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A mnemonic for the major factors influencing the likelihood of collusion

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In the typical industrial organization textbook and class, and in the courtroom, numerous factors are identified as providing a predisposition to a cartel. These factors include cost differences, product differentiation, number of firms, technology, growth of the industry, elasticity, frequency of sales, number and size distribution of sellers and buyers, discount rate, type of competition, vertical integration, cost ratio, imports, sealed bidding, social structure and track record, future expectations, recognition of interdependence, announcements and exchanges of economic information, multimarkets, etc. There are many factors to keep in mind. Fortunately, the accumulated theoretical and empirical work on collusion suggests that we can, for all practical purposes, focus on the factors contained in the mnemonic word CARTEL. The key factors are: Concentration, Additional, Revenue, Talk, Entry, Likeness.

The antitrust laws are no different from some other laws in that the key elements in proving a circumstantial case are (1) motive or incentive and (2) opportunity or ability. The incentive in collusion is the potential gain in profitability from enhanced conspiratorial prices (net of expected enforcement costs, antitrust fines, and damages).[1] The ability in collusion centres on the several key characteristics that economic theory and the accumulated empirical research suggest are most conducive to collusive arrangements.

From an economic viewpoint, elements of an effective or successful price-fixing collusion include the following: (1) cartel members must knowingly make an agreement on pricing (tacit or overt) among the primary market participants with the purpose understood to be controlling prices; (2) cartel members have a system to detect cheating; and (3) cartel members have a mechanism to punish cheating.

Explicit collusive agreements (direct evidence) and conscious parallelism plus other factors (circumstantial evidence) are *per se* illegal in the USA. Parallel pricing without any other plus factors is not *per se* illegal. An agreement/collusion can be shown by demonstrating regular meetings of all participants, 'smoking gun' evidence, etc. Conspiracy can be proved by direct circumstantial evidence. There need not be a 'smoking gun.' 'Collusion can be inferred from circumstantial evidence. In other words, even if there is no hard evidence of an actual agreement, one can reach the conclusion that an agreement must have occurred based upon circumstantial evidence' (Blair and Kaserman, 1985, p. 206). Blair and Romano

[1] This does not mean that the profits are high in some absolute sense or relative to some control group. Successful collusion makes prices and profits under collusion higher than they would have been otherwise. If profits were 'quite low' prior to the collusion, they may still be 'low' but are higher than they would have been in the absence of collusion. The task is to compare the prices and profits in the alleged collusion period with a 'but for,' 'violation-free' or 'benchmark' period from different times ('before or after' or 'time series' test) or different places ('yardstick' or 'cross-sectional' test).

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(1990) support the conclusion that tacit understandings can lead to collusion.

In the typical industrial organization textbook and class, and in the courtroom, numerous factors are identified as affecting the formation of a cartel.[2] These factors include cost differences between firms, product differentiation, number of firms, rate of technological advance, probability of continuation and growth of the industry, price elasticity of demand, frequency of sales, number and size distribution of sellers and buyers, discount rate, type of competition (price or nonprice), incidence of vertical integration, ratio of fixed (or overhead) to variable costs, importance of imports, sealed bidding procedures, the market's social structure and track record on antitrust, expectations as to the future, mutual recognition of interdependence, announcements and exchanges of economic information, size of firms,[3] product or market diversification (i.e. multimarkets),[4] etc. This is obviously a large number of factors for a student or juror to keep in mind.[5] Fortunately, the accumulated theoretical and empirical work on collusion suggests that we can, for all practical purposes, focus on the factors contained in the mnemonic word CARTEL.[6] The key factors are Concentration, Additional, Revenue, Talk, Entry, Likeness.

Concentration refers to the number and size distribution of firms in a well-defined market.[7] It is easier to agree on price if the colluding firms control a majority of market sales, because there is less need to worry about nonparticipating firms on the competitive fringe undercutting the conspiratorial price. Empirical research has shown that where market participants are found guilty of price fixing, high seller concentration was a common ingredient. If the number of firms is small (ten or less), and the level of sellers' concentration is high (four-firm concentration ratio is 70% or better or the Herfindahl–Hirschman Index is 2000 or above), the likelihood of effective collusion is greater.[8]

Additional factors are reserved for special circumstances that could make the possibility of collusion in a particular situation under investigation greater. For instance, the use of a sealed bid procedure, price transparency, low buyer concentration, trade associations, etc., would be facilitating factors for effective collusion if such were involved in the situation at hand.[9]

Revenues refers to the factor that there must be enhanced revenues resulting from the collusion, given the positive costs of attaining and maintaining the collusion including the potential antitrust violation costs if detected. In general, the smaller (more inelastic) the own price elasticity of demand, the greater the likelihood of success.[10]

Talk refers to the fact that the greater the personal and interfirm communication, the easier it is to attain and maintain a collusive arrangement. Some scholars consider collusion to be nothing but 'communication par excellence'. Adam Smith, the father of limited government, observed sagely that 'people of the same trade seldom meet together even for merriment or diversion, but conversation ends in a conspiracy against the public or in some contrivances to raise prices'. For instance, 80% of the carpet produced in the USA is manufactured by firms located within a 65 mile radius of Dalton, Georgia. Since top-level executives live and work in this restricted area, there are numerous opportunities for communication. This type of social interchange facilitated regular pricing communications among defendants, executives and employees. Because of their proximity to one another, an agreement regarding prices did not have to be as fixed or mechanical as would an agreement among collusive parties spread out across the nation, which is a much more common situation. Thus, it is not surprising that the carpet industry, for

[2] See Kamerschen (1979, pp. 193–209), Cabral (2000), Carlton and Perloff (1999), Church and Ware (2000), Dick (1998), Kamerschen and Morgan (2004), Peppal *et al.* (1999), Scherer and Ross (1990), Waldman and Jensen (2001).

[3] Small firms are more prone to price-fixing agreements because their owners are more likely to benefit directly from price-fixing than are the managers of a large firm whose compensation is primarily a fixed salary. Thus, the organizational structure of a closely held firm may provide a greater incentive for collusion to occur.

[4] Theoretical analysis and empirical research suggest firms that compete with each other in several markets have a greater predilection to collude and/or collude to a greater extent. See Cabral (2000, pp. 138–40). In contrast see Tirole (1988, p. 243).

[5] Moreover, some of these factors are ambiguous in that various scholars say they go one way and others say they go another way. For instance, some maintain that collusion is more likely where growth is stagnant or declining as desperate firms with low or negative profits turn to collusion. However, declining growth makes it difficult to maintain an effective collusion. (For actual examples, see Waldman and Jensen, 2001, p. 247.)

[6] See Waldman and Jensen (2001, p. 247).

[7] While the definition of the market is not formally required in a collusion case, it is needed to calculate the market shares, which do bear on the likelihood of collusion.

[8] The major reason this is true is that the cost of attaining and maintaining a collusive arrangement increases significantly as the number of firms increases and the size of firms diminishes.

[9] See Kamerschen and Morgan (2004).

[10] An inelastic demand would suggest that this collusion is presently not exploiting all the potential gains and not necessarily that collusion does not exist. While a price increase may be profitable and optimal if demand is elastic, it definitely is profitable and optimal if demand is inelastic (see Kamerschen, 1994).

example, has been involved in antitrust litigation. On the other hand, the importance of talk has been downplayed recently by the fact that many of the most injurious cartels since 1990 have been international in scope (see Conner, 2001).

Entry conditions or barriers to entry are any factors that allow incumbent firms to earn supernormal profits, while making it unprofitable for newcomers to enter the market. Entry conditions are important for the durability of cartels. No monopoly or collusion can exist for long without legal (i.e. legal protection for incumbents against entry by, for example, patents or government regulations), structural (i.e. incumbents have cost or marketing advantages), or strategic (i.e. incumbents take specific steps to deter entry such as developing a reputation for aggressive deference of its market, for example, by predation) barriers to entry. Despite the large body of theoretical work on entry, surprisingly little empirical work was done on entry (and exit) conditions until about thirty years ago. This recent work is surveyed nicely in Waldman and Jensen (2001, pp. 147–51, and in footnote 45, pp. 163–64). In general, gross and net entry is negatively related to high capital requirements and multiplant operations, and positively related to market growth and high historical profit rates. Gross, but not net, entry is negatively related to advertising. The relationship between entry and scale economies or research and development intensity is unclear, confusing, and perhaps chaotic.

Likeness refers to the fact that the more symmetrical are the co-conspirators' products, costs, expectations as to the future, degree of vertical integration,[11] etc., the easier it is to achieve and continue a collusive arrangement. Significant cost differences, varying expectations as to future market shares, demand and cost, different degrees of vertical integration, etc., all make the coordination costs significantly higher. Similarly, a slower rate of technological advance is more conducive to collusion. Rapid technological advance leads to demand and cost differences among firms that increase the fragility of cartel agreements. Thus, it is easier to reach an agreement on price-fixing in the slowly changing US gypsum board industry than the US computer industry.[12]

While it is not claimed that the acronym CARTEL can cover all cases, experience in the classroom or the courtroom suggests that it will cover most of the situations likely to arise.[13] The job of an antitrust economist in the courtroom is to decide if the preponderance of factors show that the evidence in the case is consistent with collusion. It is the job of the jury to decide if, in fact, collusion exists.

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[11] The economic literature also indicates that the enforcement costs of collusion are increased and complicated when some members sell at different levels from greater integration, allowing more opportunities for hidden price cutting.

[12] See Waldman and Jensen (2001, p. 247).

[13] Another factor that sometimes makes things difficult to predict is the topsy-turvy principle, which states that the more competitive possible behaviour, the more likely collusion is sustainable. This is because the more competitive possible behaviour, the harsher the possible punishment, and the more likely collusion (Shapiro, 1989). Flat marginal cost curves or excess capacity can be factors that promote the stability of collusion! The game-theoretic view suggests a positive correlation between collusion and excess capacity.

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