shows that those headquarters tend to be situated primarily in industrial nations. This suggests that although calculations of the pecuniary harm should in principle shift from the national to the global, *at present* reforms to the "investigative technology" probably need only focus on cooperation between the industrial nations.[44]

As a first response, it is tempting to advocate creating a global enforcement authority with powers to collect evidence, conduct interviews, and then compute the global gains from cartelization and levy the appropriate fines. In principle, such a proposal could overcome the deficiencies of the current system of national enforcement and bilateral cooperation. However, at this juncture no nation appears ready to pool sovereignty in such an aggressive manner, or to allow its citizens and firms to be punished by such a body. The EC's relatively weak enforcement powers against price-fixing and the like are a testament to the reluctance of EU members, who have been pooling sovereignty in other areas for decades, to cede powers in cartel cases—even though the distortions to the free flow of goods and services across European borders that cartels can engender are widely acknowledged.[45] Without denying the intellectual appeal of such a far-reaching solution, we turn our attention to more modest and perhaps more likely reform options.

[44] However, the growing tendency for firms in developing economies to undertake overseas transactions suggests that the time may well come when the "investigative technologies" (referred to in the text) should be extended to beyond the industrial nations.
[45] See Waller (2000) for an account of EC anti-cartel enforcement.

The first and least ambitious reform option would involve extending the US-Canada or US-Australia bilateral cooperation agreements on antitrust to all industrial countries. Such a reform would go some way to remedy the current deficiencies in evidence collection and information sharing, increasing the probability of cartel members being caught and punished. To ensure some degree of uniformity in the agreed forms of bilateral cooperation, this reform would probably be best effected through the signing of a plurilateral agreement between these industrial nations, rather than through multiple bilateral agreements.[46] Such a plurilateral agreement need only refer to the modalities of inter-agency cooperation.

The second option builds on the first and tries to address the deficiencies of the current system of national corporate leniency programs. The plurilateral agreement (discussed above) would be extended in two ways. First, a provision should be introduced so that firms can simultaneously apply for leniency in multiple jurisdictions and have those applications evaluated on the totality of the evidence of cartelization presented. Second, to reduce the uncertainty faced by the "first" firm to come forward with evidence about a currently uninvestigated international cartel, corporate leniency programs should state the *minimum* (*non-zero)* degree of relief from penalties.[47] Such a reform would further increase the incentive of any cartel member to "defect," making cartelization harder to sustain.[48]

Although these two reform options can be thought of as improving the investigative technology, the pecuniary gains from cartelization would still be calculated on a nation-by-nation basis. The third option takes initial steps to remedying this deficiency. Once the investigation turns to the matter of calculating pecuniary gain, this inevitably controversial step could be turned over to a pre-selected panel of qualified and independent experts, who reside in the signatories to the plurilateral agreement.[49] This panel would present estimates

[46] However, such an agreement would require considerable changes to the EC's anti-cartel enforcement system.
[47] For example, nations could commit to give the first successful applicant for leniency at least a 50% reduction in any fines that are subsequently imposed. Of course, there is nothing sacrosanct about the 50% figure.
[48] These first two reform options do not rule out expanding the agreement to allow one antitrust agency to take the lead in a cartel investigation that might have ramifications for multiple jurisdictions, with other parties to the agreement providing whatever assistance is necessary. This might economize on enforcement resources, potentially enabling more actions to be taken within given budgets.
[49] The fact that such a panel would consider the cartel's effects in more than one nation's markets is not what makes this step controversial from an economic point of view. Rather, in order to perform this task the panel

(with associated estimated standard deviations) of the cartel's gains across all the affected nations that are parties to this agreement.[50] The panel would break down its estimate of the total gains to the cartel from each nation's markets, which enforcement authorities would take into account when penalizing cartel members or when making their case to a court to penalize cartel members.

The obvious disadvantage of this latter reform option is that gains from cartelizing non-signatories' markets are not taken into account. Given the non-trivial amounts of information required to come up with a sensible estimate of cartel's pecuniary gains, it is naïve to blithely insist that any supranational panel estimate the global consequences of a cartel. Instead, this plurilateral agreement should have open accession clauses to enable non-members that have developed both national enforcement capabilities and which have attained a pre-specified degree of international anti-cartel cooperation to join. Furthermore, thought could be given to informing non-signatories that their interests are affected by a cartel in return for a commitment to treat leniently any firm that has volunteered information during the investigative stages.[51]

Taking these proposals together, a reform process could unfold over time in which industrial countries move from their current arrangements to the first through third options. Strengthening national anti-cartel laws and commitments to enforcement are a necessary prerequisite. The enhanced cooperation will foster trust between antitrust agencies, which is

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would have to estimate the prices and quantities that are likely to have prevailed in the absence of the cartel. This involves making assumptions—which may be difficult to validate—about the underlying market structure and about the likelihood and nature of strategic interaction between the cartel members that, in the absence of a cartel, might have taken place. See White (2001) for a discussion of these issues within the context of the U.S. actions against the lysine cartel.

[50] The panel would have access only to that evidence which is required to compute these estimates, and provisions for confidentiality and restrictions on the use of any information supplied could be established. The panel could be supported by qualified staff.

[51] Even though the gain calculation would take into account the cartel's effects in a number of signatories' markets, the fines and penalties in this third reform option would still be imposed by national authorities. This does not violate the apparent unwillingness of nations only to penalize cartel members for the harm done in their own jurisdictions. Requesting, insisting, and even advocating that signatories impose fines on the worldwide pecuniary gain—which includes the cartel's gains in non-signatories markets—flies in the face of this established practice. Countries that allow private civil suits for damages could also expand their jurisdiction in international cartel cases to allow consumers in countries that were not party to plurilateral agreements to seek redress in the home countries of the cartel members.

essential if agencies are to have any faith in the intent and capacity of others to use the ample discretion built into most anti-cartel laws to successfully conduct international cartel investigations. Admittedly such a process would not immediately lead to the creation of a supra-national anti-cartel agency, but it does not prevent such an agency from being created eventually. Furthermore, the experience of mutual cooperation and assistance, combined with increasing harmonization of antitrust laws would provide the basis for nations to create such an agency if they should choose to do so.[52]

An alternative to these three reform options that has been proposed is a plurilateral or multilateral agreement at the World Trade Organization (WTO). Such an agreement could involve commitments to enact and enforce an anti-cartel law, and to cooperate with investigations launched abroad. As there is less than ten years of experience with international anti-cartel investigations, it is doubtful that *best practices* in enforcement have evolved to such a stage that they could be codified in an agreement. This implies that any such multilateral agreement would probably have to be based on *minimum* substantive standards and implementation procedures. Investigative and prosecutorial discretion are likely to remain and it not obvious how a WTO dispute panel might assess whether a government used that discretion in a manner entirely consistent with the agreement. The likely outcome is that only those antitrust authorities that have not followed certain minimal procedural steps would be found in violation, an outcome that is unlikely to result in significant increases in the probability that cartel members will be punished. Finally, such a WTO agreement is unlikely to ensure that the penalties for cartelization are based on the worldwide pecuniary gains. For all of these reasons a WTO agreement is, at present, unlikely to remedy the deficiencies of national anti-cartel enforcement. However, the international agreements described earlier could provide the basis for strengthening anti-cartel enforcement in countries that currently are not willing or able to adopt and enforce stronger anti-cartel laws.

[52] First (2001) makes a similar point—namely that recent cooperative efforts to investigate international cartels portend the development of international competition law.

A WTO agreement could be crafted (or the GATT agreement amended) to explicitly address two forms of privately-orchestrated and trade-related cartels.[53] First, laws which permit recession cartels, where firms under considerable competitive pressure—potentially from imports—to engage in market division, could be banned on the grounds that the WTO already has well-established safeguard mechanisms.[54] Second, disciplines could be placed on legally-sanctioned export cartels. Given the discussion in section 3 there appears to be a justification for letting small firms share the considerable fixed costs of marketing and exporting; the objective should be to prevent such arrangements from resulting in consumer welfare losses. Two disciplines could be imposed on laws granting exemptions for export cartels: notification and unimpeded entry. Notification would involve the publication of the names of the members of such cartels, which will facilitate monitoring by antitrust officials in the importing country. A requirement that entry to such arrangements be unimpeded would help both reduce any market power that is enjoyed by existing members, and make coordinating any restrictive business practices more difficult.

7. CONCLUSION

International cartels are a nontrivial impediment to the flow of goods and services across borders. Recent enforcement experience suggests that widespread cartelization in certain industries has affected many nations' markets. This might not be a concern if national antitrust laws provided a sufficient deterrent to international cartels—however both *a priori* reasoning and the fragmentary record of international cooperation in this area suggests that this is not the case. In particular, three aspects of cartel enforcement need reform. First, the probability of a cartel being punished is considerably reduced by the current patchwork of bilateral cooperation agreements on evidence collection and sharing with foreign jurisdictions.

[53] It is a separate, and important, matter whether WTO-disciplines should be imposed on state-run export cartels. Arguably these cartels can distort trade flows and the allocation of resources, just like privately-run cartels. Furthermore, since governments (and not firms) are signatories to WTO agreements then it could be argued that disciplines against state-run cartels would be easier to enforce than those requiring governments to take action against domestic privately-run cartels.

[54] For an overview of the legal statutes on recession cartels in industrial nations see Waller (1996). Feibig (1999) provides an excellent account of both the use of crisis (or recession) cartels in Europe and the tendency for competition law considerations to be trumped by industrial policy considerations during acute periods of industry contraction.

Second, penalties based on national assessments of the pecuniary gains to cartelization are unlikely to deter cartels that operate in many countries' markets. Third, vigilance should not end with a cartels' punishment, as former price-fixers often try to effectively restore the *status quo ante* by merging or by taking other steps that lessen competitive pressures and raise prices. Unless a pro-efficiency approach drives all competition policy enforcement, the benefits created by keen international cartel enforcement will be eroded by lax enforcement in other areas.

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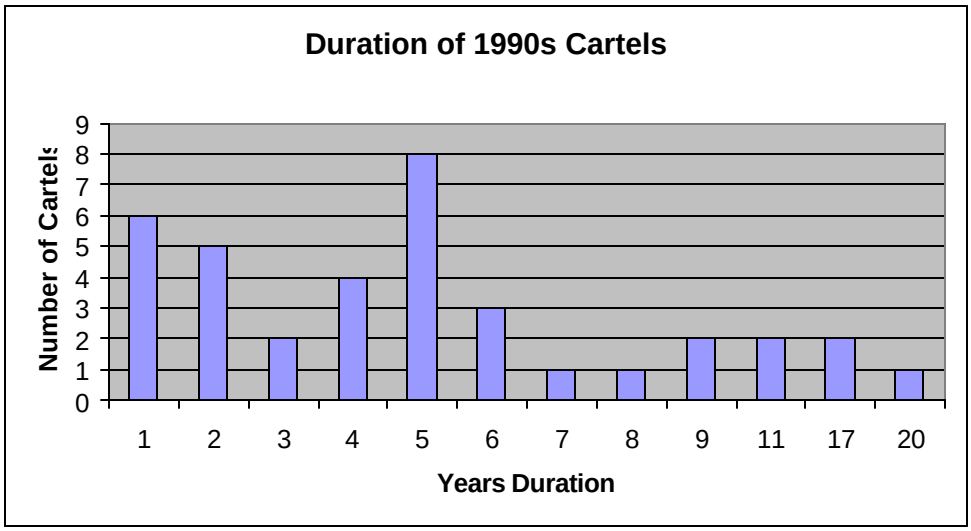
Figure 1: INTERNATIONAL CARTEL DURATION IN THE 1990s



Source: Levenstein and Suslow (2001), Table 1.

Table 1
COUNTRIES WITH FIRMS CONVICTED OF PRICE FIXING BY THE UNITED STATES AND THE EUROPEAN COMMISSION DURING THE 1990s

Country	**Cartel**
Angola	Shipping
Austria	Cartonboard, citric acid, newsprint, steel heating pipes
Belgium	Ship construction, stainless steel, steel beams
Brazil	Aluminum phosphide
Britain	*Aircraft*, steel beams
Canada	Cartonboard, pigments, plastic dinnerware, vitamins
Denmark	Shipping, steel heating pipes, sugar
Finland	Cartonboard, newsprint, steel heating pipes
France	*Aircraft*, cable-stayed bridges, cartonboard, citric acid, ferry operators, *methionine*, newsprint, *plasterboard*, shipping, sodium gluconate, stainless steel, steel beams, seamless steel tubes
Germany	*Aircraft*, graphite electrodes onboard, citric acid, aluminum phosphide, lysine, *methionine*, newsprint, pigments, *plasterboard*, steel heating pipes, seamless steel tubes, vitamins
Greece	Ferry operators
India	Aluminum phosphide
Ireland	Shipping, sugar
Israel	Bromine
Italy	Cartonboard, ferry operators, newsprint, stainless steel, steel heating pipes, seamless steel tubes
Japan	Graphite electrodes, lysine, *methionine*, ship transportation, shipping, sodium gluconate, sorbates, seamless steel tubes, thermal fax paper, vitamins
Luxembourg	Steel beams
Malaysia	Shipping
Mexico	Tampico fiber
Netherlands	Cartonboard, citric acid, ferry operators, Ship construction, sodium gluconate, Tampico fiber
Norway	Cartonboard, explosives, ferrosilicon
Singapore	Shipping
South Africa	Diamonds, newsprint
South Korea	Lysine, *methionine*, ship transportation, shipping
Spain	*Aircraft*, Cartonboard, stainless steel, steel beams
Sweden	Cartonboard, ferry operators, newsprint, stainless steel
Switzerland	Citric acid, laminated plastic tubes, steel heating pipes, vitamins
Taiwan	Shipping
UK	Cartonboard, explosives, ferry operators, newsprint, pigments, *plasterboard*, shipping, stainless steel, seamless steel tubes, sugar
US	*Aircraft*, aluminum phosphide, bromine, cable-stayed bridges, cartonboard, , citric acid, diamonds, ferrosilicon, Graphite electrodes, isostatic graphite, laminated plastic tubes, lysine, maltol, *methionine*, pigments, plastic dinnerware, Ship construction, ship transportation, sorbates, Tampico fiber, thermal fax paper, vitamins
Zaire	Shipping

Source: Levenstein and Suslow 2001, Table 1. Note: Products in italics are currently under investigation.

Table 2

EVIDENCE FROM HISTORICAL CASE STUDIES AND FROM RECENTLY PROSECUTED CARTELS: ARE CARTEL MEMBERS ATTEMPTING TO CREATE BARRIERS TO ENTRY?

Industry	Conspiracy Dates (approximate dates for recent cartels, first year of cartel for historical studies)	Does anecdotal evidence point to firms accommodating entry or creating barriers to entry? If so, how?
Bromine	1885	Raising pharmaceutical standards; vertical rent sharing/exclusive contracts
Bromine	1995-98	Appear to be accommodating entry of developing country producers. Establishing joint ventures.
Cement	1922	Vertical integration
Diamonds	1870s	Vertical integration
Citric Acid	1991-95	Firms tried to block entry by twice requesting anti-dumping duties to protect the US market from Chinese citric acid imports. Once during the conspiracy (in 1995), and once after (1999). Both times the petition was denied.
Ferrosilicon	1989-91	Five of the six major US manufacturers pled guilty and were fined. These same manufacturers asked for antidumping duties to be placed on Brazil, China, and other countries as well. These tariffs were approved and levied in 1993-94. When the International Trade Commission found out about the price-fixing conviction, however, they reversed the tariffs. The Commission said that industry leaders had been fixing prices during the very time period that they had testified that there was intense price-based competition. (Charleston Gazette, 8/28/00)
Graphite Electrodes	1992-97	Cartel agreement specified that firms agreed to restrict non-conspirator companies' access to certain graphite electrode manufacturing technology.
Ocean Shipping	1870s	Deferred rebates for customers conditioned on cooperation with cartel; predatory pricing
Oil	1871	Tariff
Parcel Post	1851	Vertical rent sharing; network economies; 1st mover reputation
Railroad/Oil	1871	Vertical rent sharing
Seamless Steel Tubes (Oil Country Tubular Goods)	1990-95	Appear to be accommodating entry. Several cartel participants have, since the breakup of the cartel by the European commission, entered into joint ventures with firms based in developing countries.
Steel Beams	1988-94	Restricted flow of information in order to freeze out any new competitors
Vitamins	1990-99	No direct evidence of creating barriers to entry, other than a request for anti-dumping duties in 1999 (no decision yet?). After the breakup of the cartel, mergers of cartel members were approved by competition authorities.

Source: Historical case studies based on Levenstein and Suslow (2002), Table 16. Recent cartel evidence based on Levenstein and Suslow (2001).

Table 3

National Exemptions to Competition Law for Exporters[55]

Country	Exemption	Reporting Requirement
Canada	Export activities that do not affect domestic competition	None
Estonia	Activities that do not affect the domestic market	None
Germany	Repealed by 1999 amendments to the Act Against Restraints of Competition	Notification and approval requirements depend on the nature of the exemption
Hungary	Activities that do not affect the domestic market	None
Japan	Agreements regarding exports or among domestic exporters	Notification and approval of industry administrator required
Latvia	Activities that do not affect the domestic market	None
Lithuania	Activities that do not affect the domestic market	None
Mexico	Associations and cooperatives that export	None
Portugal	Activities that do not affect the domestic market	None
Sweden	Activities that do not affect the domestic market	None
United Kingdom	Apparently removed by 1998 Competition Law	Formerly, agreements had to be furnished to Director General of Fair Trading
United States	Webb-Pomerene Act: Activities that do not affect domestic competition Export Trading Co Act: Exemption similar to W-P Foreign Trade Antitrust Improvement Act – Exemption from Sherman and FTC acts	Webb-Pomerene Act: Agreements must be filed with FTC Export Trading Co. Act: Certificate of Review provided by Commerce Dept

[55] Information above is drawn from OECD (1996), American Bar Association (1991), and OECD (2000b).