

PART IV: PRELIMINARY DISCUSSION OF AN APPROACH TO NON-MERGER CASES

8 THE DETERRENT EFFECT WITH RESPECT TO CARTELS

Introduction

- 8.1 In principle, competition policy has a deterrent effect when the existence of a competition authority with the power to prevent anti-competitive conduct or mergers means that some form anti-competitive practice is prevented, without the authority ever having to take action. For example, suppose that, if caught, price fixers will be heavily penalised. We might expect that some firms will choose not to fix prices because the likelihood of being penalised is too great, even though they would have fixed prices in the absence of any competition law. In such cases the OFT would never bring an action against these firms. However, consumers would nevertheless benefit from the existence of the competition regime because prices would be lower than they would have been.
- 8.2 If there is one legal ‘certainty’ in competition law, it is that price fixing and market sharing cartels are prohibited¹⁶⁵. Deterrence of other forms of anti-competitive practices may also be important. However, we note that there is often more room to debate whether or not mergers or other forms of behaviour are anti-competitive. If so, the deterrent effect may be less effective perhaps because firms are genuinely unaware that their behaviour is anti-competitive, or because they believe that there is a reasonable chance of obtaining clearance because each case must be judged on its own merits¹⁶⁶.
- 8.3 The deterrent effect is inherently difficult to measure in cartel cases since we can rarely find a control group which allows us to detect how, in the absence of antitrust policy, a firm or group of firms would have behaved. Nevertheless, there are both theoretical and empirical literatures which allow us to hypothesise about how important the deterrent effect might be in price fixing cases. These are discussed in the second and third sections respectively. We then present,

¹⁶⁵ This is not to argue that price fixing and market sharing agreements are *always* prohibited. However, by ‘cartel’ we mean that the agreements cover a significant part of the relevant market and so would most likely be found to be restrictive of competition.

¹⁶⁶ For mergers, see the discussion of deterrence at Appendix II to Chapter 7.

for a typical cartel case, some simple calculations to demonstrate how the welfare gains from the lower prices brought about by deterrence in that market could easily be as large as the gains from lower prices brought about by direct intervention.

A Theoretical Approach to Deterrence

8.4 Block, Nold and Sidak (1981) formulate a simple model of deterrence which demonstrates that antitrust penalties for price fixers will not necessarily eliminate price fixing but will lead to the optimal mark up being lower than the monopoly price. The intuition is simple. If the penalty is some function of the mark up¹⁶⁷, then there is a trade-off between setting a high mark up but, if caught, attracting a high penalty, and setting a lower mark up with a lower associated penalty but lower cartel profits if the cartel remains undetected. Likewise, if the probability of detection also increases with the mark up, then, again, a trade-off exists between setting a high price, which might make detection more likely, and setting a low price and potentially forgoing some profits.

8.5 Block, Nold and Sidak also assume that a cartel can collude perfectly and so would set the monopoly price in the absence of antitrust enforcement. They then model the effect of antitrust enforcement by introducing a probability that the cartel is detected (and prosecuted) and subsequently fined. The cartel chooses price (p) to maximise expected profit:

$$EA = (1 - d) A_1 + d A_2 \quad (8.1)$$

where

- d is *the probability of detection* which is dependent on expenditure on antitrust enforcement and the mark up.

- A_1 is profit if the cartel is not caught,

$$A_1 = (p - c)Q(p) \quad (8.2)$$

where c is constant marginal cost and $Q(p)$ is output.

- A_2 is equal to the profit less the fine if the cartel is caught, expressed as

$$A_2 = (p-c)Q(p) - t(p-c)Q(p) \quad (8.3)$$

¹⁶⁷ Measured in their model as (price – marginal cost)/marginal cost.

- 8.6 The second part of the expression says that the *fine* is some multiple t of cartel profit. If $t = 3$, for example, then the fine is three times the cartel's profits (say, as in a treble damage suit).
- 8.7 They argue that an increase in d or t in most cases reduces the price (and hence mark up) set by the cartel. Even if it does not deter cartels completely, increasing either the probability of detection (eg via a leniency policy or by spending more on antitrust enforcement) or increasing the expected penalty for price fixing should nevertheless lead to lower prices.
- 8.8 It is worth noting that equation [8.1] can be re-arranged as follows:

$$EA = (1 - dt)(p - c)Q(p) \quad (8.4)$$

- 8.9 This illustrates that, if it is possible to set the multiple t equal to the inverse of the probability of detection, then the expected gain from price fixing would be zero. In practice, however, if the probability of deterrence is low, then it may not be possible to set a fine high enough to deter cartel behaviour completely. For example, with the probability of detection of 15 percent, this suggests that t should be set at 6.67 to deter cartel completely. Such a high fine may not be politically acceptable¹⁶⁸.
- 8.10 A brief comment is also worth making on cartel stability. Block, Nold and Sidak assume that, in the absence of deterrence, the cartel would have secured the monopoly price. However, there are many other collusive equilibria for which the optimal price is below the monopoly price. Furthermore, cartels may break down or enter 'punishment' phases due to demand and supply shocks, cheating, dissension by cartel members or other reasons. Even so, intuitively we expect that the deterrent effect will make collusive equilibria based on high mark ups *less attractive* than they otherwise would be.

Empirical evidence on deterrence

- 8.11 From a trawl of the literature, we have identified four quite different approaches which are of relevance to empirically assessing the deterrent effect of competition policy. The first considers whether, following an indictment, the deterrent effect lasts in the same market that firms were indicted. The second considers surveys of antitrust practitioners. The third is

¹⁶⁸ Note also that the optimal fine is not necessarily the estimated gain from the infringement multiplied by the inverse of the probability of detection if the authorities make *errors* occasionally. This is because, knowing this, law abiding firms may be deterred from some beneficial behaviour that could be interpreted as cartel behaviour (Simon and Werden, 1987).

a study of mark-ups in cases where indictments occurred. The fourth studies the impact on a group of cartel firms in the UK of the introduction of anti-cartel legislation by comparing their experience with a control group.

Deterrence in the same market that firms were indicted

- 8.12 Having ascertained that an indictment leads to lower prices in a particular industry, a natural question is to ask how long the lower prices last. There are fewer studies which address this point and overall the results are inconclusive. As noted in Chapter 5, on the one hand, Thompson and Kaserman (2001) argue that the negative returns from indictments found in Bosch and Eckard (1991) are shortlived. On the other hand, Feinberg (1984) finds some support for deterrent effects lasting over five years, admittedly on a much smaller sample¹⁶⁹.

Survey evidence

- 8.13 The DoJ (2000) notes: 'We firmly believe that deterrence is perhaps the single most important ultimate outcome of the [Antitrust] Division's work. We are just as sure that it presents the most significant measurement challenges...' (p.49). Having considered various possible ways of measuring the deterrent effect, the DoJ suggested that a survey of attorneys in private law firms specialising in antitrust would perhaps be the best: 'While acknowledging a fairly low response rate, we nonetheless feel there is a great deal of general value to the specific results of the survey: primarily that *if the Division stopped enforcing Section 1 of the Sherman Act, there would be an estimated 150 percent increase in the number of conspiracies over the next five years, and an increase in the aggressiveness of those conspiracies* (p.49A).'
- 8.14 While the estimated magnitude of deterrence is subject to measurement error, this finding is consistent with the theory described above. In the absence of antitrust policy, we would expect that more cartels would form than otherwise would have existed – the survey perhaps suggesting that there would be more than twice as many¹⁷⁰. Also, the survey lends support to the view that those cartels that would have formed anyway would increase prices by less than they otherwise would have done due to the deterrent effect.

¹⁶⁹ Note also the debate on whether indictments lowered prices for premium baked bread in Washington, where Block et al's (1981) evidence in support of the deterrent effect is arguably overturned by Newmark (1988).

¹⁷⁰ Loosely speaking, Section 1 of the Sherman Act deals with anti-competitive agreements. The DoJ's quote therefore does not relate only to cartel agreements.

- 8.15 Feinberg (1985) reviews results of an anonymous survey of legal opinion in Brussels in the early 1980s. While the response rate was relatively low (24 out of 135), Feinberg noted the following. First, few respondents doubted that the European Commission failed to detect most price fixing violations (ie the probability of deterrence is low). Feinberg also cites a US survey in 1983 which drew a similar conclusion. Second, there was some support for the view that firms fixed prices due to a disregard for the law in pursuit of private gain as opposed to ignorance of the law (this is consistent with economic theory and implies that penalties will have a deterrent effect through reducing the expected private gains from collusion). Third, the probability of detecting cartels and imposing fines was viewed to have increased over the previous decade, having a considerable deterrent value.

The spillover effect of antitrust

- 8.16 Block and Feinstein (1986) provide a model of the deterrent effect of antitrust enforcement that might arise from ‘spillover’ effects. They argue that an antitrust indictment in a local market against bid riggers in (say) highway construction is more likely to have a deterrent effect against bid rigging cartels in other local markets in the *same industry* than against bid rigging cartels in different industries. This is because antitrust authorities, having uncovered one local cartel, might expect to uncover more local cartels in the same industry. This will be particularly so when conspirator firms operate in more than one local market¹⁷¹. A firm indicted for bid rigging in one area would be foolish to continue bid rigging in a different area¹⁷².

¹⁷¹ This applies on an international scale as well. Recent US prosecutions of international cartels have led to prosecutions in other jurisdictions providing an example of how collusion in any particular industry may be rife across jurisdictions or sub-markets.

¹⁷² An indicted firm might also be reluctant to bid rig in a different industry. Antitrust authorities might reasonably be suspicious of indicted firms who have been found to rig bids in one industry when the same firms also operate in a similar industry. Howard and Kaserman (1989) cite an example of firm A which colluded with two other contractors (B and C) in road paving. B and C also provided sewerage works for the public sector. Firm A approached B and C and asked to be involved in their bidding ring for sewerage works. Firm A presumably expected B and C to be bid rigging in sewerage because they colluded in road paving. B and C were indeed also colluding in bid rigging for public sewerage works. Having said this, it is worth noting that prior to being prosecuted for its involvement in the Vitamins cartel, F. Hoffmann-La Roche pled guilty to involvement in the citric acid cartel. It would appear that this indictment did not deter it from continuing with the Vitamins conspiracy.

- 8.17 Between 1977 and 1982 the DoJ indicted more than 200 highway contractors for bid rigging¹⁷³. Block and Feinstein apply a model of spillover effects to the highway construction industry across the US. They argue that, given there has been an indictment in state *i*, an indictment in state *j* will be more likely as the number of firms common to *i* and *j* increases. This is a primary spillover effect. There may also be secondary effects in state *k*, where *k* and *j* also have common suppliers. Block and Feinstein capture the magnitude of all of these spillover effects in a 'Q coefficient'. The higher the Q coefficient, the greater the spillover linkages and so the higher should be the deterrent effect.
- 8.18 Block and Feinstein argue that their Q coefficient is important in determining mark ups¹⁷⁴ and hence how conspirators react to indictments in other states. This, they argue, supports the view that the effect of antitrust indictments can be *greater* in other states than in the state where the indictment took place. However, the deterrent effect is not uniform and depends on the cross linkages of firms from state to state¹⁷⁵.

Effect of cartel laws in the UK

- 8.19 Symeonidis (2000) examines the impact of cartel policy on firms' profits using a panel data set covering the whole of the UK manufacturing industry between 1954 and 1973¹⁷⁶. His results provide an insight into both the deterrent effect of competition law and to how this ultimately affects the profitability of firms¹⁷⁷.
- 8.20 Symeonidis describes a 'natural experiment' provided by the introduction of the 1956 Restrictive Trade Practices Act (RTPA) in the UK. This led to the cancelling of many restrictive (often cartel type) agreements which reduced competition prior to the impact of the RTPA. Interestingly, most agreements were cancelled between 1959 and 1963. Prior to 1959 most agreements were *registered* with the authorities as opposed to cancelled. The first few of these

¹⁷³ Of all bid rigging indictments, highway construction generated the most. The construction sector was particularly rife with bid rigging and in the early 1980s. Some two thirds of all the indictments filed by the Antitrust Division were for bid rigging in construction (most of these were for local or at most regional markets).

¹⁷⁴ In fact the authors use as their dependent variable the residual from a regression of the mark up on a cyclical measure of unemployment and state dummies. The residual should then capture the element of the mark up that cannot be explained by cyclical or state factors.

¹⁷⁵ Block and Feinstein argue that their model explains the data more effectively than two competing models: (1) that the major impact of an indictment is in the state where the indictment took place and (2) that the deterrent effect is similar across states as opposed to being dependent upon the extent of common firms across states.

¹⁷⁶ He has data for the years 1954, 1958, 1963, 1968 and 1973.

¹⁷⁷ Symeonidis' emphasis is slightly different. He provides evidence that an exogenous increase in the intensity of price competition leads to an increase in concentration, leaving profitability unchanged in the long run. He then argues that this supports the use of the assumption of a free entry – zero profit equilibrium in theoretical models.

registered agreements reached the Restrictive Practices Court (RPC) only in 1959. When the Court took a hard line against those agreements, a firm precedent was set leading to many agreements being abandoned. This provides evidence of how the number of anti-competitive agreements abandoned due to the deterrent effect is far greater than the number of cases that are actually struck down in practice by the competition authorities.

- 8.21 Symeonidis' sample allows a comparison of a control group of industries which did not have restrictive agreements prior to 1956 and a group of 'cartelised' industries. Assuming that, other than the impact of the cartel law itself, both groups faced similar shocks over the sample period¹⁷⁸, then a comparison of the mark up of the control group with the mark up of the cartel group informs us of the effect of the anti-cartel law on margins. Symeonidis finds that the short term impact of the RTPA is to reduce margins in the cartel group¹⁷⁹. By 1968 margins for cartel firms had recovered relative to the control group and the situation remained the same in 1973. Symeonidis concludes that the long term impact on margins of the RTPA is negligible.
- 8.22 Symeonidis explains this outcome in the following way. If it is the case that, prior to the RTPA, there were low entry barriers into manufacturing, then the marginal firm in the industry should make (more or less¹⁸⁰) zero profits – so that margins are high enough only to cover the fixed costs of production¹⁸¹. The increase in the intensity of price competition leads to a fall in margins

¹⁷⁸ For example, over the period, UK manufacturing became more open to foreign competition and faced improvements in technology which impacted on costs. Symeonidis assumes that there is no systematic difference in how these (and other) shocks affect the control group and the cartelised group.

¹⁷⁹ Symeonidis finds that, by 1963, margins had fallen by 1 percentage point relative to the control group. He emphasises that this is *not* an estimate of how much the cartels raised margins in the short run and that his results are consistent with a rather larger effect of cartels on price. The 1 percentage point is likely to be an underestimate of the short term impact of the anti-cartel law for two reasons. First, the impact of the RTPA had not fully taken effect for some industries in 1963. In several cases the restrictive agreements were replaced by information sharing agreements which had similar effect. It was not until the mid 1960s when the RPC took a hard line against information sharing, that the RTPA had its full impact on intensifying price competition. Second, in other industries the long term effect of shakeout in raising margins may have already set in by 1963.

¹⁸⁰ If there is an integer constraint such that there is room for entry of (say) only half a firm, then the marginal firm will earn a small degree of excess profits in the long run equilibrium.

¹⁸¹ Symeonidis' data do not allow him to calculate firm level margins but only industry level margins. Hence, the margin is an average for the industry. While theory allows us to predict the effect of more intense price competition on the marginal firm (absent integer issues) it is harder to predict what will happen to the average margin for the industry (given that firms are unlikely to be identical).

and so induces a shake out. As some firms exit the market (or merge), concentration increases until margins once again rise to a level high enough to cover fixed costs¹⁸².

- 8.23 The theoretical implication, supported by Symeonidis' results¹⁸³, is that where antitrust laws intensify competition in industries where entry barriers are *already low*, welfare gains are likely to arise not through gains in consumer surplus but through gains in producer surplus¹⁸⁴. It should also be noted that antitrust legislation will also be more effective against cartels in industries where entry barriers are high¹⁸⁵. Where entry barriers exist cartels are not only likely to be more damaging, they are also likely to last longer¹⁸⁶.

Estimating the magnitude of deterrence

- 8.24 In this section, we turn to what is the big question for our purposes. What, if anything, does the literature on cartels tell us about the magnitude of the deterrent effect – can we quantify the extent to which cartels rein back their actual margins to avoid detection? Of course, in the general absence of hard documentary evidence, any answer is always likely to be speculative, nevertheless, the literature has laid down a few pointers which we now bring together in a simple model.

¹⁸² Symeonidis assumes that the recovery in margins for cartel firms is due to a recovery in *prices* after the shake out. However, he accepts that it is possible that the recovery in margins is also due to *lower costs* as a result of greater price competition. Thus, if cartels lead to excess entry (or insufficient exit), it is quite feasible that cartels support the existence of inefficient firms (or inefficient levels of production) in the industry. Indeed, Symeonidis notes that 'price setting by the cartels often consisted in a compromise between high-cost and low-cost firms, with prices set at a level that allowed the high-cost firms to break even' (page 8). If so, Symeonidis' results imply that antitrust legislation not only lead to lower fixed costs in the industry but also lower marginal costs and lower prices (although lower costs were not fully passed on to consumers).

¹⁸³ Symeonidis' notes that 'the intensification of price competition following the 1956 Act reduced, on average, the number of firms across all classes of industries by about 12-13 percent between 1958 and 1973' (page 20).

¹⁸⁴ Intuitively this is explained as follows. Free entry means that the cartel cannot prevent prices from rising (too far) above competitive levels. However, shake out means that there are fewer firms in the industry and so there is less duplication of fixed costs.

¹⁸⁵ Indeed, Symeonidis notes an example of a cartel in the secondary battery industry which had raised entry barriers. The impact of the RTPA seemed to lead to new entry and the expansion of smaller firms with the effect that margins and concentration fell.

¹⁸⁶ Evenett and Suslow (2000).

8.25 Assume that in a typical cartel case the probability of detection depends positively on the magnitude of the price set by the cartel:

$$d = ap/p^m \tag{8.5}$$

where

- p^m is the monopoly price ($p^m \geq p$), and
- a lies in the range $0 < a < 1$ so that $0 < d < 1$.

8.26 Note that, even if the cartel prices at the full monopoly price, if $a < 1$ this implies that the antitrust authorities will not necessarily detect the cartel. Therefore, a might be interpreted as a measure of the antitrust authority's ability to root out and prosecute cartels based on observing what appear to be excessive prices. This is intuitively likely since higher prices will lead to more complaints, and the higher prices are in relation to costs (ie the closer p is to p^m), the easier it might be to prosecute a cartel. We assume that a is exogenous¹⁸⁷.

8.27 Now, in any particular case, we observe an actual price, p , and our objective is to impute from this the value of p^m – the price which the cartel would like to set, absent any antitrust constraint¹⁸⁸. To see how one might proceed, we calibrate this expression with what we take to be, from the literature, 'typical' values:

$$d = 0.15 \text{ and } (p/c) = 1.1^{189}$$

8.28 Rewriting [8.5] as:

$$p^m/c = (a/d).(p/c) \tag{8.6}$$

and inserting these two 'typical' values gives:

$$p^m/c = (1.1/0.15).a = (22/3).a$$

¹⁸⁷ However, a may not be exogenous to the antitrust authorities. For example, it may be the case that a increases as antitrust authorities spend more on cartel enforcement or give anti-cartel policy greater priority. Thus we might imagine a game where the antitrust authority moves first and chooses a to maximise some welfare function. Under this interpretation, then the model described here refers to the second stage of the game where it is the turn of the cartel to move taking a as given.

¹⁸⁸ For the moment, we make the (extreme) assumption that the cartel could replicate the monopoly outcome.

¹⁸⁹ For the probability of default, 0.15 is the mid point of the range estimated by Bryant and Eckard (1991). The assumption that $p/c = 1.1$ is consistent with Bosch and Eckard (1991) whose evidence from the stock market suggests that the mean excess margin arising from cartel behaviour was 0.09. We note that these studies pre-date the greater focus on cartels, higher penalties and more effective leniency policy in the US which may well have increased the probability of detection from the mid 1990s.

8.29 This plots the (wide) range of possibilities (combinations of p^m and a) which could account for an actual mark up of 10 percent and a 15 percent probability of detection.

- At one extreme, is the case where the antitrust authority is particularly effective (high a), and this has severely constrained the cartel. Thus, as a tends to unity, p^m/c tends to $22/3$, and a relatively moderate actual outcome, $p/c = 1.1$, is consistent with what would have been a potentially very large monopoly mark up. Here, the gains from deterrence have been substantial¹⁹⁰.
- At the other extreme, the antitrust authority is ineffective (low a), and the reason why the actual mark up is only 1.1 is that the potential monopoly mark up is also low – at the limit, p^m/c tends also to 1.1.

8.30 In other words, $22/3 > p^m/c > 11/10$.

8.31 This can also be written as:

$$1 > p/p^m > 3/20$$

8.32 In fact, we can narrow down this down to a most likely range by recalling that the monopoly price in any context is determined by the value of the price elasticity of demand:

$$p^m/c = e/(e - 1)$$

8.33 Thus, the upper bound corresponds to $22/3 = e/(e - 1)$, ie $e = 1.16$, while the lower bound corresponds to $11/10 = e/(e - 1)$, ie $e = 11$. A value of $e = 1.16$ is somewhat unlikely (although just possible) because it would mean that the hypothetical monopolist would be operating very close to the inelastic part of its demand curve (which implies an extremely low marginal revenue). This seems to us to be a reasonable (ie conservative) lower bound value for e .

8.34 On the other hand, $e = 11$ lies well outside the normally observed range of values for demand elasticities and, moreover, cartels are likely to be associated with relatively inelastic demand. Such a high value is only possible because we have assumed that perfect collusion is feasible absent deterrence. If we now assume, admittedly arbitrarily, that, absent deterrence, the cartel could only achieve 75 percent of the absolute value of the monopoly mark up¹⁹¹ this implies a lower bound for the monopoly mark up over marginal costs of 1.13, and an upper bound for $e = 8.5$.

¹⁹⁰ Our assumption that the cartel can replicate the monopoly outcome is not important in this scenario since pricing at the monopoly level would almost certainly be detected.

¹⁹¹ ie if a monopolist would increase price by an amount equal to 13.33 percent of marginal cost, the cartel would increase prices by an amount equal to 10 percent of marginal cost.

8.35 It would be wrong to draw any very strong conclusions from this exercise, but it has provided some pointers. If it is 'typical' that $d = 0.15$, $p/c = 1.1$ and cartels achieve 75% of the monopoly price, then:

- It is reasonable to assume that there has been a non-trivial deterrent effect – on the reasonable assumption that typical demand elasticities are not as high as (say) 8.5.
- The deterrent effect could be very substantial – at the very extreme, leading to an actual price of about one seventh of the monopoly price.
- If plausible demand elasticities lie in a range of 2 to 4, this implies that p^m would be between 100% and 33% higher than marginal costs. If we further assume that a typical cartel would be able to achieve 75% of the absolute monopoly mark up then, absent deterrence, the cartel would set a price between 75% and 25% higher than marginal costs. If a typical cartel increases prices by 10% above marginal cost, the deterrent effect has been non trivial.

8.36 Furthermore, if a typical value for p/c is 1.2 instead of 1.1 the above analysis remains relevant¹⁹². It would still be reasonable to argue that, absent deterrence, the cartel would set a price between 75% and 25% higher than marginal costs.

Summary and concluding comments

8.37 If the probability of detection is high enough, or if fines are large enough, then antitrust policy may deter cartels completely. However, their clandestine nature (and thus the relatively low probability of detection) means that it will be impossible to eliminate every single cartel through the deterrent effect. The main message then is that, even where fines are not set sufficiently high to deter cartels completely (perhaps due to political reasons), they will still have a deterrent effect and lead to lower mark ups than otherwise would have existed.

8.38 Empirical evidence points to the importance of a deterrent effect. While there are mixed results on the effect of deterrence in the same market that firms were indicted, survey evidence (and casual empiricism) suggests that

¹⁹² We can repeat the above analysis assuming that $p/c = 1.2$. Here, the lower bound for e is 1.16 and the upper bound for e is 5. The upper bound falls to 3.75 if we assume that, absent deterrence, a cartel achieves 75% of the absolute value of the monopoly mark up. Therefore the above discussion based on an elasticity of demand in the 2-4 range remains relevant and so it is reasonable to argue that the deterrent effect is non trivial.

deterrence is important and that private sector antitrust practitioners will occasionally advise their clients not to proceed with certain forms of behaviour due to the likelihood that they will infringe competition law.

- 8.39 Empirical evidence for the US suggests that rooting out cartels in one industry may well lead to lower prices in similar industries, particularly where the indicted firms are also found in those industries. Having made an initial discovery of a cartel, this also suggests fruitful avenues for competition authorities to pursue.
- 8.40 The introduction of the RTPA 1956 in the UK deterred anti-competitive agreements. Once it was established that the courts would take a tough stance against cartels, this led to several anti-competitive agreements being abandoned with the effect that price competition became more intense and that industry costs fell.
- 8.41 Finally, Chapter 5, on the effect of cartels on prices, suggests that a typical cartel might increase prices by at least 10 percent or even as much as 20 percent. Even so, the deterrent effect of antitrust policy is non trivial. Making some plausible assumptions about the probability of detection, we demonstrate how, in the absence of deterrence, mark ups are likely to have been even higher.

9 SOME PRELIMINARY THOUGHTS ON SAVINGS IN NON MERGER CASES

Introduction

9.1 In this chapter we offer a provisional¹⁹³ view on how far our methodology for deriving consumer saving estimates for merger cases might carry over to non-merger cases. We consider cartels, anti-competitive behaviour, excessive prices and the deterrent effect. The final section summarises.

Cartels

9.2 Recall that our methodology for mergers includes, in principle, three approaches to deriving estimates: fully developed, potentially sophisticated, econometrics, based on specific theory; less sophisticated oligopoly models and rules of thumb; and, if all else fails, a lower bound default measure. We consider first the scope for applying them when estimating the returns from intervention on cartels.

Econometric modelling

9.3 In our Chapter 5 review of the empirical evidence on by how much cartels raise prices, we described a variety of methods. While the techniques vary in the sophistication of the econometrics used, the procedure is generally as follows. First, the researcher selects a theoretical model of the process which generates bids (in bid rigging investigations) or prices (in price fixing cartel investigations). Second, (s)he needs a non-contaminated sample of observations which is not affected by cartel behaviour. In conjunction with the model, this provides a prediction of what a competitive bid (or price) would be, given the characteristics (ie the exogenous demand and supply conditions) of the particular market. Third, the actual bids in the contaminated sample (ie the sample which we have reason to suspect is affected by cartel behaviour) are compared with the prediction of what the bids would be, if they were set competitively. If, having controlled for other factors that might affect bids, they are found to be significantly different in the contaminated sample from the estimates of the competitive level, it is inferred that there has been cartel

¹⁹³ Our research brief specified non-merger cases as a subject for stage 2, and so we have not devoted much attention in our research effort to non-merger cases. This chapter is therefore necessarily somewhat speculative.

behaviour. Therefore, so long as the data are available, we expect that the OFT could draw on such techniques, choosing the model appropriate for the type of cartel under investigation.

- 9.4 There is also a large econometric literature on detecting tacit collusion – much of it loosely referred to as ‘New Empirical Industrial Organisation’. Early work, in which ‘conduct’ (or conjectural variation) parameters are estimated as part of the first order conditions in structural models was summarised by Bresnahan (1989). A more up to date summary is provided by Church and Ware (2000, pp. 440-456). Indeed, this tradition continues to this day. Invariably, this approach involves industry-specific case studies, using data on margins or prices, demand functions and costs. Where such data are available, it is possible to estimate the degree of market power, and, by implication, the price raising effects of (usually tacit) collusion. In principle, such techniques might be used in OFT or CC investigations, although they will typically be time intensive.

Bidding/oligopoly models and rules of thumb

- 9.5 Where data are not available for formal econometric modelling and given that (say) documentary evidence confirms that cartel behaviour was at hand, it may be possible to estimate the effects by the use of theoretical models which are calibrated with plausible parameters. In other words, analysts choose the values of the parameters themselves rather than estimate them econometrically. An example of this sort of approach is MacMillan’s (1991) study of bid rigging in the Japanese construction industry. He develops a theoretical model of bid rigging behaviour where, given that collusion is taking place, the expected value of the winning bid is a function of only two parameters – n , the number of potential bidders and k , the spread of possible production costs¹⁹⁴. Unlike n , which is observable, k has to be chosen by the analyst. Therefore MacMillan chose a plausible range based on estimates from a sample of contracts tendered by the Ontario government in Canada. In the case of price fixing, it would be possible to use a Cournot or Bertrand model, similar to those used in Chapter 7, to provide the counterfactual. As before, the analyst would need data on market shares, the price cost margin and elasticities of demand. In addition, the analyst might choose a value for a conjectural variations type parameter.

¹⁹⁴ Each firm’s production cost is assumed to be drawn independently from a distribution with a lower bound of a and an upper bound (the government’s ceiling purchase price) of A ; $k = A/a$.

Lower bound default estimate

- 9.6 In Chapter 5 we noted the following stylised facts about how cartels affect price: in general, albeit with exceptions, the evidence suggests that bid rigging leads to prices well in excess of 10 percent, sometimes in excess of 20 percent, of competitive levels; while price fixing cartels tend not to lead to such consistently higher prices, when they do, the price rises are still often very large and well in excess of 10 percent.
- 9.7 It follows that a reasonable lower bound estimate for bid rigging cartels would be that prices were 10 percent higher than they otherwise would have been. For price fixing cartels, we might be more cautious because it seems that price fixing cartels are not able to raise prices on such a consistent basis. The judgment of the analyst would be important here¹⁹⁵, for example, that documentary evidence of the cartel exists, but no data are available to measure the likely harm caused by the cartel. We might then turn to economic theory – if the cartel was found to operate in conditions which appear conducive to cartel stability¹⁹⁶ we might argue that 10 percent is an appropriate lower bound estimate. However, if theory suggests that the cartel would be likely to be unstable, then a more cautious lower bound estimate may be more appropriate.

Cartel duration

- 9.8 Although the typical cartel might last around 5-6 years, studies of cartel duration find that there is a wide dispersion in the length of cartels from 1-2 years to over a decade. Given this dispersion, it may be appropriate to calculate consumer savings based on the assumption that the cartel would only have lasted for another year.

Anti-competitive conduct

- 9.9 We discuss briefly various forms of potentially anti-competitive conduct under two broad headings: predatory pricing and vertical restraints

¹⁹⁵ Documentary evidence and testimony of parties to the cartel may also be helpful in setting an appropriate lower bound, especially because indicted firms have the incentive to underestimate the effect of the cartel on prices.

¹⁹⁶ See Evenett and Suslow (2000) for factors which facilitate cartel stability. While empirical studies indicate that cartels may *form* under a multitude of different circumstances, cartel *stability* is often found to coincide with many of the factors cited at paragraphs 5.4.

PREDATORY PRICING

- 9.10 The intention behind predatory pricing is to force a rival out of the market and, having done so, to raise prices to a level higher than what could have been achieved had the rival remained. Since the ultimate effect is to reduce the number of players, in principle, oligopoly models which are used to simulate price rises from mergers may be suitably adapted to derive consumer savings estimates from taking action against predatory pricing. In that predation may also be used to impose subsequent price discipline on survivors, modelling might also acknowledge the possibility of replacing competitive by cooperative behaviour.
- 9.11 We note that, in pursuing predation cases, competition authorities obtain detailed information on costs which will help to calibrate the models. Since relevant markets tend to be narrow and highly concentrated, this might lead our models to forecast substantial price rises as a result of forcing a competitor out of the market. Analysts will have to make a judgement as to how feasible such price rises would be. Nevertheless, given that a 1 percent lower bound estimate is conservative in merger cases, we might expect the same to be especially true in predation cases.
- 9.12 Moreover, an important element in predatory pricing is the reputation the predator obtains for aggressive behaviour. This may not only deter subsequent entry into the market in question, but there may also be spillovers into other markets in which the predator operates. This could be an important feature in industries comprising geographically separate local markets, eg buses¹⁹⁷. Such savings may be calculated as a matter of course where the OFT makes an estimate of what the likely gain from predation would have been as part of the process of setting a financial penalty¹⁹⁸.

VERTICAL RESTRAINTS

Econometric modelling

- 9.13 A trawl of the academic literature reveals a paucity of econometric case studies, although Slade's (1998) investigation of the effects of different types of vertical contracts in UK brewing/pubs is illustrative of what can be done, given adequate data techniques could be used. In general, the problem is in finding a way of calibrating an appropriate counterfactual. One obvious

¹⁹⁷ An example of how formal modelling can be used to test for the existence (and, by extension, the extent) of predatory pricing in the UK local bus industry is Dodgson et al (1993).

¹⁹⁸ For example, see footnote 9 to paragraph 2.8 of the Director General of Fair Trading's Guidance as to the Appropriate Amount of a Penalty, OFT 423, March 2000.

possibility is reasonable runs of data for a period prior to the introduction of the restraint and a period after its introduction. In practice, however, data are rarely available for such techniques and competition authorities tend to weigh up a whole range factors before arriving at a conclusion that the conduct under investigation harms the process of competition.

- 9.14 Nevertheless, specific cases will sometimes include their own appropriate comparators. For instance, in the *New Motor Cars* case (2000), the Commission considered the effect of selective exclusive distribution (SED) on competition. One of its conclusions was that:

How far prices may currently exceed the competitive level is difficult to estimate. The responses of suppliers and dealers to changes in costs, input prices and exchange rates have become ossified by the SED system (which itself also adds costs). We are, however, able to draw on the evidence of the differences in discounts and financial benefits between private and fleet customers as well as our international price comparisons. We note that, as we report, exchange rates are not very different from those of the last three years which we have used in our comparisons. On this basis we believe that prices paid by UK private customers are currently likely to be on average about 10 percent too high even after taking account of discounts, trade-in allowances and financial benefits. This amounts to some £1,100 for the average car.’ (para. 2.374)

Oligopoly models and rules of thumb

- 9.15 There is, of course, a wide range of models used in the vertical restraints literature (see Church and Ware, 2000, Chapter 22), but it remains to be seen how useful they might be in generating practicable rules of thumb. We suspect that the most fruitful line of approach would be to first identify the alleged adverse consequence of the restraint, and then identify an appropriate rule of thumb, given the problem. For example, in the case of a restraint which impacts most significantly on entry, new entrants might be modelled by either an increase in firm numbers and/or the emergence of a constraining competitive fringe. Alternatively, where the restraint facilitates tacit collusion, we might posit a change in a conjectural variations parameter.

Two examples of consumer savings estimates

- 9.16 **New Motor Cars.** We can make a crude estimate of the harm to consumers resulting from the anti-competitive practices in this industry in 1998. The value of UK new car sales in 1998 was £28.4 billion. We can postulate that some £13 billion arose from sales to private buyers¹⁹⁹. It follows that if prices were 10 percent above competitive levels, effective competition could have saved private buyers *in excess of £1 billion pounds* in 1998²⁰⁰.
- 9.17 In practice, competition policy may not expect to eradicate all market power. However, even if only a 1 percent reduction in prices were achieved, more effective competition could have saved private buyers *in excess of £100 million pounds* in 1998.
- 9.18 **RPM on medicines.** The OFT was recently engaged in a court case where its intention was to end RPM on over-the-counter (OTC) medicaments and vitamin and mineral supplements (VMS). The OFT simulated how, in the absence of RPM, supermarket chains might lower prices on OTC medicaments and VMS. Allowing for possible consumer switching costs, the OFT's model suggests that consumers might benefit from lower prices by £50-265 million per annum²⁰¹.

Excessive prices

- 9.19 When taking action against excessive prices, it is likely that the OFT would have detailed pricing, profitability and cost information to support its case; if so, a consumer saving estimate should fall out quite naturally.
- 9.20 For example, the Office has recently made an infringement decision against Napp pharmaceuticals, a supplier of sustained release morphine products to hospital and community buyers. This decision included a finding that prices were excessive and this was based in part on a detailed examination of

¹⁹⁹ This is based on the Society of Motor Manufacturers and Traders' estimate that private buyers accounted for 46% of total new car registrations in 1999. Note, however, that this estimate has been challenged by some industry commentators as being too high. It also refers to a different time period and to a measure of volume as opposed to value.

²⁰⁰ Of course, a 10% fall in prices should lead to more consumers purchasing new cars than before (and some existing consumers may upgrade the model that they buy). Consumer surplus should be increased as output increases, although it would be difficult to quantify this without more detailed data (eg on elasticity of demand).

²⁰¹ This is a gross estimate and does not account for the effect on those pharmacies who, it was alleged, would no longer be viable as a result of lost sales to supermarkets. Nevertheless, even allowing for this, the model suggests that consumers would benefit substantially from the removal of RPM.

prices, costs and profitability²⁰². Given that Napp had had several years of patent protection to recover its R&D costs and earn a return to compensate for any risks it had undertaken, and that its advertising expenditures were low, the above evidence supported a finding of excessive pricing.

Example of consumer savings

- 9.21 In the same judgment (paras 259-260), an explanation for Napp's fine is set out. It is argued that while '[i]t is impossible to estimate with certainty how much lower Napp's profits would have been, or would be now..., in the absence of the infringements' it is conservatively estimated that Napp would have gained at least £2m from the infringements.
- 9.22 Given that the OFT was able to make the latter conclusion, it would also be able to make a conservative estimate for consumer saving. We might expect that the figure would be close to £2 million, given that a significant part of the gain from Napp's infringement was due to the excessive prices incurred (hospital sector prices were below cost).

Historical evidence

- 9.23 A useful point of reference on 'excessive prices' is an internal OFT paper (1996) which discusses the feasibility of undertaking a cost-benefit analysis of competition inquiries²⁰³. In Appendix C, 19 cases over the period 1973-93 for which the MMC described prices and/or profits of investigated firms as 'high' or 'excessive'. The authors conclude (p.69) that 'a general assumption of 5 percent as the monopoly price increase over a more competitive situation will be a considerable underestimate'. Indeed, they cite a number of cases in which the MMC recommended price cuts much larger than 5 percent (eg 15 percent for Opium Derivatives, 33 percent for Contraceptive Sheaths, 70 percent for Valium²⁰⁴).

²⁰² 'Napp earns a gross profit margin on its sales of MST to the community segment of 80% – at least [...] [*in excess of 10*] percentage points higher than the margin earned by its next most profitable rival when cost differences are allowed for. On other products that Napp sells to the NHS, it earns an average margin of [...] [*between 30 percent and 50 percent*]. The difference between the costs that Napp incurs on MST and the price it charges for MST in the community is therefore excessive. Finally, the community price of MST is 40 percent higher than Napp's highest price rival.' Paragraph 231. CA 98/2/2001 available at www.offt.gov.uk

²⁰³ This is an unpublished discussion paper – the OFT does not apply a de minimis competition inquiries test.

²⁰⁴ A number of these cases were examined in much more detail in Clarke, Davies and Driffield (1998), and a relatively small amount of extra research effort, working with these two studies, might be sufficient to produce usable lower bound estimates of consumer savings for a relatively large sample of cases of monopoly abuse.

Deterrence

- 9.24 In the previous chapter, we have already broached the possibility of assessing the deterrent effect in cartel cases (and see Endnote 2 to Chapter 7). This should also be considered for cases of anti-competitive behaviour.
- 9.25 In general, we would expect that levying financial penalties on firms who are found to infringe the competition act should lead to fewer anti-competitive practices taking place than otherwise would occur²⁰⁵. Indeed, this is recognised in the Director General of Fair Trading's Guidance as to the Appropriate Amount of a Penalty (OFT 423, March 2000), paragraph 2.8:

The penalty figure reached after the calculations in steps 1 and 2 may be adjusted as appropriate to achieve the policy objectives... in particular, of imposing penalties on infringing undertakings in order to deter undertakings from engaging in anti-competitive practices. The deterrent is not aimed solely at the undertakings which are subject to the decision, but also at other undertakings which might be considering activities which are contrary to the Chapter I and Chapter II prohibitions. Considerations at this stage may include, for example, the Director's estimate of the gain made or likely to be made by the infringing undertaking from the infringement.

- 9.26 Given that the probability of detecting and prosecuting an anti-competitive agreements will be less than one, it will not be possible to deter all forms of anti-competitive conduct. However, analagous to the analysis of cartels at Chapter 8, we would expect that by lowering the payoffs from anti-competitive behaviour, such behaviour is less likely to occur. Detailed models of deterrence are envisaged for stage 3.

²⁰⁵ We assume that, in general, firms will *know* whether their conduct is anti-competitive prior to embarking on it. Firms are expected to weigh up the gains from infringing competition law against the likelihood that they are caught, prosecuted and fined. The probability of detection is probably higher than for cartels because conduct tends to be more transparent. On the other hand, typically once we move away from cartels, conduct must be assessed on a case by case basis. This means that when a potentially anti-competitive practice is detected, there is still room to debate whether the practice is harmful for the competitive process. We acknowledge that firms may genuinely not know whether or not their practice is anti-competitive. Allowing for such uncertainty in the law then there is the possibility that cases that set new precedent, or clarify the law, create additional, or incremental, deterrent effects. We do not deal with this aspect further, but see Appendix II to Chapter 7 for a discussion in relation to mergers.

Conclusions

9.27 Although the above review is necessarily somewhat superficial, we feel reasonably confident in drawing the following conclusions.

- We expect that the three step methodology advocated for mergers should carry over quite easily to non-merger cases. As before, in general, we would not expect in-depth econometrics/simulation to be feasible at the time of an inquiry, but, where available, such studies would add considerable support for lower bound estimates. Rules of thumb, based on simple oligopoly theory, should be more or less routinely feasible, and would have the same value. Lower bound estimates of 1 percent savings are not only feasible, but also (almost certainly) defensible.
- In fact, non-merger cases are probably more amenable than merger cases, to direct estimation of consumer savings from the inquiry itself. Where OFT makes an infringement decision under Competition Act 1998 (or the CC investigates a scale or complex monopoly) investigations are very detailed. We would expect consumer saving estimates often to fall out naturally from the case itself.
- When penalties are levied on undertakings that have infringed the prohibitions of the Competition Act 1998, one factor that the Director General may consider is an estimate of the gain made or likely to be made by the infringing undertaking from the infringement. When making this estimate, the OFT would be able to make a consumer saving estimate as well without generating a significant amount of extra work.
- We believe that there may be a strong case for using a default lower bound figure of rather more than 1 percent in some types of non-merger cases. This belief is based on some of the examples (for cartels, excessive prices and anti-competitive practices) cited in this chapter.

PART V: SUMMARY

10 ADVICE ON ESTIMATING CONSUMER SAVINGS FOR MERGERS: A SUMMARY

- 10.1 For successfully challenged horizontal mergers, the OFT could produce a lower bound estimate of consumer savings for a given recent year(s), based on a hypothesised 1 percent price effect. This could use either the simple arithmetic approach (SAA) or attempt to estimate the saving in consumer surplus. (The former should suffice). Much of this work could be carried out in-house.
- 10.2 This could be most easily calculated for the two years 1997/8 since some of the work has been done already in Chapter 7. But, if necessary, this could be repeated for, say, 1999 and 2000. The sample could include confidential guidance cases where the OFT gave advice that the merger would have been referred to the Competition Commission.
- 10.3 However, even this lower bound estimate would involve an element of extra data extraction. For example, the existing merger files often report only the aggregate worldwide or UK turnovers of investigated firms, whereas the focus should be on turnover in the relevant market.
- 10.4 In future, we suggest that the OFT should devise an internal standardised form, which would systematically record the relevant data for computing consumer saving estimates. Such a form would routinely require information on market shares, margins, relevant turnovers etc, and should be completed by the OFT analyst at the time (s)he is assessing the merger.
- 10.5 We are confident, on the basis of all information available to us, that a default estimate which measured consumer savings as 1 percent of the annual turnover of the merged firms in the relevant market would be very conservative. Consumer savings would be likely to exceed such a default estimate, in more or less every case, often by an order of magnitude.
- 10.6 Therefore, where the default estimate is applied, there could also be an indication of how far above the lower bound the actual savings are likely to be. This could be based on rule of thumb modelling or (when data and time permit) sophisticated econometrics, or from information in the CC report

where there are natural comparators. At least for internal purposes, this might give the OFT a better feel for the likely consumer savings. Further research in this area would appear to be most useful.

- 10.7 In aggregate, the magnitude of such an estimate for a given year will clearly be very sensitive to the size of the turnovers in the particular cases arising in that year. This is a cause for concern, in that year to year variations in the aggregate estimate should not be too sensitive to the occurrence of one or two very large cases in a given year²⁰⁶.
- 10.8 Furthermore, it is essential that any aggregate estimate should be issued alongside a 'health warning'. While we are reasonably confident that our lower bounds will be conservative, we are not so confident about how far above that bound the 'true' figures are.
- 10.9 Therefore, we certainly do not believe that this a science, capable of generating performance targets for the OFT²⁰⁷, and we doubt the incentive effects of issuing OFT officials with performance targets based on consumer savings. If the OFT has the incentive to increase consumer savings year on year, there is a risk that a consumer saving target becomes a *turnover target*. The OFT should not be encouraged to pursue very weak cases in large turnover markets just to 'bump up' its consumer saving targets. Taking action in small markets may have an important deterrent or demonstration effect.
- 10.10 Having dismissed consumer savings in mergers as a suitable performance indicator, this is not to argue that consumer saving estimates, and the techniques used to derive them, would not be useful. First, where analysts are confident that they understand the assumptions and any biases in the simulation method, estimates of the price rise could form part of the case analysis itself. Second, consumer saving estimates might be used in a simple cost benefit analysis, in which the conservative estimate of consumer savings might be compared with the annual budget of (the relevant departments of) the competition authorities.

²⁰⁶ This would be a matter for further deliberation. Two alternatives (neither of which is completely satisfactory) would be (i) to report consumer savings as a moving average, or (ii) to use the turnover in the median case (where cases are ranked by market turnover).

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