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COMPETITION DAMAGES ACTIONS IN THE EU

LAW AND PRACTICE

DAVID ASHTON
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Economics contribution from Frank Maier-Rigaud and
Ulrich Schwalbe

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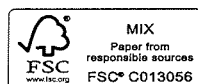
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QUANTIFICATION OF ANTITRUST DAMAGES*

Frank Maier-Rigaud** and Ulrich Schwalbe***

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An economically founded quantification of the damage caused by competition law infringements has increased in importance in particular through the advancement of competition law damages actions in the EU. Damages claims are increasingly brought, in particular as follow-on claims, and it is very likely that this trend will continue in the future.¹ If a damages claim is presented in court and compensation of the harm suffered is sought, quantifying the level of the damage suffered becomes necessary. On the basis of these developments several theoretical and applied studies investigating the fundamental economic principles and empirical-econometric methods to determine damage have been presented in the last few years with the aim to provide guidance to the courts on how the quantification of damage should be approached and what aspects have to be taken into consideration.²

Estimates of the magnitude of damage caused by competition law violations show that they are quite substantial. The empirical literature concerned with estimating aggregate damages has so far, however, exclusively focussed on cartel cases. Empirically estimating the total damage caused by all cartels is, however, conceptually very difficult, as the total number of cartels is unknown and only discovered cartels can be analysed. The damage caused by European and national cartels have therefore been estimated using simplifying assumptions.³ Presuming a certain detection rate, it is possible to estimate the number of existing cartels.⁴ By further assuming a relationship between fines and damage caused, the harm inflicted by cartels in Europe was estimated.⁵ The estimation led to a lower bound of the yearly damage of approximately €16.8 billion. Measured as a percentage of European gross domestic product (GDP), total cartel damage is 0.15 per cent. An upper bound for the yearly cartel-induced damage lies at €261.22 billion. This corresponds to 2.3 per cent of EU GDP. These numbers show that cartel-induced damage is quite substantial.

1 See Chapter 1.

2 See in particular European Commission (2011) and, for example, Bishop and Walker (2010) or Niels et al. (2011). For a German text see Inderst et al. (2013a).

3 European Commission (2007).

4 The underlying assumption being that undetected cartels are as damaging as detected cartels. The majority of EU cartel cases since the introduction of the first leniency programme in 1996 are due to leniency applications. Excluding other reasons for triggering leniency applications such as due diligence in a merger for example, a data set based mainly on leniency applications may bias the results downward as the most profitable cartels will not find it attractive to go for leniency whereas leniency applications – if economically motivated – must be based on a change in the cartel incentive constraints, that is, a leniency application will become attractive if cartel profitability decreases either due to a higher detection probability coupled with damages claims and fines or due to the fact that the cartel is inherently becoming less profitable. See Friederiszick and Maier-Rigaud (2007, 2008) for a discussion of the EU leniency programme and the need for *ex officio* cartel detection.

5 European Commission (2007: 96).

8.003 In this chapter, the main conceptual and methodological aspects that are of relevance for an economically sound quantification of damage in the context of competition law infringements are presented. The chapter is structured as follows. Section two discusses the conceptual foundations for the quantification of damage. Firstly, the types of damage caused by cartels and the economic actors affected by cartel activities are characterised in detail. A distinction is made between damage to the overall economy in the form of inefficiencies or welfare losses and individual damage, which also includes redistribution from the consumers to the cartel, for instance due to abnormally high prices, and that are therefore typically larger than the economic welfare losses. Secondly, the repercussions of cartel-induced price increases on the value chain as well as on neighbouring markets are spelled out. Thirdly, damage caused by abusive behaviour of dominant firms and the affected actors is described.

8.004 Section 3 deals with the methods employed in the quantification of damage in cartels as well as abuse of dominance cases. To estimate the damage, it is necessary to compare the factual situation with a hypothetical counterfactual scenario. The problem of choosing the appropriate counterfactual scenario is discussed as this has a crucial impact on the damages to be calculated. Also, the available economic and econometric methods for the calculation of damages, giving prominence in particular to comparator-based methods and approaches (yardstick or benchmarking) either relying on actual or on simulated, artificial markets are introduced. The quantification of damages in cases of abusive behaviour is illustrated by an example of an exclusionary abuse. In addition, further aspects in the quantification of damages such as, for example, compounding and discounting damages and the consideration of after-effects are discussed. Also, the precision of the available statistical methods and problems of causality and the remoteness of damage with respect to the infringement are discussed. The final section concludes with a summary of the main results and an outlook.

II DAMAGE CAUSED BY CARTELS AND ABUSIVE CONDUCT

8.005 The restriction of competition by a cartel or abusive conduct by a dominant firm leads to economic welfare losses and also harms the purchasers and ultimately the consumers of the products or services through increased prices, lower quality and reduced variety.⁶ If the functioning of competition between firms is impaired or eliminated by illegal cartel agreements or by abuse of a

⁶ This chapter focusses on cartel and abuse of dominance cases. Of course, vertical agreements also can cause damages and trigger damages claims.

dominant position, the competitive mechanism will no longer fulfil its allocative function and market outcomes will become unsatisfactory from an economic point of view because they will generate welfare losses due to inefficiencies. In addition to these inefficiencies, competition law infringements lead to a redistribution of wealth from direct and indirect purchasers to the cartel, and also affect economic actors that are neither part of the supply chain nor purchasers of the goods or services provided by a cartel or directly affected by an abusive conduct.

The primary goal of cartels and abusive practices is to increase profits by softening competition. By cartel agreements, the intensity of competition between rival firms is either substantially reduced or fully eliminated. Such agreements can be based on different strategic parameters. In price-fixing cartels competitors collectively decide on the prices of their products, whereas in quota cartels a collective agreement is reached concerning the quantities to be produced and marketed by the cartel participants. Other forms of cartel agreements include market sharing arrangements, where firms geographically divide the market, for instance by determining regions that are served, or, in particular in the case of public procurement auctions, agreements are reached concerning price and conditions of the bids to be submitted (bid-rigging cartel).

In all of these instances, cartels generally result in higher prices and lower quantities than would have been observed in the absence of the cartel. In price-fixing or bid-rigging cartels the competitors explicitly agree on a price that generally is substantially above the price that would have been obtained under competitive conditions. Quota cartels reduce the quantity supplied strategically in order to obtain a price increase indirectly. Market sharing agreements allocate geographic markets to individual competitors, allowing the firm to act as monopolist, charging the monopoly price, in the respective region.

Abusive conduct by dominant firms can be either exploitative or exclusionary. Exploitative abuses work similarly to cartels by increasing prices directly, while exclusionary abuses aim mainly at eliminating competitors by foreclosing the market or limiting competitors in their expansion. In addition, a dominant firm may aim to discourage the entry of potential competitors or limit the scale of market entry, that is, it may try to quell the beginning of competitive pressure or at least any increase in the intensity of competition. It may also attempt to leverage its market power into neighbouring markets.

From a conceptual point of view, damage is quantified by a comparison of the factual situation, that is, the situation of the competition law infringement with

a hypothetical situation, the so-called counterfactual or but-for scenario, a situation that would have obtained in the absence of an infringement.⁷ Firstly, the types of damage that is caused by cartels or abusive behaviour have to be specified and secondly, the victims, that is, the economic actors that were negatively affected by the illegal conduct have to be identified. In the following subsections, the types of damages and the affected economic agents are specified for cartels and for abusive conduct respectively.

A Damage caused by cartels

1 Types of damage caused by cartels

8.010 From an economic point of view, the cartelisation of a market leads to two types of effects: a transfer of wealth and inefficiencies, both of which have to be considered as damage from the point of view of the affected economic actors. To illustrate the two types of damage using a simple example, a cartel in a final products market, selling goods directly to final consumers, is considered.⁸ Concerning the allocation of resources, the cartel leads to a welfare loss due to non-exhausted gains from trade in the form of lost utility for final consumers. This is called the dead weight loss (DWL) and represents an economic or allocative inefficiency. Due to the higher price induced by the cartel there is also a transfer of economic rent from consumers to producers. These two effects are shown in Figure 8.1, which depicts consumer demand for a cartelised product, the pre-cartel price of p_c and the cartel price of p_k , where c stands for competition and k for cartel. The quantities sold in the competitive and in the cartelised market are denoted by q_c and q_k .

8.011 Based on a price p_c that would prevail under effective competition, that is, the counterfactual or but-for price (here assumed to be the perfectly competitive price⁹), the cartel increases the price to p_k . This increase in price results in a DWL of welfare depicted as a black triangle and a redistribution of wealth in the form of a transfer of T (depicted as the grey area). The welfare loss that is caused by the cartel which induced a price increase from p_c to p_k results from the fact that for prices between p_c and p_k gains from trade are not exhausted. Consumers exist who would have been willing to pay a price p , $p_c < p < p_k$ for additional units of the product and there are firms that could produce those

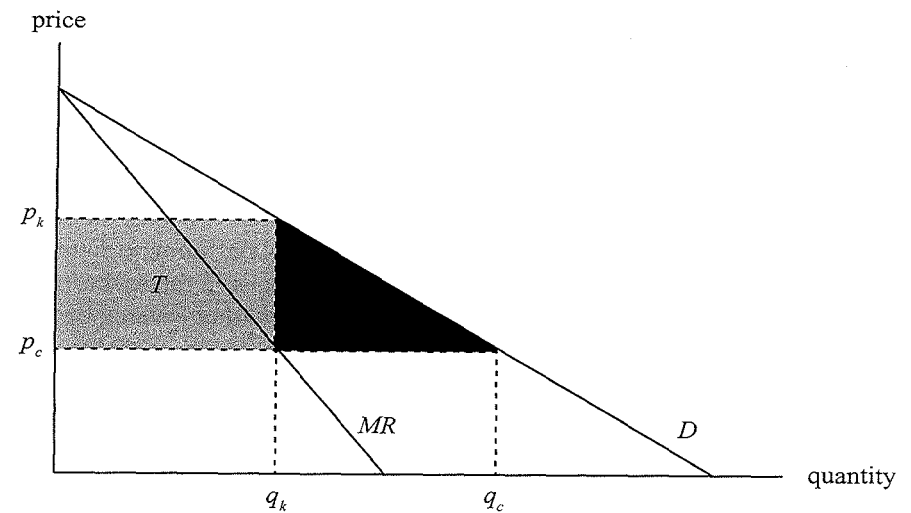


Figure 8.1 Transfers and (dead weight) welfare losses caused by cartelisation

units and still cover their costs. Due to the cartel, these transactions do, however, not occur. Consumers are thus damaged by a loss of utility as at the higher cartel price, a smaller quantity of the good is bought. This is the quantity effect, which is the main economic rationale for the prohibition of cartels under competition law.

The transfer, T , however, does not represent a welfare or efficiency loss as it is a pure redistribution of wealth and has no impact on efficiency. As the additional expenditure for the quantity bought at the cartel-induced higher price is, however, a loss to consumers, it has to be counted as damage.¹⁰ This damage is known as the overcharge, or more generally, the price effect of a cartel. The total damage inflicted on consumers is thus composed of the transfer T , that is, the price effect (grey rectangle), and the welfare loss, that is, the quantity effect, depicted as black triangle, and is therefore higher than the economic efficiency losses and also higher than the profits generated by the cartel that correspond to the transfer. A cartel typically causes both types of harm and there are no convincing economic arguments that would suggest giving preference to either type of harm in estimating total damage. In practice, it may, however, be more difficult to estimate quantity effects with a high degree of accuracy. This is due to the fact that it is usually easier to demonstrate that a higher price has been paid on units of the good bought in contrast to demonstrating that a certain

⁷ More details on how to establish the appropriate counterfactual are provided in sections III.A and III.C.

⁸ Furthermore, it is assumed here that all inputs of the cartel are produced in perfectly competitive markets so that no damage occurs upstream of the cartel. It is also assumed that there are no effects outside the value chain, for example for producers of complements or buyers of substitutes. These assumptions are relaxed in section II.B.

⁹ The price under effective competition is not necessarily the price that would prevail under perfect competition. In particular, in oligopolistic markets, the price under effective competition may be substantially above the perfectly competitive price.

¹⁰ In this particular setting, where only final consumers are purchasing from the cartel, the price effect is also called overcharge, which in turn is simply the illegal gain.

number of goods were not bought but would have been had the price not increased. This holds in particular for those consumers who did not buy the product at the high cartel price but would have bought at the lower price under effective competition.

8.013 The magnitude of cartel-induced damage depends on a range of factors such as the duration and the market coverage of the cartel, as well as the magnitude of the price increase or the reduction in quantity. Obviously, the damage due to a cartel will be higher the longer the cartel is in place. Economic theory has also shown that the size of the cartel, that is the share of the market covered by the cartel, has a substantial impact on the welfare effects. Generally speaking the negative welfare effects, and therefore also the damage, increase with market coverage.¹¹

8.014 A further essential determinant of the damage is the extent of the price increase or the quantity reduction. This in turn depends on several factors, for instance the intensity of competition that would have prevailed but for the cartel. Some markets are characterised by a relatively low intensity of competition even in the absence of a cartel, whereas other markets may be subject to fierce competition.¹² In the first scenario, the damage created by the cartel would be relatively low as prices would have been comparatively high even in the absence of the cartel. In the second scenario, the damage is more significant because, without the cartel, prices would have been substantially lower due to the intense competition. An additional factor impacting the extent of the price increase is the degree of coordination in the cartel. Cartels will not always be able to achieve perfect coordination, implying that they will not be able to fix the price or quantities at the level that maximises total cartel profits. Under certain circumstances, perfect coordination cannot be achieved and only a partial coordination will be feasible, so that prices will remain below the cartel profit-maximising price.¹³ Damage therefore increases with the degree of

11 On welfare effects of cartels with partial market coverage see Schwalbe (2011). In this context, so-called 'umbrella effects' are relevant, that is, price increases of firms active in the same relevant market but not participating in the cartel, which can also increase their prices under the umbrella of the higher cartel prices. See Inderst et al. (2013b).

12 On this see also section III.A.

13 The factors that may contribute to a cartel being able to set the profit-maximising cartel price are the same as the factors that have been identified as facilitating non-coordinated effects in a merger context. See the judgment of the then CFI of 6 June 2002 in Case T-342/99 *Airtours plc v Commission* [2002] ECR II-2585 and the judgment of the ECJ of 10 July 2008 in Case C-413/06P *Bertelsmann AG and Sony Corporation of America v Independent Music Publishers and Labels Association (Impala)* [2008] ECR I-4951. Intuitively, it is clear that firms with different variable costs will find it difficult to agree on the quantity that will equate marginal revenue with their respective marginal cost as those will differ between firms.

coordination.¹⁴ Finally, the slope of the demand curve has a substantial impact on the magnitude of the price increase and the welfare losses. This can be illustrated with an example where it is assumed that in the absence of the cartel, the market is perfectly competitive and firms produce with equal marginal and average cost. In this case, the competitive price is determined by the marginal cost and thus independent of the demand function. *Ceteris paribus*, a price inelastic demand will lead to a larger price increase than a price elastic demand. If demand is inelastic with respect to price, consumers have only a few options to substitute and can therefore not switch to alternative products once the price increases, implying that a cartel can charge substantially higher prices before reductions in quantity demanded become important. If consumers, however, have many possible substitutes at their disposal, demand is price elastic and a cartel will not increase the price substantially as it would otherwise only sell a much reduced quantity. This implies that under perfect competition the damage caused by a cartel is higher the lower the price elasticity of demand is. This is demonstrated in Figure 8.2.¹⁵

Again, a scenario is considered where price in the absence of the cartel is given by p_c and the quantity demanded is q_c . With a price inelastic demand (D^{in} and a corresponding marginal revenue curve MR^{in}), the cartel will increase the price to p_k^{in} , where *in* stands for *inelastic*, and the corresponding damages will be given by areas shaded in dark and light grey. If demand is price elastic (D^e and a corresponding marginal revenue curve MR^e), the cartel will increase the price only to p_k^e , where *e* stands for *elastic*, and the damage for the consumer is thus given by the area shaded in dark grey, that is, substantially lower than the damage incurred with a less price elastic demand. In contrast to the damage suffered by the consumer, the magnitude of the efficiency loss is not directly related to the price elasticity of demand. While the price increase given a price elastic demand function is relatively small, the quantity demanded is reduced substantially. If the demand function is price inelastic, the quantity effect is limited, but the price increases substantially. As a result, the welfare loss may increase or decrease with the price elasticity of demand. Whether the quantity or the price effect prevails is an empirical question and depends on the specifics of the demand function.

In addition to the allocative inefficiencies captured by the DWL depicted in Figures 8.1 and 8.2, cartels may also give rise to productive and dynamic

14 Note, however, that the same factors that will enable a higher degree of coordination are also factors that would tend to soften competition in the market naturally, implying that cartel coordination may be high but the cartel mark-up over the competitive price is correspondingly low.

15 For a more detailed discussion of elasticities, emphasising in particular that the concept is in itself not a suitable indicator for damages, see Inderst et al. (2013a).

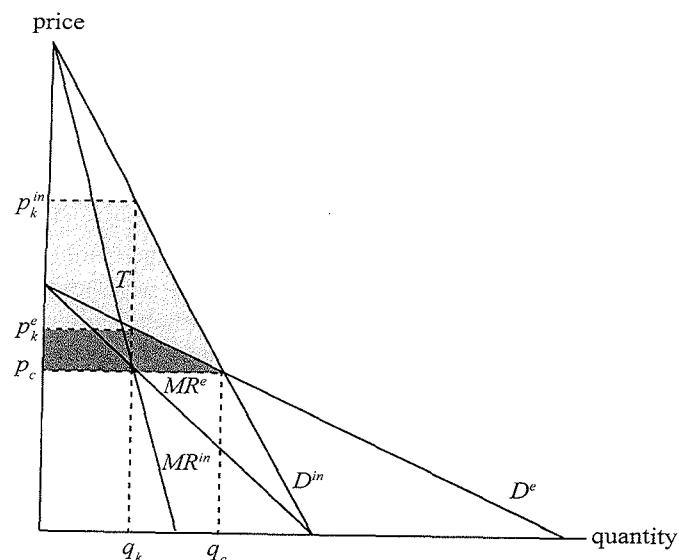


Figure 8.2 Damages and welfare effects with demand functions of differing price elasticity

inefficiencies. Productive inefficiencies may arise because cartelists, due to the softening of competition, face reduced incentives to produce efficiently or search for the most cost-efficient production technology.¹⁶ As a result, a cartel can create a situation where inefficient firms producing with higher costs remain in the market although they would have been forced to exit under effective competition.¹⁷ If a cartel leads to higher cost, this should be taken into account when quantifying cartel damages. In particular, when cost-based methods (see section III.A) are employed, higher costs induced by cartelisation should be accounted for. Such inefficiencies could also give rise to after-effects that extend beyond the cartel period.

- 8.017 Cartels might also change market characteristics such as concentration or production capacities and could also have a negative impact on innovation. Usually, a cartel will try to foreclose the market to avoid market entry, to stabilise the cartel and to prevent an erosion of profitability. The softening of competition due to a cartel could also reduce the incentives for firms to innovate on both products and services but also regarding the production process and the

technology employed. This can lead to substantial dynamic inefficiencies in the long run, that is, reduced research and development (R&D), and a lower rate of technological progress leading to substantial additional welfare losses. Theoretical results with respect to the impact of cartels on innovation are, however, ambiguous; on the one hand higher cartel profits allow for investments in R&D but on the other hand there are increased incentives for 'business stealing'.¹⁸ In addition, cartels may reduce product variety as it is in general easier to stabilise a cartel in a homogeneous product market. Also, all expenditures related to organising the cartel and to protecting the cartelists from detection by the competition authority have to be considered welfare losses.

Existing empirical studies on cartel damage have concentrated on mark-up and overcharge calculations. Quantity effects have often been neglected.¹⁹ The results of these studies show some variance. In the study by Posner (2001) that considers 12 cartel cases, the median amount by which the price increased is estimated at 28 per cent,²⁰ whereas the OECD analysis of 2002, based on cases between 1996 and 2000, estimates a median increase in price of 16–18 per cent. In a meta study by Werden (2003), where 13 studies are analysed, a median increase of 15 per cent is found. The most comprehensive study on cartel-induced price increases is by Connor and Lande (2008), who analysed more than 670 cases taken from approximately 200 studies. They conclude that the median price increase is about 20 per cent of the cartel price and the average at about 23 per cent. Based on this study, the distribution of cartel-induced price increases was calculated; however, only those cartel cases were considered that were established after 1960 and that fulfilled several other selection criteria, so 114 cartel cases were eventually considered.²¹ For this sample, the median of the price increase was approximately 18 per cent and the average was about 20 per cent of the cartel price. The distribution of cartel-induced price increases of this sample is depicted in Figure 8.3.

Figure 8.3 reveals the substantial variance of cartel-induced price increases. Whereas in 7 per cent of the cartel cases analysed no increase could be estimated, the increases can in certain cases exceed 50 per cent, implying a cartel price more than twice as high as the competitive price.²²

18 See Schumpeter (1950) and Arrow (1962). There is as yet no conclusive empirical evidence.

19 The neglect of quantity effects is a general problem of the mostly US-influenced literature on damages. In addition, the focus on the overcharge instead of the quantity effect is due to the fact that US damages actions at the federal level are brought by direct purchasers in the absence of the passing-on defence, rendering the overcharge the only relevant damages category.

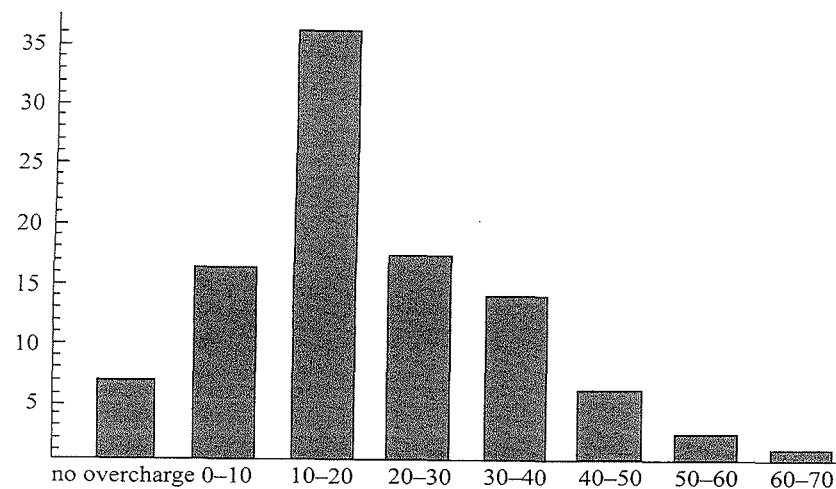
20 The cartel-induced price increase or mark-up is normally expressed as a percentage of the cartel price.

21 European Commission (2009: 91).

22 Other studies include Levenstein and Suslow (2006); Connor (2006); Connor (2006); Connor and Bolotova (2005); Bolotova et al. (2009); Griffin (1989); OECD (2003); and Combe and Monnier (2007).

16 This type of inefficiency is known as X-inefficiency (Leibenstein 1996) often associated with the 'quiet life' of a monopolist (Hicks 1938: 8).

17 In turn, a perfectly efficient cartel will imply that less efficient firms no longer produce and only receive transfers.



Source: The analysis is based on the underlying data in Connor and Lande (2008), described previously, and selection criteria described in European Commission (2009).

Figure 8.3 Distribution of cartel-induced price increases in per cent

2 Economic actors damaged by cartels

8.020 Section II.A.1 discussed the two basic effects through which firms or consumers can be harmed by anti-competitive conduct, namely price and quantity effects. This section will provide a more systematic analysis of the vertical, horizontal and other (non-vertical and non-horizontal) cartel effects in order to give a better understanding of how cartel damage percolates through the economy.

8.021 Horizontal effects are generated on the same antitrust market and therefore concern all producers of cartelised goods or services irrespective of whether they take an active part in the cartel or not. Also, producers of products that only become substitutes at the cartel price are affected.²³ Vertical effects are effects along the different levels of the production chain and concern firms providing direct and indirect inputs to the cartelised firms as well as firms and consumers that act as direct or indirect purchasers. Non-horizontal and non-vertical effects accrue, for example, to firms that provide complements or firms and consumers purchasing from firms providing complements. Such effects also accrue to firms that purchase from some of the direct or indirect cartel input providers or some of the firms purchasing from firms offering substitutes to direct or indirect cartel inputs or firms offering substitutes to the products offered in the value chain of the cartelists.

²³ In that sense, horizontal effects may also arise outside the relevant market as is intuitively clear if one considers the cellophane fallacy.

Figures 8.4a and 8.4b set out five levels of a value chain, locating the cartel at level three in the chain. Correspondingly, there are also five separate horizontal markets of cartel-affected inputs and cartel-affected outputs as well as their substitutes. In addition, the figures also capture three neither horizontal nor vertical effects, that is, a producer of complements to the cartel product, a purchaser of substitutes to a direct cartel input and a direct and indirect purchaser of a cartel substitute. Furthermore, the figures show some typical outcomes in terms of positive damage (dark grey) and negative 'damage' or profit increases (light grey). **8.022**

In principle, a whole range of economic actors can be affected by anti-competitive conduct. General equilibrium theory shows that all actors in an economy can potentially be positively or negatively affected by a cartel. By increasing the price of the cartelised product, the cartel changes the relative prices and thus causes substitution and income effects that can affect the whole economy, similar to how a stone that is thrown into a small pond will generate waves that will spread across the whole pond.²⁴ To realise that effects accrue not only downstream in the supply chain is important in an EU context as the US literature that focuses on direct and indirect purchaser standing may have obfuscated this point.²⁵ We first consider the effects of a cartel on the upstream levels of the supply chain and then discuss the effects on the downstream levels. Finally, we consider cartel effects on economic agents outside the supply chain. **8.023**

a Upstream effects

Figure 4a depicts some possible upstream effects that could be generated by a cartel, that is, level 1 of indirect input suppliers and level 2 of direct input suppliers as well as producers of substitutes for direct (firm A) and indirect (firm B and firm C) inputs. **8.024**

The cartel-induced price increase leads to a reduction in the demand of the cartelised product and therefore also diminishes the demand of the cartelised firms for direct inputs required to produce this good. It should be noted that the decrease in input prices due to the reduction in input demand is an aggregate effect and that indeed firms not participating in the cartel but producing the same products (firm E) or producers of substitutes to the cartel product (firm F) **8.025**

²⁴ From a practical point of view damages claims will, however, realistically only be brought by a small subset of those actors affected. Similar to the small pond metaphor, however, where the height of the wave is normally greatest near the point where the stone sank into the water but also depending on the depth topology of the pond, the economic effects or damage are not necessarily greater for direct as opposed to indirect purchasers or those that are even further removed from the actual economic dealings of the cartel. Indeed there are – empirically probably rare – constellations where direct purchasers may even benefit from the cartel to the further detriment of indirect purchasers.

²⁵ See Chapter 3 for a discussion of standing in antitrust litigation in the EU and the US.

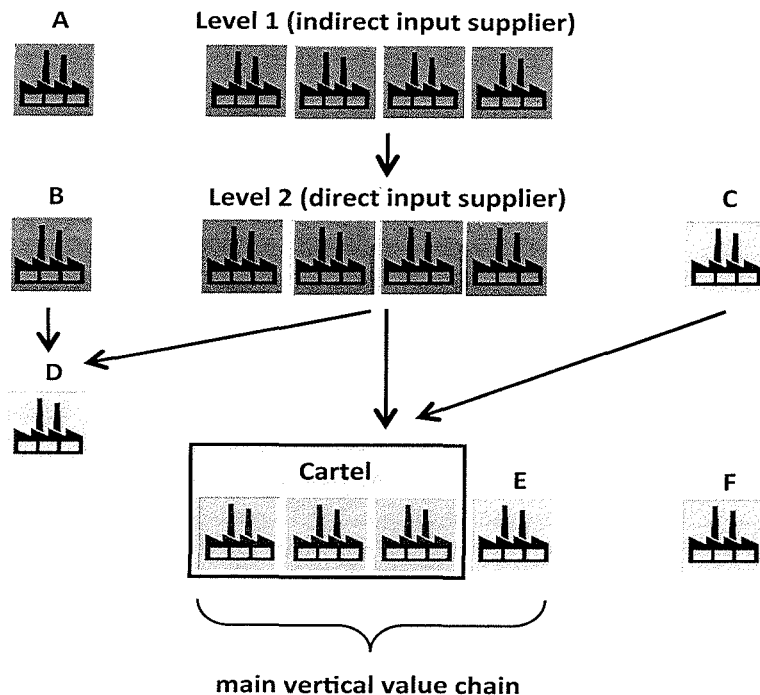


Figure 8.4a Stylised vertical, horizontal and other cartel effects upstream of the cartel

– to the extent that F requires the same inputs – may actually increase their production (for example, in case of a market characterised by Cournot competition). This increase will, however, not compensate for the reduction in input quantities demanded by the cartelists.²⁶

8.026 As a result of the reduced demand for the direct input²⁷ produced, level 2 firms' profits are reduced despite the fact that their profit-maximising response results

²⁶ Firms E and F are drawn with a light grey background as they benefit from so-called umbrella effects. The quantity reductions or price increases of the cartel allow both firms to increase prices or increase quantity depending on whether the market is characterised by Bertrand or Cournot competition. Indeed firm E and, depending on the degree of substitutability, also firm F benefit most from the cartel as their profits increase more than the profits of the cartelists. Under quantity competition these firms do not follow the cartel in restricting their output at the cartel price but expand production thereby mitigating cartel effects both up and downstream, but also increasing their own profits. A similar free-rider effect exists under price competition, where firms E and F follow the cartel in increasing prices but do not increase prices as much as the cartelists, again resulting in a quantity increase. See Inderst et al. (2013b).

in a reduction of their own prices, thereby mitigating the negative effect of the cartel. The lower prices charged by the level 2 firms benefit firms such as D (and of course any firm that may have been buying from level 2 producers but is not depicted in the figure) for whom the input provided by level 2 direct input providers now becomes an attractive substitute. This has a negative impact on firm B, a producer of substitutes to level 2 direct input suppliers' product as B finds it profitable to adjust its price downward in a reaction to the price decrease of level 2 direct input suppliers. This in turn benefits firm D.²⁸ Level 2 firms are, however, not only negatively affected by the drop in demand induced by the cartel but may be further harmed if for instance this industry was experiencing economies of scale prior to the drop in demand. This may lead to firms such as C, that use a different production technology and that were not competitive at the pre-cartel production levels, becoming attractive suppliers of substitutes. Indeed, the reduction in demand by the cartelists and the undercompensating demand increase by firms E and F may lead to a partial shift of the remaining demand away from level 2 suppliers to firm C.

So far, level 2 firms have been considered to have been equally impacted by the different effects discussed. This need not be the case. While market conditions for these firms change as described and lead to a decrease of prices for level 2 supplier products, some firms may in fact be more affected than others. 8.027

Similar arguments apply for the indirect input suppliers (level 1). Indeed, these indirect input suppliers face a reduced demand from level 2 firms and, as a result of their own profit-maximising response to this drop in demand, reduce prices to mitigate these effects. Overall prices and quantities decrease, resulting in lower profits also for producers of substitutes such as firm A. Again, the aggregate quantity and price effects are independent of whether only one or all four of the firms depicted are selling inputs to level 2 firms, although the resulting damage may of course not be equally distributed and depend on the respective market shares. 8.028

b Downstream effects

Figure 8.4b depicts the effects downstream of the cartelised market. Clearly, the direct purchasers (level 4) as well as the indirect buyers (level 5) are negatively affected by the increase in price of the cartelists. The cartel, however, also has an 8.029

²⁷ Note that the figure assumes that this input is solely used for producing the cartelised product and possibly also for the production of substitutes to the cartelised product. This does not need to be the case and depending on what fraction of total sales on level 2 go to other industries, or are diverted into other industries as exemplified by firm D subsequent to the decrease in price that level 2 firms implement, the effect on the direct input suppliers relative to their total profits is mitigated.

²⁸ Firm D may therefore benefit from the cartel even if it does not substitute to products from level 2 firms.

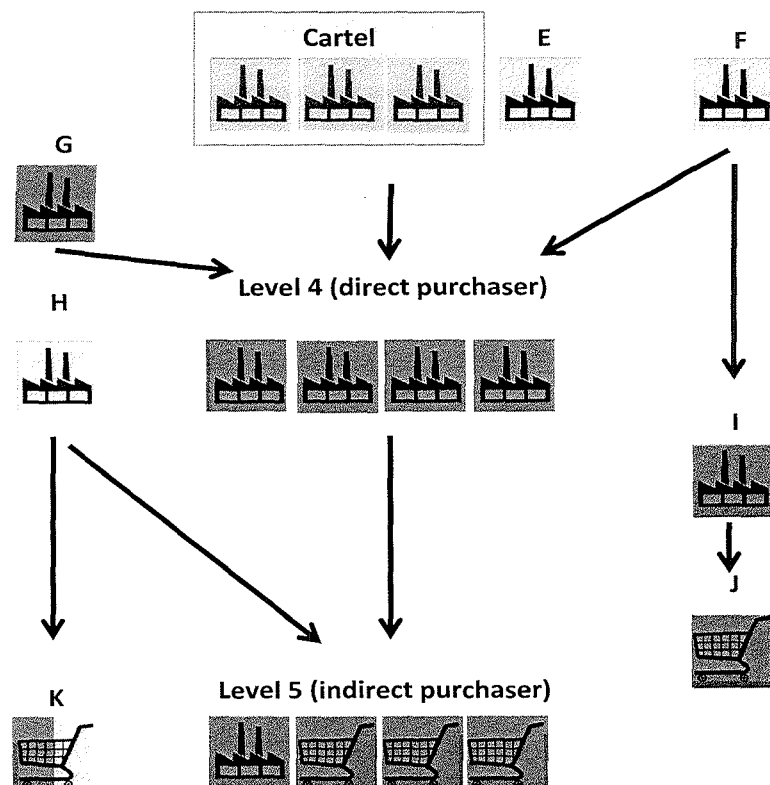


Figure 8.4b Stylised vertical, horizontal and other cartel effects downstream of the cartel

effect on firms like E, producing the same product as the cartel, and F, producing substitutes to the cartel product. These firms do not participate in the cartel but profit from so-called ‘umbrella effects’.²⁹ The cartel-induced price increase leads to a diversion of demand to non-cartelised firms producing the same good as the cartel and to firms producing substitutes of the cartelised product. The increase in demand causes these firms to raise the prices of their products and to increase their supply. This increase in supply is, however, insufficient to compensate for the reduction in supply by the cartel, as otherwise the cartel would not be formed.³⁰ In the case of a homogeneous product, the

umbrella effect induced by the cartel leads to a price increase by the same amount as the cartel price, that is, the damage that accrues to customers of non-cartelised firms is the same as for the customers of the cartel as both pay the same price. If products are differentiated, the increases in price and supply under the umbrella of the higher cartel price depend on the amount of demand diverted from the cartel to non-cartelised producers of substitutes. The higher the degree of differentiation, the less pronounced the reaction of the non-cartelised competitors will be. In addition, the relative magnitude of that effect crucially depends on the reaction of the indirect purchasers (level 5) as will be seen in the discussion below. In anticipation of that reaction, level 4 firms unintentionally mitigate the negative effects of the cartel by not increasing prices as much as the increase in input cost would seemingly warrant, simply in order to maximise profits. Nevertheless, there is an increase in price compared to the counterfactual price that prevailed absent the cartel and therefore the indirect purchasers and consumers (level 5) pay a higher price and buy a reduced quantity of the product.

While the existence of the cartel results in positive effects for firm F, as set out above, its direct and indirect customers I and J are harmed (see Figure 8.4b). The reason for this is that as the demand that firm F faces increases (due to substitution and the possibility to act as a price follower to the cartel), its profit-maximising prices increase as well. This is a notable result as it indeed shows that consumers in otherwise completely unrelated markets may suffer damage from the cartel. A further concern may be that the only, albeit indirect, link with the cartel is through firm F, which actually benefits from the cartel and would therefore not have any incentive to disclose information on a possible cartelisation to its own customers.

Similar to the effects on firm F already discussed, the substitute producer H is positively affected as indirect purchasers partially substitute consumption away from the level 4 direct purchasers to firm H, which in turn sells a higher quantity at a higher price. The consumers K that were buying from H before are harmed in this case as the price is higher than in the absence of the cartel due to the fact that H is now also facing demand from level 5 consumers. Alternatively, one may envision that this increased demand allows the firm to produce at lower cost due to some increasing returns to scale technology. If that is the case, the price may go down so that consumers K are benefitting from the cartel.

c Effects on producers of complements

Further effects of the cartel accrue for firm G, a producer of complements to the cartel products. With a reduced demand for cartel products, the demand for complements also decreases. As a result, the profits of firm G decrease despite a

²⁹ For a detailed discussion of umbrella effects see Inderst et al. (2013b).

³⁰ The assumption has to be that a sufficient amount of firms (or firms covering a sufficient share of the market) in a market are cartelised. If entry is easy or firms are not at capacity or otherwise constrained it is not possible to form a profitable cartel.

profit-maximising reaction, consisting of lowering price to partially offset the quantity effect.³¹ What is notable is that this firm is negatively affected by the cartel although its input prices are completely independent of the cartel and, in that sense, no damage has been 'passed-on'.³² Nevertheless, G clearly is harmed by the cartel and may even stand a good chance of demonstrating this harm if, for example, its complementary products are sold in a fixed proportion to the cartelised product.

d Summary of effects analysis

8.033 This discussion has shown that while the total net effects of a cartel are necessarily negative due to the resulting welfare losses, the cartelisation of an industry can have positive effects for some consumers and firms and negative effects for others.³³ It should also be clear that the notion of 'passing-on' of damages is misguided as the cartel does not produce a certain fixed 'quantity of damage' that is then passed up and down the different levels of the value chain. Rather, by changing relative prices, the cartel actually triggers responses up and down the value chain and also outside (outside vertical or horizontal relationships) that, while solely induced by profit-maximising behaviour, mitigate cartel damages.

8.034 In US cartel damages cases, the focus is mainly on price effects and on the value chain downstream of the cartel. In addition, damages claims at the federal level are restricted to direct purchasers who consequently are allowed to claim the total downstream damages based on price effects. As price effects are pure transfers, the sum of all price effects is equal to the overcharge, which is the illegal gain. Using US terminology, the passing-on-adjusted overcharges of all downstream levels sum to the entire overcharge. As in some US states, indirect purchasers are also allowed to claim damages; the concept of passing-on is introduced in addition to the concept of overcharges. This allows the retrospective calculation of price effects at different levels of the value chain starting from the overcharge, but makes it difficult for courts to apportion damages across several claims pertaining to one infringement. These concepts are ill-suited for calculating damages when full compensation is the goal as quantity effects need to be taken into account and total damages are therefore not equal to the overcharge. From an economic point of view, the concepts of overcharge and

³¹ Note that price reductions will be more significant if the complement is not sold in fixed proportion to the cartelised product. If it is, the price reduction will be more mitigated as quantity reactions will only depend on the price of both, the complement and the cartelised product.

³² This is another incidence demonstrating the problematic nature of the notion of 'passing-on' for calculating damages in an EU context.

³³ This is actually inherent in the notion of transfer, although the figures show that such transfers not only accrue to the cartelists but that there are transfers that benefit consumers or firms that are not in the cartel (firm E, for example, will benefit more than the cartelists relative to its size) and may not even be active in the same industry.

passing-on are therefore at best complicated methods of deriving price effects as they neither provide a basis for calculating total damages nor capture effects upstream of the cartel or outside the vertical value chain.³⁴

The discussion of Figures 8.4a and 8.4b assumed certain typical industry responses and did not explicitly consider the reactions of firms to changes in demand and input prices. In the following, a graphical analysis analogous to the one in section II.A.1 is used to describe some of the reactions that were summarised in the discussion above. The presentation focuses on the special case where the direct purchasers are not harmed by the cartel, that is, the case where all 'damage' is 'passed-on' so that only indirect purchasers and final consumers are affected. Modifying this case and assuming that there is only a monopoly direct purchaser serving final consumers leads to another special case where almost no 'damage' is 'passed-on'.³⁵ With one possible exception all relevant cases lie in-between these two special cases.³⁶ **8.035**

3 Illustration

The previous subsection discussed the effects that a cartel can have throughout the economy and the economic actors likely to be affected by a cartel. This subsection focuses on the price and quantity effects as they accrue in a vertical value chain in more detail. In explaining these, the sometimes inconsistently used concept of overcharge will also be discussed.³⁷ More specifically, as set out **8.036**

³⁴ Doubts are in order as to whether these concepts are compatible with European law as they are derived from a legal context that does not allow all victims standing and that is not geared towards full compensation of harm suffered. This of course does not imply that these terms are absent in the EU debate and have not created confusion. For example the problem of unjust enrichment is solely a relic of the overcharge approach. Also the controversially debated US question on whether the passing-on defence should be allowed is no longer of relevance in Europe where all victims have standing. The proposal of the European Commission concerning a directive on the rules governing actions for damages (see European Commission (2013); and Maier-Rigaud (2013)) has not succeeded in overcoming these difficulties.

³⁵ Of course there exist very realistic cases where no passing-on occurs. This is, for example, the case if the cartelised product is part of the fixed cost of the downstream purchaser, as would be plausible for instance in an elevator cartel.

³⁶ The exception is a scenario in which direct purchasers actually benefit from the cartel. See Hellwig (2007). An alternative scenario in which the direct purchasers benefit is due to side payments and is discussed in Schinkel et al. (2008).

³⁷ Here, the term cartel-induced price increase or mark-up is consistently used to describe the effect the infringement has on price, that is, if the infringement results in a price of €15 when the but-for price would have been €10, the mark-up is €5. The term overcharge is consistently used to denote the monetary amount obtained by multiplying the mark-up with the quantity bought by the purchaser under the infringement. This overcharge is identical to the price effect if no passing-on occurs, for example, if final consumers are considered. The term overcharge is, however, sometimes also used in the literature to denote the mark-up. Some authors also use the term interchangeably, contributing further to the confusion between price effects and overcharge as defined here. See, for example, European Commission (2009), which first defines overcharge as defined here, then later on uses the term as a synonym for mark-up. This approach is repeated in European Commission (2011), which also adopts the US terminology of overcharge and passing-on that is of limited use in an EU context. See also European Commission (2013).

in Figure 8.5, a cartelised market for an intermediary product is considered. This intermediary product is an input for the production of a further intermediate good that is produced on a perfectly competitive market. The intermediate product on that market is finally sold to a monopolist who produces a final product sold to consumers. In order to simplify the exposition, it is assumed that no other inputs are required to produce the intermediate as well as the final product than the one impacted by the cartel. Furthermore, marginal costs for each firm in the value chain are assumed to be equal to c so that total production costs for the downstream monopolist are $3c$ under perfect competition and $2c + p_k$ in case there is a cartel on the first intermediate product market. It is further assumed that one unit of input is used to produce one unit of output throughout the value chain.

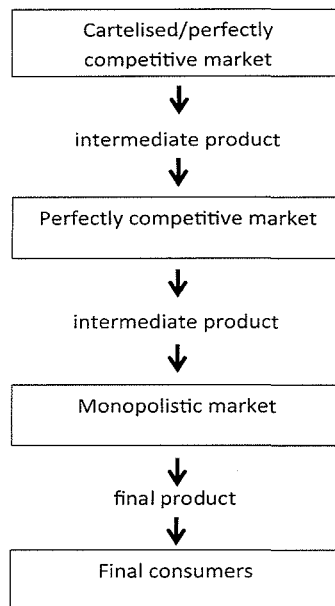


Figure 8.5 Possible effects of a cartel on a downstream value chain

- 8.037 Consider first what happens in the absence of a cartel. If there is no cartel and given the demand function D_M , consumers are charged the price p_M^* , corresponding to a quantity q_M^* depicted in Figure 8.6. This price is higher than the marginal cost curve of $3c$ because the indirect purchaser (monopolist) has market power and charges a price higher than marginal cost. The monopolist pays $2c$ for its input as the first intermediate supplier market is competitive, charging a price $p_1 = c$, and the second one is competitive as well, charging a price of $p_2 = c_2 = 2c$, so that total marginal costs are $3c$. As the production of the final product is assumed to occur in a monopolistic market, final consumers will

be confronted with a price that corresponds to the quantity q_M^* , where marginal revenue (depicted as MR_M equals marginal cost ($3c$)).

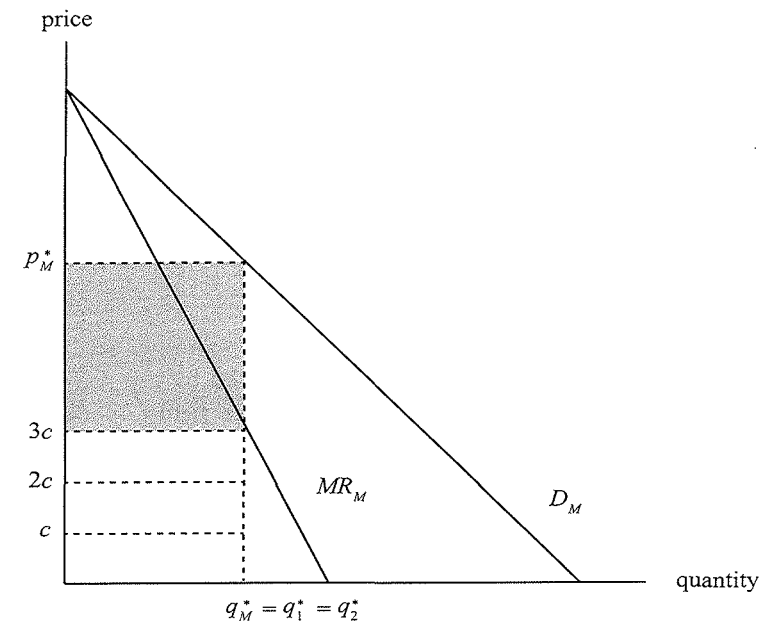


Figure 8.6 Situation in the absence of a cartel

The monopoly profits of the indirect purchaser are depicted in Figure 8.6 as the area shaded in light grey. As all other markets are assumed to be perfectly competitive, other firms make zero profits, that is, they only earn a normal rate of return.³⁸ 8.038

Consider now the situation with which the upstream producers are confronted if they want to form a cartel. Originally, that industry was perfectly competitive, charging a price equal to marginal cost. Now the market is assumed to be perfectly cartelised and the cartelists produce a quantity where marginal cost equals marginal revenue and the resulting price is the monopoly price on that market. Clearly, marginal revenues depend on the demand that the cartel faces downstream in the competitive market, which in turn depends on the demand of the monopolistic market, which in turn depends on final demand. In order to 8.039

38 The zero profit result under perfect competition does not imply zero profits in an accounting sense, but only implies that the firms do not earn more than a normal rate of return, that is, they earn zero profits defined as any amount exceeding a normal return.

be able to find the profit-maximising price, the cartel has to take into account all reactions throughout the value chain.

- 8.040** As discussed in section II.A.1, the calculation of damage resulting from the cartel for final consumers is conceptually easy. Consumers are hurt as they no longer purchase a quantity q_M^* but reduce consumption to q_{Mk}^* at the corresponding prices p_M^* and p_{Mk}^* , where k denotes the fact that this is the price-quantity combination chosen by the monopolist under the cartel (see Figure 8.7). The DWL (the black triangle) is the damage due to the reduction in quantity and the price effect is given by the transfer indicated by the area shaded in medium grey above the price p_M^* that is, the increase in price for all units that continue to be bought.³⁹
- 8.041** The cartelised industry benefits from the cartel as it no longer earns the normal rate of return at $p_1 = c$, but realises a profit indicated by the rectangular area shaded in dark grey below p_{1k}^* in Figure 8.7. The firms operating on the perfectly competitive intermediary product market continue to earn only a normal rate of return and are therefore not affected, although they sell a lower quantity, that is, $p_{2k} = p_{1k}^* + c > p_2 = 2c$. As marginal cost has increased, prices have increased as well and a lower quantity is being sold.
- 8.042** The downstream monopolist is negatively affected by the cartel as its profits decrease. Instead of the rectangular area shaded in light grey depicted in Figure 8.6 and again in Figure 8.7, the monopolist now only earns the profits in the amount of the area shaded in medium grey above the price p_M^* .
- 8.043** Several aspects are noteworthy with respect to this stylised example. Firstly, net cartel profits are given by the price increase multiplied by the quantity that continues to be sold at that price.⁴⁰ The benchmark conveniently assumed is a perfectly competitive industry, so that there are no negative quantity effects of the price increase to be taken into account.⁴¹ Secondly, total damage far exceeds the cartel profits as the area shaded in dark grey in Figure 8.7 is smaller than the difference between the areas shaded in light grey and in medium grey above the price p_M^* (damage accruing to the monopolist) plus the area shaded in medium grey above the price p_M^* and the black triangle (damage accruing to final consumers). This also implies that the overcharge which is identical to the illegal gain substantially underestimates total damage. Thirdly, while the

³⁹ With final consumers, and only with final consumers, this price effect is equal to the overcharge of the firm(s) selling to the final consumers.

⁴⁰ This illegal gain is of course identical to the overcharge faced by the direct purchaser.

⁴¹ There are quantity effects but they do not result in harm as there is no profit loss.

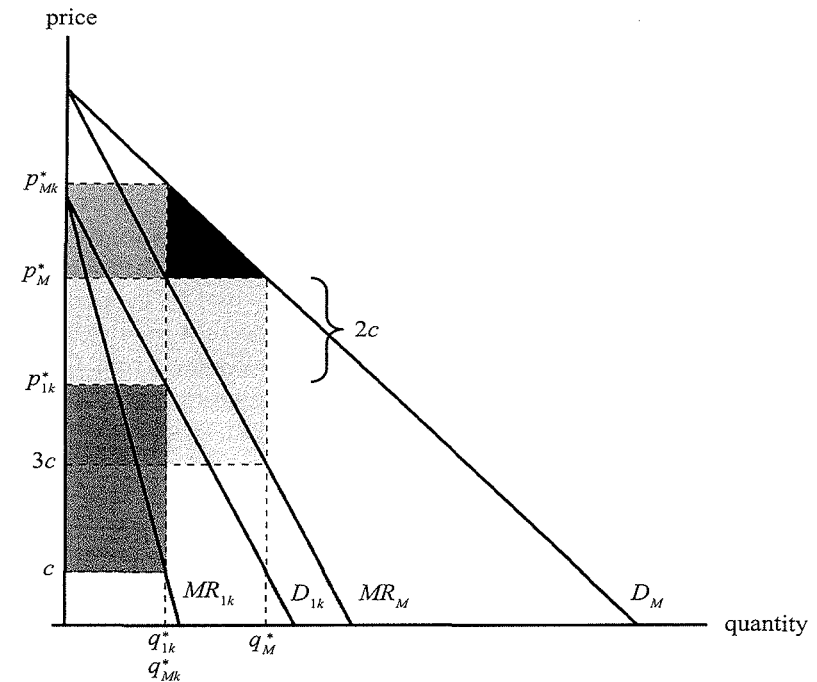


Figure 8.7 Situation with a cartel

damages to final consumers can conceptually be easily calculated by multiplying the price increase of the indirect purchaser (here the monopolist) with the quantity that consumers continue to buy and adding the quantity effect, this is not possible for the monopolist. The monopolist loses the profits on the quantity he no longer sells, but generally also on the quantity he continues to sell as his own cost mark-up changes, because he is pushed into a more elastic section of the demand function. This happens as soon as an imperfectly competitive market is considered and would therefore also have to be expected in oligopolistic markets.⁴² It is thus incorrect to calculate the damage accruing to the monopolist by adding to the lost profits due to the quantity reduction an amount equal to the overcharge, that is, the mark-up over the but-for price multiplied by the quantity it continues to sell, as this would be a substantial

⁴² The most important factors determining the reduction in mark-up are generally the degree of competition downstream, whether all downstream firms are equally affected by the price increase, the shape of the demand function and the type and nature of the cost function. In addition, if the monopolist (in that instance it would be more appropriate to call it a single seller) or the oligopolists are constrained, for instance by foreign importers that are not affected by the cartel, it becomes more difficult to maintain a higher mark-up as the cost increase may have to be fully absorbed.

overcompensation.⁴³ Fourthly, the scenario demonstrates that damage may not accrue to direct purchasers but may concentrate at lower levels of the value chain. Although jurisdictions that only give standing to direct purchasers allow these firms to claim total damages, including those occurring further downstream, some scepticism may arise as to the potentially substantial informational problems that a direct purchaser would have to overcome to elicit the required information from indirect purchasers or, for that matter, from producers of complementary products. The scenario also shows that quantity effects can only be ignored if – as assumed here for the direct purchaser – the market is perfectly competitive or the cartel only affects fixed costs.⁴⁴ In perfectly competitive markets, however, there is also no damage, so that in all relevant cases where variable costs are affected, quantity effects will play a role. Given these conditions, quantity effects are more important the more market power the concerned firms have, that is, approximately, the more concentrated the industry is.

B Damage caused by abusive conduct

- 8.044 Abuse of a dominant position can take the form of exclusionary or exploitative conduct. Whereas an exploitative abuse directly increases the profits of a dominant firm through price increases,⁴⁵ exclusionary abuses increase profits indirectly. Through the abusive practice the competitive pressure emanating from actual or potential competitors is reduced. Practices such as predatory prices, retroactive rebates, margin squeeze, refusal to deal or exclusive dealing aim at reducing the competitiveness of rivals in order to strengthen the market position of the dominant firm. While a particular practice is only considered abusive if anti-competitive effects can be demonstrated, implying that consumers are made worse off, the increase in market share of the dominant

43 Of course, it is possible to decompose the damage suffered by a purchaser into an overcharge, a passing-on and a quantity effect, as is done for example by van Dijk and Verboven (2008, 2009) or Kosicki and Cahill (2006). Although artificial, such a decomposition may be justified in a jurisdiction where quantity effects are considered irrelevant. If in addition only direct purchasers have standing and the passing-on defence is not allowed, it is sufficient to calculate the overcharge, that is, the illegal gain, and disregard both the quantity effect and the price effect which would require adjusting the overcharge by subtracting passing-on. For an economically appropriate calculation of damages this is, however, not required.

44 In economics, a distinction between fixed and variable costs is made. Fixed costs do not vary with changes in output, whereas variable costs do. In a short-term analysis, changes in fixed costs would not result in any quantity effect. From a business perspective it is crucial to determine how fixed costs are allocated to outputs.

45 See OECD (2012a) for a detailed discussion of excessive prices. Just as for cartels, exclusionary conduct has as its primary goal increasing profits by softening or eliminating competition. Whereas a cartel reduces or eliminates the competition between firms, abusive conduct aims at foreclosing the market for actual or potential competitors or at least to limit their growth and development.

undertaking at the expense of its competitors amounts to a transfer of profits from competitors to the dominant undertaking.⁴⁶

1 Types of damage caused by exploitative and exclusionary conduct

In the case of an exploitative conduct, similar welfare implications result as in a cartel context. The prices are higher and the quantities are lower than under functioning competition so that the resulting allocative inefficiencies take the form of profit or utility losses. Just as in a cartel context, there is also a transfer from purchasers to the dominant firm. 8.045

Whereas cartels generally entail higher prices,⁴⁷ reduced quantities and lower quality for customers and ultimately final consumers, abusive practices may – at least in the short term and to the extent that they entail profit sacrifices – also entail positive effects for the purchasers. With predatory prices, for example, purchasers are better off in the first implementation phase of the predation strategy as prices decrease. Only once competitors have exited the market and the dominant firm can recoup its profit sacrifice will prices increase beyond the price that prevailed prior to the implementation of the predation strategy and the harm for purchasers and final consumers will become apparent. The repercussions of the abusive practice may therefore vary across phases, increasing the difficulties of estimating both the welfare consequences of the practice and also the individual damage. 8.046

Many of the business practices of dominant companies that can be classified as abusive, however, also entail positive effects on competition. For instance, tying can be used to leverage market power from one market to another but might also entail substantial reductions in transaction costs for consumers.⁴⁸ The harm generated by abusive practices is therefore often much more difficult to pin down than in cartel cases. In contrast to the latter, they do not exclusively exhibit anti-competitive effects but also entail efficiency enhancing effects that are procompetitive. In addition, different types of purchasers may be affected 8.047

46 It is important to bear in mind that a calculation of individual damage is distinct from an effects analysis that would be conducted to establish whether an infringement took place. An effects analysis aimed at establishing an infringement will focus on anti-competitive effects and in particular on consumer harm. It will not consider the loss of market shares of competitors as such as a problem. Once the infringement is established, however, the loss of market share, if it can be attributed to the abusive conduct, presents a clear individual damage. In other words, and drawing on the welfare discussions above, the efficiency justifications for competition law lead to a focus on the overall welfare effects of a particular practice and therefore disregard pure transfers of wealth. From an individual damage perspective, however, these transfers are typically the most important part of the damage suffered even if they are not welfare losses.

47 A caveat is of course indicated with respect to episodes of price wars in cartelised industries. During these price wars, prices are likely to be below cost and would therefore also fulfil a predation standard. See the model by Green and Porter (1984) and its empirical application in Porter (1983).

48 Of course such efficiencies may be reached without anti-competitive effects by bundling instead of tying.

differently. Under price discrimination, for example, purchasers with a price elastic demand generally stand to gain as they are paying a lower price than under uniform pricing, but purchasers with a less elastic demand are faced with a higher price. The total effect of the price discrimination on welfare may even be positive.

- 8.048 Under exclusionary abuse, the behaviour of a dominant firm usually changes over time. In the first phase of such an abuse, for example in the case of predatory pricing, competition may be very intense up until the point where competitors leave the market and where competition will subsequently be substantially weakened. Some abusive practices may also lead to a permanent change of the market structure so that the negative consequences on the market structure become quasi-permanent and possibly irreparable, something that is more difficult to imagine in the context of cartelised markets. It may, however, also be possible to imagine a situation where remedies of the competition authority, in particular if structural remedies are considered, lead to a much more competition prone environment than prior to the abuse. This is discussed in more detail in section III.B.1.

2 Economic actors damaged by exploitative and exclusionary conduct

- 8.049 If the abusive practice is exploitative, the harmed parties are, using the analogy of a cartel situation, the direct and indirect purchasers as well as the direct and indirect suppliers, but also the producers of complementary products and the purchasers of substitutes. Under price discrimination, different consumer types are affected differently. If there are two groups of customers, some with an elastic and others with a less elastic demand for the product, those with an elastic demand will stand to benefit and those with an inelastic demand will stand to lose if prices are compared to a uniform price. This represents a substantial difference to cartel-induced price increases that typically affect all purchasers uniformly.⁴⁹

- 8.050 If the abusive practice is exclusionary, the bulk of the damage is borne by competitors of the dominant undertaking. Due to the exclusionary practice, competitors lose market share and may eventually even have to exit the market. This could for instance be the case under a retroactive rebate scheme or under predatory pricing, which have a direct bearing on the revenues of competitors.

⁴⁹ While a cartel-induced price increase may be identical for all purchasers, the consequences of such a price increase for individual purchasers and therefore also the damage suffered can be quite distinct. Consider for example a situation where due to the cartel-induced input price increase a firm's product is now priced substantially higher than before, resulting in alternative products becoming viable substitutes for its purchasers. In an extreme case, this firm may have to exit the market in the long term whereas other purchasers of the cartel may only face reductions in profit due to much more mitigated price and quantity effects on their products.

This could in turn result in damage for the suppliers of these firms as they can only sell a reduced quantity. If the abusive conduct stems from a vertically integrated undertaking, similar effects can be obtained through a margin squeeze or a refusal to deal strategy that successfully raises rivals' costs. In addition, potential competitors also may be among the victims if the abuse is instrumental in erecting entry barriers that keep other, potentially even more efficient, rivals out of the market.

- While the bulk of the damage accrues to competitors, purchasers of the dominant firm are, in particular once the infringement takes effect, also harmed by higher prices, reduced quantities, lower quality and less innovation. If the abusive conduct is terminated prior to competitors losing substantial market share, the damage to purchasers is limited and they may even have benefited from the increased competition.⁵⁰ In practice it seems therefore reasonable to expect competitors to be the key victims in such cases. 8.051

III QUANTIFICATION OF DAMAGES

- Once the type of competition law violation is established in the context of a specific damages claim, the affected economic agents can be determined and the damage caused by the infringement can be assessed at least conceptually. In order to fully compensate victims, the specific level of damages for each victim has to be calculated. As discussed previously, the approach for determining the damage is based on a comparison of the actual wealth position as impacted by the competition law infringement with a wealth position in a hypothetical counterfactual situation that would have prevailed in the absence of the infringement.⁵¹ In principle, the market outcome of a comparable factual or hypothetical market is the basis for estimating the damage that is caused by the competition law infringement. In that sense all methods employed for estimating damages are comparator-based and the main distinguishing feature is simply whether the comparator is theoretically constructed or taken from an 8.052

⁵⁰ Note that this crucially depends on whether the abusive practice involves a profit sacrifice or not. This is the case with predation but may very well not be the case under retroactive rebate schemes or other abusive practices such as refusal to deal. For a discussion of whether rebate schemes involve a sacrifice, see Maier-Rigaud and Schwalbe (2013).

⁵¹ Wealth position is a more general term than profit, which could wrongfully be construed as implying that losses in utility are not considered relevant. The term wealth position is, therefore, not used coincidentally as quantity effects for consumers are typically not expressed as profit losses but as utility losses, but, nevertheless, can be expressed in monetary terms and should be counted as damages.

existing market.⁵² In the following subsections the different approaches for assessing the counterfactual scenario for the two basic competition law infringements of cartel agreements and abusive conduct are presented.

A Quantification of damages in cartel cases

8.053 In the context of a cartel, the counterfactual scenario is given by the price, quantity and quality that would have prevailed if there had not been any cartelisation in the industry and firms had competed within the structural conditions prevalent in the market.⁵³

8.054 In order to construct a counterfactual scenario, an actual market that is similar or comparable to the cartelised market in terms of time, geographic location or in terms of products could be used. An alternative to a factual comparator market is the design of an artificial market based on models from industrial organisation theory and empirical analysis that could be used to establish the but-for price, the corresponding quantity and finally the cartel-induced damage. A further possibility to estimate the counterfactual price consists in using the production cost and a 'normal' mark-up, that is, a mark-up that could have been realised on a market under competitive conditions. Alternatively, other factors, such as, for example, the profitability of a firm, could be used to assess the counterfactual scenario. The following sections discuss the different methods that have been proposed to estimate damages in the context of cartel cases. While most of these methods can also be employed in cases of abusive conduct, the specificities of estimating damages in these cases are relegated to section III.B.

1 Time series analysis

8.055 In many cases it will be appropriate to use a comparison in time to estimate the cartel-induced damage. This method typically involves using the same market before and/or after the cartel period and is conducted with the help of regression analysis or other methods of time series analysis.⁵⁴ Such an approach has the advantage that the companies in the factual and counterfactual scenario are mostly the same, so that the counterfactual is a good comparator at least in

that respect. It should be noted, however, that with the use of a before-and-after method a number of problems can also arise. In some cartel cases, when the cartel actually started is unknown, which creates difficulties in determining the period of time when the market was not cartelised.⁵⁵ The reason for the existence of a cartel may also be due to a period of fierce and ruinous competition, so that the prices prior to the cartel do not reflect normal competition. In other instances the time period after the end of the cartel may be too short to allow a reliable estimation of competitive prices. In addition, it may well be the case that the end of the cartel is followed by a phase of fierce competition and price wars so that again the prices observed in that phase are not a good indicator of competitive prices.⁵⁶ Furthermore, it cannot be omitted that the preceding cartel agreements created a focal point allowing the former cartelists to continue to charge prices that are very close to those agreed upon during the cartel phase and that are therefore not a good benchmark for prices under normal competition.

The main approach that has been proposed to estimate the counterfactual using a factual comparator market is the before-and-after method,⁵⁷ that is, prices before and after the end of the cartel period are used to establish the appropriate benchmark prices within the cartel period had the infringement not taken place. The method is based on the simple idea that to the extent that cartel prices differ in a statistically significant way from the prices prior to the implementation of the cartel agreement and the prices once the cartel ceased to operate, the difference could be attributed to the cartel. The before-and-after approach is usually implemented within a multiple regression framework that is used to estimate the price over the entire period covering both non-cartel periods prior to the start of the cartel and after the cartel ceases to exist and includes a dummy variable, that is, a binary indicator taking the values of 0 and 1 depending on whether the time window falls into the cartel period or not. Estimating the coefficient of this dummy variable then measures the amount of the cartel-induced price increase. For this to be a valid inference, control variables accounting for other factors that may have impacted prices, for example increases in input prices, must be included.⁵⁸ Failure to include such controls may result in significant distortions in the calculation of damages as

⁵² This distinction seems more intuitive than the structure proposed by the European Commission (2009: 43) that distinguishes between comparator-based, financial analysis-based and market structure-based. See also European Commission (2011) distinguishing between comparator-based and simulation, model and cost-based analysis.

⁵³ A cartel may also cause additional damage if for example the incentives to innovate are reduced or if firms explicitly agree on a reduction of product quality or product variety. In practice, however, quantification of these damages will usually be difficult as it is necessary to prove a causal relationship with the cartel infringement.

⁵⁴ On the empirical and econometric methods for calculating damages see for example Davis and Garcés (2010: 347–381).

⁵⁵ As long as required data is available, an econometric analysis may be able to pin down the starting date of the cartel based on structural breaks, but these methods are not error free, for instance in cases where the cartel increased prices slowly.

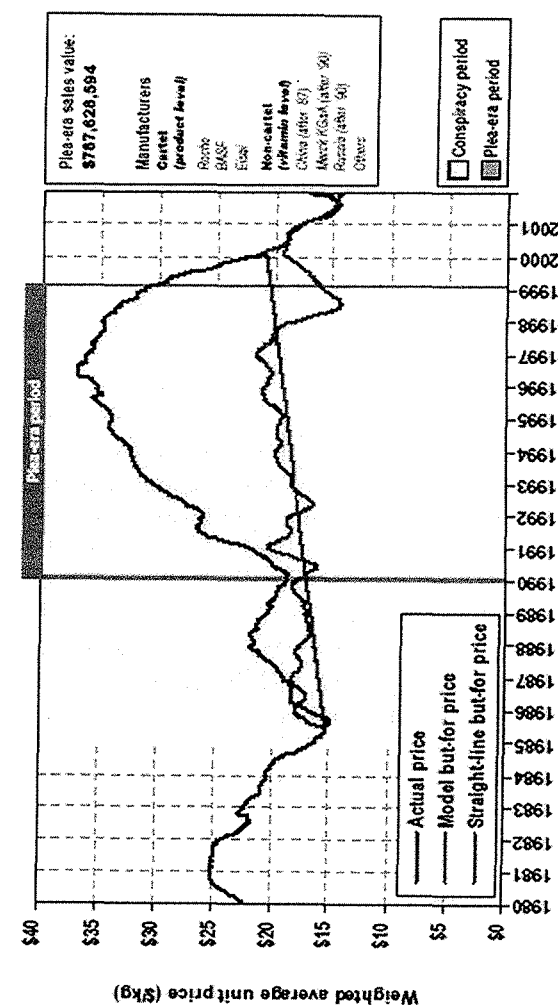
⁵⁶ This type of price war probably occurred after the breakdown of the German cement cartel, meaning that the prices of this phase were weighted down in the estimation of damages. See Friederiszick and Röller (2010).

⁵⁷ Also called before, during and after method, see OECD (2011: 14).

⁵⁸ This is particularly important if these factors are correlated with the cartel period.

price effects are causally attributed to the cartel when they are in fact due to circumstances that are independent of the cartel.

- 8.057 Consider for example a situation where the before-and-after method is used to estimate the price effects of the cartel and that entry occurred at about the same time as the cartel ended.⁵⁹ Clearly, additional entry will tend to decrease prices in the market and if this aspect is not controlled for in the regression the observed price reduction after the cartel ended will be taken as caused by the breakdown of the cartel agreement, resulting in damage caused by the cartel being overestimated. As a result, it is crucial to include all factors that have an impact on price and that changed during the relevant time period in the estimation. This would call, for instance, for an inclusion of demand factors such as the price of substitutes and complements but also cost factors such as capacity utilisation and input prices.
- 8.058 An empirical example of this type of before-and-after estimation was performed in the context of the vitamin cartel in the 1990s. In his expert report for the Vitamin Antitrust Litigation, Bernheim (2002) estimated the prices that would have prevailed absent the conspiracy using reduced form regressions. This is depicted in Figure 8.8.
- 8.059 In contrast to an analysis where the structural breaks, that is, the beginning and ending phase of the cartel period, are exogenously determined, endogenous structural break models allow for a statistical determination of the start and ending periods of a cartel, possibly also including gradual price changes at the beginning and end in a dynamic analysis.⁶⁰
- 8.060 In general, caution may be required in focussing on prices after the cartel ended. There are essentially three reasons for this. Firstly, former cartelists expecting damages claims in the aftermath of the cartel episode will find it in their interest to maintain higher prices than would otherwise be warranted, to the extent that the profit loss associated with such higher prices is overcompensated for by lower damages claims if post-cartel prices are used in the estimation of damages; for example, in the context of a before-and-after methodology. Secondly, the breakdown of a cartel could result in a price war and the exceptionally low prices during this period do not reflect prices that would prevail under normal competitive conditions.⁶¹ Thirdly, some cartel cases exist where the



Source: Seven-month centred moving average for US 'tel quel' food, pharma and cosmetic price from Roche ROVIS data.

Figure 8.8 Vitamin E Acetate Oil USP price and counterfactual price

59 It may even be that entry is in fact the very reason that the cartel broke down.

60 On this topic see for example Harrington (2008).

61 This was presumably the case in the German cement cartel, see for example Friederiszick and Röller (2010).

competition authority was not satisfied with fining the cartelists and implementing a cease and desist decision but also tried to reduce the future possibility of tacit collusion.⁶² As a result, prices observed after the cartel ended may remain supra-competitive and it may be prudent to give such prices a lower weight than pre-cartel prices in estimating the counterfactual price.

2 Cross-sectional analysis

8.061 Alternatively to the before-and-after method, geographic comparator markets can be used to estimate the prices and quantities under normal competitive conditions. This type of cross-sectional analysis assumes that the market structure in another geographic market, for instance in another country or region, is sufficiently comparable, that is exhibiting a similar concentration, similar technologies and cost structures as well as similar demand conditions. In addition, such a geographic market can only be considered a valid benchmark if it can be ascertained that no restrictions to competition exist. This could be a problem insofar as to the extent that the geographic market is a good empirical fit, the same incentives to cartelise should prevail, so that prices in this market may similarly deviate from prices under normal competitive conditions. As a matter of fact, there will generally always be differences between the two geographic markets, for instance concerning wages, input costs or demand, that could subsequently be taken into account by adjustments in the prices. In practice it will, however, be difficult to pin down exactly what the appropriate corrections in prices should be.

8.062 Cross-sectional models estimate the price effect of the cartel by comparing data in the relevant market with comparable unaffected markets. Cross-sectional models do not have a time dimension and are typically based on a comparison of data taken from the same time period. The underlying assumption in a cross-sectional analysis is that the comparator geographic or product market has been chosen in such a way that all differences identified in a comparison will be due to the cartel. Any remaining differences between the markets would need to be identified and controlled in a similar fashion as discussed above in

⁶² These instances are, however, rare. See for example US Detroit Automobile Dealers Association (DADA). In 1984, the FTC alleged that the automobile dealers violated federal antitrust laws through a conspiracy to limit competition in the sale of new cars in the Detroit area by closing dealerships on Saturdays and most week nights. In addition to a cease and desist order concerning the fixing of opening hours, the FTC also imposed a behavioural remedy requiring the dealers to be open a minimum amount of hours during the week in order to avoid dealers simply sticking to the previously agreed upon opening schedules that at this stage were a natural focal point. In general the use of behavioural or structural remedies is rare in cartel cases despite the fact that tacit collusion may become much more practicable in the aftermath of a cartel phase as argued by Connor (2004). This is essentially the argument that a cartel agreement may reinforce or create focal points although one could legitimately inquire about the need to form a cartel structure based on regular meetings if indeed one initial meeting may have been enough to make a particular focal point salient.

the context of time series analysis. While such comparisons could be made between geographic markets or even distinct but comparable product markets, comparisons could also be made between individual firms.

Deriving the counterfactual price based on cross-sectional comparisons can take the form of simple comparisons of averages⁶³ or regression techniques. These regression models would proceed similarly to the regressions discussed in the context of time series analysis with the exception that the binary dummy variable would now identify the two comparator markets. The advantage of a regression approach is that it will allow for controlling identified differences between the comparators. **8.063**

One of the problems with this method, already touched upon previously, is that if another geographic or product market is truly comparable to the cartelised one, there are good reasons to believe that the incentives to cartelise are also similar, so that it cannot be avoided that one cartelised market is compared to another, thereby substantially underestimating damage. An advantage of this method compared to the simplest time series analysis that allows for structural breaks is that the beginning and end phases of the cartel are determined endogenously. **8.064**

3 Difference-in-differences method

A superior alternative is the so-called panel data analysis that combines the before-and-after and the geographic comparator method for estimating the counterfactual price. This method is based on a simultaneous observation of price developments through time on the cartelised market and on one or several comparable but geographically separated markets. This method, which is also known as the difference-in-differences method, allows a more precise estimation of the cartel-induced price increase. It analyses and compares the differences in the price developments in the cartelised and the benchmark markets allowing a more precise estimation of the cartel-induced price effect as changes in price that are, for example, identified in a time series analysis, may now no longer be attributed solely to the cartel but could for instance also be traced back to an increase in cost that affects all companies irrespective of the geographic market they operate in. Also, constant differences between the two geographic markets can be accounted for, as in the case of different production technologies. **8.065**

⁶³ The average or arithmetic mean is the sum of all observations divided by the total number of observations. Possible alternatives are comparisons based on median or mode prices, that is, the price of the firm in the middle of a price ranked distribution or the price observed with the highest frequency respectively.

8.066 As the difference-in-differences method can be considered a combination of time series analysis and cross-sectional analysis, either the average prices in the two markets can be compared or additional factors can be considered by using a regression analysis. Two dummy variables, one for the cartelised market and one for the cartel period are introduced, as well as an interaction term that is defined as the product of the two dummy variables. The estimated coefficient of this interaction term gives an estimate of the cartel-induced price increase. Application of the difference-in-differences method, however, often encounters data constraints, so that the basis for a time series comparison across different geographic markets is not always given. Suitable comparisons between similar product markets, that is, a comparison of markets for similar products in which the market is not distorted by cartel agreements, can generally only be found in exceptional cases as the differences in production processes, cost structures and demand as well as competitive conditions will render a meaningful comparator market extremely difficult to find. In addition, the caveats mentioned in the context of a geographic market comparison also apply here, that is, the problem that the market may also be cartelised.

4 Simulated comparator markets

8.067 As a result, there will be a number of situations where neither a convincing geographic market nor product market can be found and also the application of the before-and-after method will not be fruitful. In such cases, one could resort to a simulated, that is, an artificially constructed, counterfactual market. Similarly to simulation models used in merger control, a model from industrial organisation theory would need to be designed that reflects the competitive situation on the concerned market as precisely as possible. Depending on the cartelised goods, the central competition parameters and the allocation mechanism, one could resort to standard oligopoly models with homogenous or differentiated goods and quantity competition (Cournot models), oligopoly models with differentiated goods and price competition (Bertrand models) or auction models, that would typically need to be tailored to the specific parameters of the concerned markets, for example, concerning entry barriers, capacity constraints or demand fluctuations.

8.068 Based on demand data, information on the quantities sold and on costs and prices, an empirically based model of the market could be designed that would allow the simulation of the market outcome, that is prices and quantities, that would probably have prevailed in the absence of the cartel. In addition to the question of data availability, such an approach is confronted with two fundamental conceptual problems. The first problem concerns the degree of coordination that the firms achieved in the cartel. Under perfect coordination, the cartel would choose a price that maximises total cartel profits, that is, it would

act as a monopolist on the cartelised market. For various reasons, for example a possible market entry by potential competitors or an incomplete market coverage, a cartel might be able to achieve only a partial coordination, so that the cartel price remains below the profit-maximising price a monopolist would charge.⁶⁴ As a result, it is important to explore whether, and, if so, to what extent the cartel price was below the monopoly price. The second conceptual problem lies in identifying what price would have prevailed in the market absent the cartel agreement. This in turn depends on the intensity of competition absent the cartel agreement. This intensity may have been relatively low in the first place, for instance if the market is characterised by a small amount of similar companies operating on a transparent and stable market with limited innovation and the existence of an effective punishment mechanism. In such a case, a relatively high counterfactual price would result and the cartel-induced damage would correspondingly be limited. It is not appropriate to generally presume that the counterfactual is given by the maximum degree of competition that the oligopoly model adopted to simulate the market allows. If the damage is supposed to be estimated as accurately as possible, the possibility of a lower intensity of competition in the absence of the cartel needs to be considered. This is analogous to other areas of competition law such as merger control, where coordinated conduct is taken into consideration.⁶⁵

5 Cost-based and profitability-based approaches

An alternative comparator-based method for determining the counterfactual scenario involves using the variable cost of production and adding an appropriate mark-up in order to derive a counterfactual price in a 'bottom-up' way.⁶⁶ The mark-up could be estimated using information on margins in comparable competitive markets or theoretically determined information. Thus, these methods can also be considered as comparator-based approaches.

The use of the variable cost raises some questions because cartelised firms may have inflated costs due to X-inefficiencies and/or may simply face higher variable costs due to the reduced cartel output and economies of scale. With multiproduct firms there is the additional problem of common cost allocation. To solve these problems, variable costs would need to be compared and adjusted based on information on the variable costs of firms in competitive markets, which can be fraught with difficulties.

⁶⁴ Due to factors such as the existence of potential mavericks or a competitive fringe, the level of coordination will often be less than perfect. Even when firms are all interested in coordination, production technologies are likely to diverge sufficiently for marginal revenues not being equal to marginal costs for all cartelists, implying that coordination is not perfect even if compensatory side-payments are envisioned.

⁶⁵ See Inderst and Schwalbe (2011).

⁶⁶ See Konings et al. (2001) on mark-ups.

8.071 Whereas the presented methods emphasise the estimation of prices and quantities in the counterfactual scenario, other methods focus on profitability or price-cost margins directly. For a cartel on an input market, it will generally be the case that cartel profits increase, whereas the profits of purchasers decrease.⁶⁷ As the bulk of the cartel damage is based on the transfer of wealth from the purchasers to the cartelists, increases or decreases in profits can be used as an indicator of damage.⁶⁸

8.072 To measure profitability, two general concepts can be used. On the one hand, an accounting approach focussing on the profitability of the firm based on the return on capital employed (ROCE) can be used, or, on the other hand, a finance approach can be used that, drawing on the capital asset pricing model (CAPM), is based on net present value (NPV) and the internal rate of return (IRR).⁶⁹

8.073 An alternative method for estimating the profitability or the change in profitability is the calculation of the price-cost margin or, stated otherwise, the percentage mark-up. In this context, the cost concept is crucial and long run average incremental costs (LRAIC) are typically considered the most suitable cost concept.⁷⁰ These costs are defined as the average of all variable and fixed cost associated with the production and supply of a particular good in relation to the total quantity produced. Stated otherwise, the LRAIC denote the costs that would be saved if in the long run the production of the good would be stopped. Due to the long-run perspective, not only the variable cost but also the fixed cost that could be saved are taken into account. A change in the profitability as indicated by this method could equally be considered an indicator for the transfer and therefore for part of the damage caused by the cartel.

B Damage quantification in abusive conduct cases

1 Damage caused by abusive behaviour and the counterfactual scenario

8.074 To estimate damages resulting from abusive conduct, the same basic conceptual framework as in the case of cartels applies. The actual situation with the infringement has to be compared to the hypothetical counterfactual situation in the absence of the abuse. The damage is then the difference in wealth of economic actors in both scenarios. A practical application, however, is often

67 As was explained in section II.A, the change in profitability of the purchasers depends on the price and quantity effect which in turn depends on downstream demand.

68 The increase in profits of the cartelists being the lower bound of total damage if no quantity effects are considered. As shown in section II.A, this lower bound may be far off.

69 See OECD (2012a: 63–66); and Gregory (2011).

70 See OECD (2012a: 66–70).

fraught with severe difficulties. In what follows, the general problem of constructing a suitable counterfactual scenario in abuse of dominance cases is discussed. As this differs in cases of exploitative and exclusionary abuse, these two cases are dealt with separately. Section III.B.2 discusses the practical problems in the quantification of damages in the case of an exclusionary abuse by means of some examples. Damage calculations in abuse of dominance cases are usually more difficult than in cartel cases and this may also be the reason that to the best of our knowledge there is no empirical study estimating the damage caused by abusive conduct.

a Exploitative abuse

If a dominant firm charges an excessive price, the comparable geographic market or the before-and-after method can be employed, for example, time series analysis or cross-sectional data, provided that the data exist and that a suitable comparator market can be identified. The former could be an appropriate approach if the dominant firm is offering the product in question in another geographic market where it is confronted with competition at a lower price. Of course, differences in the geographic markets, for example, concerning the demand behaviour or supply cost, would need to be considered. Alternatively, cost-based methods could be used in order to determine the counterfactual price.⁷¹

From an economic point of view, to what extent the behaviour in a different market or, more generally, the terms for other buyers or suppliers can be considered a suitable counterfactual scenario is important. This can be illustrated using an example of retailers with different degrees of market power vis-à-vis producers. If retailers have different degrees of market power, they can negotiate different contract terms with the producer. This buying power may have been achieved by establishing strong customer loyalty or by serving certain regions. In these cases, a producer would be willing to accept inferior conditions as the retailer has a special position and cannot be substituted easily by a different retailer. Also, a retailer with buyer power could negotiate different contract terms for different suppliers or in different regions. If this depends on different substitution options, the different contract terms only reflect market forces. In this context the question arises as to whether the retailers were able to achieve a position of market power by competition on the merits or by abusive

71 Under an excessive price abuse, the finding of an excessive price implies the definition of an appropriate counterfactual price, at least implicitly. While competition authorities will try to avoid indicating the threshold price at which the price would no longer be considered excessive, the decision of the authority in case of a follow-on claim for damages will contain more clues as to the counterfactual price than for example a cartel decision. On excessive price abuses and the available methods to determine whether a price is excessive see again OECD (2012a).

practices. Only in the former case, can such a market be considered a suitable comparator market.

- 8.077** In case of an exploitative abuse in the form of price discrimination, leading to price increases for purchasers with a less elastic demand, the question arises as to whether the higher price level or the price discrimination is considered a breach of competition law.⁷² With respect to the damage quantification, this could make a substantial difference. While in the first case the higher price may have to be reduced to the level of the lower price, the second case requires determining the uniform price the firm would have charged in all markets and for all consumer groups. Furthermore, it has to be considered that under a uniform price the firm might not have served all markets given the uniform price constraint. A reasonable approach to quantifying the damage could involve deriving the appropriate counterfactual by using an empirically calibrated industrial organisation model, for instance a model with a dominant firm and a competitive fringe, to determine the counterfactual price absent the discrimination. Also, the market prior to the introduction of differentiated prices or another geographic market where a single price prevails could be considered. It has to be examined, however, whether different market conditions could be the reason why the firm has chosen a different pricing scheme.

b Exclusionary abuse

- 8.078** To calculate the damage caused by an exclusionary abuse, the situation that would have occurred in the market absent the exclusionary abuse will have to be assessed in order to address the question of what profits competitors would have been able to obtain in the counterfactual scenario and what prices the purchasers would have had to pay.
- 8.079** In terms of comparator-based methods, the primary candidate generally is the before-and-after method, that is, a consideration of the market prior to the initiation of the exclusionary strategy.⁷³ As an exclusionary abuse typically unfolds in time and in different phases, a comparison with a unique moment in time only provides an incomplete picture of the effects. Normally, the question would need to be answered about how the market would have developed had the anti-competitive conduct not taken place. This could for instance be highly relevant in a market with network effects. In the case of a dominant firm preventing another company from winning a critical mass of consumers and

⁷² Buccirossi (2010) emphasises that it is crucial to determine what anti-competitive practice generated the damage so that it becomes central to develop a full theory of harm in the context of damages claims if they are not follow-on actions.

⁷³ Focusing on the market prior to the introduction of the exclusionary strategy may turn out to be problematic as the market structure may have completely changed as a result of the abuse.

taking over the market, considering the situation prior to the abuse may not be a particularly meaningful counterfactual scenario as the other company would have earned substantial profits in the absence of the abuse in the meantime.

In all likelihood there will also be no comparable geographic or product markets that come close to the market at hand. In order to guarantee a minimum degree of comparability, the market would need to exhibit a similar concentration, comparable cost structures as well as similar demand conditions, something that will be rather rare. Therefore, many of the empirical methods discussed in the context of cartels cannot be applied because the necessary data are not available. **8.080**

A further conceptual problem exists in establishing what is implied by 'in the absence of the exclusionary abuse'. This is unclear as there are a multitude of possible scenarios that a dominant firm could have followed in order to achieve competition law compliance and these different scenarios are likely to have entailed very different market outcomes. For instance, in case of exclusion through a retroactive rebate, several possibilities ranging from a linear price to a two-part tariff or an incremental quantity discount could be appropriate counterfactual pricing schemes, all entailing potentially different market outcomes. In principle, the counterfactual scenario would have to be characterised by an oligopolistic equilibrium in which the dominant firm maximises profits under the constraint of complying with competition law.⁷⁴ In some cases the possibility may exist to develop such a counterfactual scenario, for example, in the case of tying. In such instances the question concerning what profits the competitors of the dominant firm would have made absent the tying, that is, in case the products had also been sold independently, would need to be answered. In other cases of exclusionary abuses, however, as for instance in the case of entry barriers, the construction of an economically well-founded counterfactual is likely to be difficult. A possible solution in these cases could be a simulation-based approach. Here, a simulation model of the market would have to be developed that might give an indication of the possible development of the market absent the abusive behaviour. To apply simulation techniques, the relevant data have to be available to calibrate the model. If these data are lacking, they have to be substituted by reasonable assumptions. **8.081**

For these reasons, estimating damages in exclusionary abuse cases often has to rely on a more or less rough estimation of the lost profits of competitors and the **8.082**

⁷⁴ It should, however, be noted that the doubts voiced earlier with respect to the likelihood of a profit-maximising equilibrium being reached in a cartel context, equally apply here. In particular, if the firm reaches a high level of independence, one will not be able to rely on (evolutionary) market forces 'pushing' the firm to such a profit-maximising equilibrium.

damage that accrued to the purchasers as opposed to a comparison between the actual and a fully developed hypothetical counterfactual. When using such a rough estimate, the conditions of the relevant market should be taken into account such as the size and geographic extent of the market, the importance of entry barriers, the type of products traded (homogenous, differentiated, intermediate or final goods), the market development, the degree of innovation, etc.

- 8.083 All things considered, it becomes clear that the type of abuse plays a central role in the derivation of the counterfactual and therefore also in the precision with which damages can be estimated. Whereas it is relatively clear what scenario would have obtained but for the infringement in cartel and exploitative abuse cases, the determination of the appropriate counterfactual scenario may be much more difficult in exclusionary abuse cases.⁷⁵ Firstly, it will be difficult to find suitable comparator markets, and secondly, a multitude of alternative business strategies conforming to competition law conduct exist. Thirdly, the market may have developed very differently in the absence of the abuse.

2 Illustration: quantification of damages in case of an exclusionary abuse

- 8.084 As demonstrated in section III.B.1, the damage estimation in an exclusionary abuse context is generally much more complex than in cartel cases or cases of exploitative abuse.⁷⁶ On the one hand, exclusionary abuses typically unfold in different phases, some of which will potentially affect economic actors positively and others negatively. This considerably increases the complexity of the analysis. In addition, it has to be considered that usually different exclusionary practices will have different competitive effects. A predatory strategy for example may result in the exit of a competitor, whereas other practices may result in entry being barred. In what follows, the complexity of the quantification of damages is illustrated using an example of an exclusionary abuse that aims at the market exit, or at least the marginalisation, of an actual competitor.
- 8.085 The actors affected by an exclusionary abuse are primarily the direct competitors and the purchasers of the products of the dominant company. In addition, suppliers of firms that were forced to exit the market are affected. In the following, the quantification of damages is analysed in the context of an exclusionary abuse aiming at the foreclosure, or at restricting the expansion of, a competitor. An exclusionary abuse typically proceeds in several phases. In phase one a competitor is forced to exit the market. The increase in market power is

⁷⁵ This difficulty is exacerbated by the fact that competition authorities will only indirectly have investigated the relevant aspects in bringing their infringement case, something that is typically done in exploitative cases.

⁷⁶ This may be one of the reasons that there is almost no literature focusing on the calculation of damages in exclusionary abuse cases. A notable exception is the contribution by Fumagalli et al. (2010) that introduces the notion of different damages at relevant phases that we will partially follow here.

then exploited by the dominant firm in phase two by higher prices and increased profits. In the following phase (phase three), after the abusive behaviour has ceased, new (or re-)entry may occur. This phase is therefore characterised by a restoration of competitive conditions. An important aspect of phase three also concerns the remedies that the competition authority may impose. In contrast to cartel cases that typically end with a cease and desist order and the imposition of fines, abusive practices trigger behavioural or structural remedies. As a result, assessing harm in the context of such cases may involve taking into account potential benefits that are due to remedies imposed by the competition authority.

a Phase one

In the first phase of an exclusionary abuse, the profits of competitors and their market shares would decline. This phase would continue until the competitor(s) leave(s) the market or, if there is no exit, until the market shares stabilise at a comparatively low level, implying the marginalisation of the competitor(s). The dominant firm can, depending on the strategy adapted, continue to earn profits, as is for instance the case in retroactive rebates. It is, however, also possible that the dominant firm is realising losses in the first phase, as would be the case under a predatory strategy.⁷⁷

The repercussions for purchasers of the firms depend in this phase on the type of abuse. In case of a predatory strategy, the repercussions on purchasers are in all likelihood positive. They pay lower prices for the products than they would have paid in the absence of the predatory strategy. Similar arguments apply in case of a margin squeeze where low prices will also be observed. These effects can propagate and also reach indirect purchasers that would equally benefit from the predatory prices. Different repercussions on purchasers arise if the abuse is focussing on an increase in input prices (raising rivals' costs) or refusal to deal. In such instances the costs of competitors increase so that the price level on the downstream market tends to increase and purchasers pay higher prices than in the absence of the infringement. Repercussions for indirect purchasers are also likely in this case.

b Phase two

In a case where the abuse leads to exit, the competitor is unable to realise any profits in the second phase and may under certain circumstances even have to

⁷⁷ The question is not necessarily whether overall profits are positive or negative but rather whether there is a profit sacrifice that would require at least probabilistic future recoupment to make the strategy profitable, or whether exclusion may be compatible with profit maximisation considering only the first phase. Both scenarios are possible and depend on the abuse.

bear sunk costs.⁷⁸ The bulk of the damage to the firm therefore comes from lost profits. In a case where the competitor remains in the market, albeit with lower market shares, it would be able to realise profits in the second phase but the profits are substantially lower than in the absence of the abuse. Also, in this case the damage is in the form of lost profits. The dominant firm in contrast has reached its goals in the second phase and is able to reap the benefits of increased market power by setting higher prices and earning higher profits.

- 8.089 Concerning the repercussions of the abuse on the purchasers, they are analogous to those of a cartel or an exploitative abuse. Direct and indirect purchasers pay higher prices. In addition to this, there is also damage in the form of reduced choice. In particular, in markets with differentiated products the elimination of competitors reduces the product variety and thereby reduces consumer welfare.⁷⁹ Proving and quantifying such damages is, however, difficult. Suppliers of the dominant company face a lower demand due to the reduced quantities supplied by the dominant firm. This results in damage in the form of lost profits.

c Phase three

- 8.090 The third phase starts with the end of the abusive practice, typically, at least in follow-on suits, roughly before the decision to cease the abuse by the competition authority. The third phase is in some sense the reversal of the first phase, although the damages calculation in this phase is likely to be extremely difficult already due to the added complications in the form of very likely behavioural or structural remedies imposed by the competition authority. Generally speaking, the third phase will see a return to competitive conditions, implying the entry of new competitors or the re-entry of the firms that exited, or corresponding increases in market shares of the firms that were marginalised. As a result of these developments the profits of the dominant firm decrease irrespective of any potential fine imposed by the competition authority, and the profits of competitors would increase. The third phase can be considered to be terminated once a situation takes place that approximates the situation that would have existed in the absence of the infringement. Once an approximation of the situation occurs some competition authorities, notably the European Commission, are obliged to effectively end the infringement, which also implies removing the possibility of any future recurrence of abuse which may preclude the return to a situation as it existed prior to the abuse.⁸⁰

78 Of course it would be incorrect to add the sunk costs to a calculation of damages based on lost profits. A firm can either claim the sunk costs or the lost profits, but not both.

79 Fumagalli et al. (2010: 209).

80 The obligation of the European Commission to effectively end an infringement implies that any future recurrence needs to be prevented. While it is not possible to develop the details concerning behavioural and

In particular, outside the context of follow-on claims, the abusive practice may have resulted in permanent changes to the market structure that are not impacted by compensatory payments so that the third phase does not lead to an approximation of the situation prior to the infringement. Even if a decision by a competition authority exists, a dominant firm may have been able to build up a reputation of fighting market entry with predatory prices.⁸¹ In such a case, entry would not be observed immediately and may eventually occur only after a long time has passed. 8.091

A similar problem exists in cases of an exclusionary abuse that does not aim at the foreclosure of a competitor already active in the market but which targets potential competitors that are kept from considering entry. In such a case, potential competitors are harmed in the form of the lost profits that they may have been able to realise after entry. Possibly this has led to entry in another, less lucrative, market, where a lower profit was realised. In this context it is also important to consider the technology a potential competitor would have used upon entry, that is, whether it would have deployed a superior, inferior or identical technology. Without additional information or proof that the company could have produced more efficiently, it may be useful to assume that such a competitor would have entered using the same technology, exhibiting a similar efficiency as the dominant undertaking. 8.092

In order to estimate the damage that accrued to the different actors in the different phases, a comparison with the counterfactual is necessary. As already discussed in section II.B, this is considerably more complicated in exclusionary abuse cases than in cartel or exploitative abuse cases. In order to fully utilise all available information, it seems appropriate to consider several realistic counterfactual scenarios that are compatible with the underlying characteristics of the markets in question. Different scenarios could be generated by utilising different approaches from the tool kit of factual and hypothetical comparator methods. They could also be generated by varying some of the crucial determinants of the outcome in a simulation model used in the hypothetical comparator approach, which would further increase the robustness of results derived with these methods. In order to explain the quantification of damages in this context, a particular counterfactual scenario is considered. For the 8.093

structural remedies as well as the Commission's mandate here, it is clear that the European Commission has imposed structural remedies so far only in cases where behavioural remedies were unlikely to be effective in terminating the abuse *and preventing any future recurrence of the abuse*. As the situation prior to phase one clearly was not a situation that prevented the future abuse, the Commission will be bound to choose remedies that exclude the possibility that the end of phase three results in the same situation as existed prior to phase one. Any remedy falling short of this could actually not be considered a suitable remedy. On the issue of remedies see Maier-Rigaud (2012).

81 See the classic paper by Selten (1978).

competitors, the profits obtained during the different phases would need to be compared with the profits obtained in the counterfactual scenario. As an exclusionary abuse can target the revenues or costs of competitors, it may be useful to estimate the change in profits of the competitors through a separate analysis of the development of revenues and costs. Such an approach could facilitate the distinction between changes in profit that are not due to the abusive conduct and those that are due to the abusive conduct. Generally speaking, reduced sales result in cost changes so that changes in profit can be derived from the difference between revenues and changes in cost.

- 8.094 As discussed in section III.A, when quantifying damages, all those factors have to be controlled that bear no causal relationship with the incriminated behaviour. The extent to which the factors have an impact on the profits follows from the respective multivariate regressions. The quantification of damages is thus corrected for the effects of these factors. An important factor in this context could be the business model used by the firm, which may differ in situations with and without abusive conduct. In principle, the econometric methods allow for an estimation of the impact of these factors on cost, revenues and profits and the determination of the extent to which the changes in profits can be explained by these factors. Depending on the case at hand, however, this may be difficult. For an estimation of the damages that is as precise as possible, it is, however, of central importance to identify all these factors and to control them in an econometric analysis. Otherwise, it is possible that changes in profits will be attributed to the abusive conduct even though the changes will have had – at least in part – different causes.

C Further aspects of damages quantification

1 Compounding and discounting damages

- 8.095 In general, the harm caused by a competition law infringement usually occurs at a different point in time to the payment of compensation to the injured party. In order to also compensate the injured party for their financial loss, knowledge of that loss needs to be available, otherwise it is necessary to calculate the present value of the damages at the time of compensation. From an economic point of view, the choice of the rate of interest used for compounding is non-trivial. The choice depends on whether an *ex ante* or an *ex post* consideration is used.
- 8.096 Consider for example the case of a firm that has been forced to exit a market. To simplify the analysis we assume that the infringement occurred at a single point in time. The damages in the form of lost profits, however, accrued until the time of compensation. *Ex ante*, that is, at the time of the infringement, the profit that the injured party might have realised if it had not been forced to exit the market

was uncertain as, for example, business fluctuations or the market entry of other firms could not be predicted with certainty. According to an *ex ante* analysis, the damages should not be computed retrospectively, but from the point of time of the infringement as the expected lost profit. This ensures that the injured party is in the same position as it would have been in the absence of the infringement. The expected profits that may have been realised without the infringement have to be discounted to the point of time of the infringement using a risk-adjusted rate of interest. This rate of interest is based on the cost of capital of the injured party. Finally, this amount is then compounded to the point in time when the compensation is paid. As this amount is no longer subject to any uncertainty, the risk-free interest rate is proposed for the compounding.

An *ex post* assessment, however, considers only the realised damages, that is, the profit that the firm would have realised given the factual situation without the infringement. In the case of an on-going infringement, as for example in the case of a price cartel, the differences between the two approaches disappear. The computed damages for the respective period are compounded to the point in time of the compensation. In this case, the use of the risk-free rate of interest is again recommended. 8.097

Under an *ex post* approach it might be necessary to take that damage into consideration that might be caused by after-effects as in the case of cartels. Also, abusive practices can exhibit considerable after-effects that may lead to future damages that have to be discounted to their present value. These damages should be considered using the *ex ante* approach by discounting the expected damages with the cost of capital of the damaged firm.⁸² 8.098

2 Estimation of after-effects

In the context of damage caused by cartels or abusive behaviour, it has been pointed out that after-effects caused by a competition law infringement may extend beyond the period when the infringement occurred. In some cases the after-effects might even extend beyond the point in time of the compensation. As this damage bears a causal relationship with the infringement they should be included in the calculation of damages. As it can be assumed that the injuring party at the time of compensation and further on will refrain from the incriminated behaviour, these after-effects are not equally relevant for all types of anti-competitive behaviour. As an example, the after-effects of a price cartel are considered.⁸³ Here, prices could be above the competitive level even after 8.099

⁸² Note, however, that eventual remedies imposed by the competition authority may mitigate or fully reverse these after-effects.

⁸³ The discussion is based on Inderst and Jakubovic (2013).

the cartel has been abandoned as the explicit collusion during the cartel period could help to establish an implicit collusion, or the higher prices might continue because of long-term contracts. Also, the former cartel members could have an incentive to charge higher prices than under competitive conditions to artificially increase the estimation of the counterfactual price and to thereby reduce the damages claims.⁸⁴

- 8.100** If these after-effects are not taken into account, the damage that occurs after the cartel period will be disregarded, and there is also the danger of underestimating the damage during the cartel period. This happens if the time after the cartel has been detected is considered to be part of the comparator market. As the prices are above the competitive level due to the after-effects during this time period, the counterfactual price is too high and thus the damage during the cartel period is underestimated. There are, however, methods available that avoid this problem. For example, when using the 'dummy approach' the cartel dummy gets a weight of 1 during the cartel period, but is not immediately set to 0 after this period, but instead only gradually reduced.⁸⁵ If there are after-effects because of long-term contracts and lagged price adjustments, these can be estimated using price data from periods before the cartel ended. This includes the cartel period if it is assumed that prices are adjusted with a comparable lag if for example costs have changed. This lagged price adjustment is taken into account in a regression by letting the current price level depend to a greater or lesser extent on the past price level.⁸⁶

3 Accuracy of statistical methods

- 8.101** Of central importance when considering the different econometric methods discussed above are the properties or the theoretical accuracy of the respective models or estimators used to calculate for example the counterfactual price. Statistical theory is concerned with the properties of different estimators or models and their robustness. An important empirical trade-off exists, for instance between using an unbiased estimator with a low precision versus a biased estimator with a high precision. In order to understand what is meant by biased (or unbiased) and by the precision of the estimate, consider the estimate derived from an unbiased estimator. This estimate may have a very low precision, that is, be far away from the true value despite the fact that the

⁸⁴ See Harrington (2004).

⁸⁵ See for example Hüschelrath et al. (2012) for an application. The functional form this reduction takes has to be assumed according to the facts of the individual case.

⁸⁶ This can be estimated by first considering a model for the profit-maximising price which is then combined with a model that describes the price adjustment process. This price adjustment model can be interpreted in a way that only some firms adjust their prices and all other firms keep their prices unchanged. For details see Gujarati (2002: 673).

method, that is, the estimator, was unbiased. The reason for this is that an unbiased estimator leads to unbiased estimates *on average*. This can be visualised by considering a normal distribution with a high variance around the true mean. If the distribution has a high variance but the mean is the true mean, the estimator is unbiased. This unbiased average could, however, be obtained solely by estimates that over and underestimate the true value substantially, so that (and here we leave the example of a normal distribution) no estimate actually reflects the true value and the estimator is only unbiased because the deviations from the true value cancel each other out. As a result, it may be preferable to take recourse to biased estimators such as structural empirical models with a high precision, that is, a low error margin in individual estimates although the estimator is biased, than to resort to an unbiased estimator that generates estimates with large errors, that is, is less precise.⁸⁷ In the context of the discussion of methods above, the more the economic model is enriched with assumptions that are imposed on the estimation, the more precise the estimates are likely to be, although results may be biased if not all relevant effects are taken into account or some assumptions are incorrect.

An additional consideration in the empirical analysis of damages is the concept of practicality as for instance developed in OECD (2011: 22). A methodology is practical when it yields a verifiable and transparent estimate within a reasonable timeframe and the proportional use of resources. Verifiability and transparency depend largely on data submission and presentational format, that is, the submission of raw data together with any documentation of adjustments and the statistical procedure used that would allow a replication of the results presented. **8.102**

Regarding the significance of statistical results, higher than usual p-values could be considered as the *a priori* probability of the but-for price in the context of a condemned cartel being significantly lower than the cartel price, for example, is not 50 per cent but substantially higher, as has been pointed out by Fumagalli et al. (2010).⁸⁸ It may therefore make perfect sense to take the fact that an infringement was established into account in follow-on damages claims. **8.103**

⁸⁷ This trade-off is considered using the weighted square error criterion.

⁸⁸ The statistical bases for hypothesis testing using the usual significance levels rest on a high data quality and the additional assumption of an *a priori* equal probability of rejecting or not rejecting the null hypothesis, for instance to find a statistically significant difference between actual and counterfactual prices. As both these assumptions are typically not fulfilled in follow-on damages claims, lower significance levels could be considered.

4 Remoteness and causality

- 8.104 In addition to the effects that a cartel or abusive behaviour causes, the aspects of remoteness and causality have to be considered. Remoteness often refers to the 'distance' between the harmed party and the infringement, for example in a value chain, where an indirect purchaser or indirect supplier of a cartel would be considered more 'remote' or 'distant' than a direct purchaser or supplier, but it may also relate to the types of effects constituting the harm suffered.
- 8.105 Regarding the former, it has already been noted in section II.A.2 that the quantification of damages may not necessarily be easier for those occurring, for example, in a direct interaction with cartelised firms as opposed to firms that are more remote. Nevertheless, the more remote the damage caused by the infringement either within or outside the value chain, the more difficult it is usually to demonstrate causality.⁸⁹ While damages do not necessarily decrease with distance from the cartel or the abusive behaviour (the example, section II.A.3 demonstrated that damages may substantially increase), proving causality may also not necessarily become more difficult, as demonstrated, for instance, in the case of products that are complementary to the cartel product. In any case, remoteness is certainly not a criterion that would allow discrediting damages claims of more remote firms *a priori*. So while remoteness understood in this way may be one of the indicators that could be used to predict the chances of winning a damages claim, economic causality will be fulfilled irrespective of whether claimants are direct or indirect purchasers, suppliers or competitors, or may be harmed by the cartel or the abusive behaviour in an even more indirect way.
- 8.106 Remoteness and the idea that a causal relation may be less likely to be satisfied for different types of harm usually refers to the damage attributed to price and quantity effects. As the US courts do not award damages for quantity effects, or opportunity costs in terms of lost profits, except under specific circumstances, one may develop the idea that price effects are less 'remote' than quantity effects, not least as price effects are normally evidenced by transactions of a certain volume at the higher prices caused by the infringement, whereas quantity effects can typically not directly be evidenced. As the presentation in section II demonstrated, this is economically unfounded. In all but special circumstances will a firm that has been harmed by a price effect also have been

affected by a quantity effect. Indeed, the harm from the quantity effect may be more substantial than the harm from the price effect.⁹⁰ From that point of view, it is hardly tenable to award damages based on price effects and deny damages for quantity effects on the basis that these are supposedly more remote.

In practice, price effects can be calculated based on the quantity purchased and the difference between the factual and counterfactual price. If this is done at every level of the value chain, one gets the respective price effects. To calculate quantity effects one requires, in addition, information on the counterfactual quantity. At least theoretically, the calculation of the counterfactual price implies knowledge of the corresponding quantity so that the informational requirements are similar.⁹¹ *A priori* it is therefore unclear why it should be considered much more difficult to estimate damages based on quantity effects as opposed to price effects.⁹² 8.107

From an economic point of view, one should therefore exert a certain level of caution regarding the idea that distance or remoteness, irrespective of whether it is understood as distance of the victim to the cartelised market or referring to price and quantity effects, will have a bearing on causality. While there may be practical and empirical considerations that will render 'remote' damages claims statistically less likely to be successful *ex post*, there is no economic basis for discarding such 'remote' claims *ex ante*. 8.108

IV CONCLUSIONS

The estimation of damages for individual consumers or firms is a difficult task, fundamentally requiring a comparison between the wealth position of a firm or consumer in the presence and absence of an infringement. The preceding sections analysed damages in terms of price and quantity effects, rejecting the division of price effects into an overcharge and a passing-on calculation. Clearly, it is possible to reconcile an estimation of damages based on an overcharge calculation that would only subsequently net out what has been 'passed-on' with a price effect analysis, but in the absence of a legal regime making such distinctions there is no convincing argument why such an approach would be superior to a direct calculation of price effects. As a matter of 8.109

⁸⁹ Generally speaking, causality refers to the requirement that all estimated damages have to be linked to the infringement in the sense that they would not have occurred in the absence of the infringement (the so-called 'but-for' test). If, for instance, important inputs to the dominant firm increase in price during the excessive price period, these input price increases would have resulted in increased prices even in the absence of an excessive price abuse. As a result these effects need to be separated from the pure excessive price effects for which causality can be demonstrated. See Chapter 5 for a discussion of the legal notion of causation.

⁹⁰ See Maier-Rigaud (2013).

⁹¹ The calculation of quantity effects for final purchasers (firms or consumers) requires additional information concerning the shape of the demand function and the cost curve between the relevant price/quantity combinations.

⁹² Even if one is willing to accept concepts as crude as the illegal gain as an approximation for reasons of simplicity or procedural efficiency, for example, it is not clear why quantity effects could not similarly be approximated.

fact, any argument advanced in favour of such a subdivision of price effects could only take recourse to the argument that such an approach may empirically be easier to follow. The information requirements for calculating overcharge and passing-on are, however, identical to those for calculating price effects.⁹³ In addition, the focalisation on price effects divided into overcharge and passing-on has led to an asymmetric treatment and ultimately a neglect of quantity effects in the analysis.⁹⁴ The justification advanced for such a step-motherly treatment of quantity effects has been that the estimation of quantity effects is more difficult than the calculation of price effects. As has been shown, calculating quantity effects requires only insignificantly more information than calculating price effects but assures that all damage is taken into account in the calculation. The calculation of both price and quantity effects should therefore also be used if a rebuttable presumption is introduced, as was recently suggested by the European Commission.⁹⁵ A further benefit of such an assessment of damages is that it automatically dispenses with the debates surrounding passing-on and standing that have unnecessarily muddled the waters of the literature on damages claims in EU competition law.⁹⁶

8.110 While estimating damages in cartel and exploitative abuse cases is, at least on a conceptual level, relatively straightforward, it is much more complicated to quantify individual harm in exclusionary abuse cases. In particular the construction of one (or several) realistic counterfactual(s) in exclusionary abuse cases will require further economic research.

8.111 Questions with respect to the appropriate counterfactual also arise with respect to market developments when the infringement has been terminated. It is not clear how to incorporate any future reduction in competition due, for example, to focal points in cartel cases. Similar difficulties exist with assessing damages in abusive conduct cases as effects may continue to play a role even if the conduct

⁹³ Calculating price effects is more difficult than estimating the overcharge, but calculating the overcharge is meaningless unless the cartel only sells directly to final consumers, allowing the passing-on problem to be ignored. In addition, if claims are brought by indirect purchasers or firms outside the value chain, establishing the overcharge is likely to be more difficult than calculating price effects directly.

⁹⁴ See European Commission (2013).

⁹⁵ See European Commission (2011) and (2013). A rebuttable presumption focusing on the overcharge endangers the Commission's accomplishment of treating price and quantity effects equally. Should a rebuttable presumption solely focusing on price effects or overcharge be introduced this would likely result in quantity effects vanishing in actual damages cases. The normative power of a rebuttable presumption focusing exclusively on price effects, together with the US approach influencing the EU debate, may be sufficient to assure that quantity effects will play no role also in the EU, thereby undermining the goal of compensation.

⁹⁶ It is, for instance, not clear at all why the European Commission devotes a whole chapter to passing-on of overcharges (see European Commission (2013), Chapter IV of the proposal for a directive) in light of the compensatory goal of damages that by definition excludes an award of the overcharge and thereby naturally requires a focus on price effects, irrespective of whether these are calculated by adjusting an overcharge by passing-on or not. See Maier-Rigaud (2013).

has ceased. An analysis of effects in such cases is further complicated by the effect of remedies imposed by competition authorities. Generally speaking, competition law infringements that entail both positive and negative effects, such as tying that also reduces transaction costs, generate the need to net the harm and the gains that typically emerge across time in abusive conduct cases.

All these considerations imply that damages cannot be estimated precisely. It is for this reason that it would be sensible to move away from point predictions generating a particular number that is supposed to characterise the total damage to the individual consumer or firm.⁹⁷ The alternative is to state damages in intervals using upper and lower bounds that may naturally emerge from different estimating methods or underlying assumptions. The robustness of the estimation can be further increased by methodological pluralism and a variation of key factors in hypothetical comparator markets in the context of simulation methods.⁹⁸ It may even be possible to state the damage intervals in terms of confidence intervals,⁹⁹ indicating a certain probability for damages to lie within a certain range.

8.112

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⁹⁷ Point predictions unjustifiably imply precision and are very likely to be incorrect. They are very likely to be incorrect as the probability that a particular point estimate of damages corresponds to the actual damages is very close to zero.

⁹⁸ This would include a careful consideration of whether slight changes, for example in the underlying model or other assumptions, will entail substantial changes in the estimates.

⁹⁹ Confidence intervals in the context of damages claims would consist of a range or interval of damages estimates that act as good estimates of the unknown damages. The level of confidence of the confidence interval, expressed as a percentage, indicates the probability that the range or interval of damages estimates capture the true damages suffered by the victim. By definition, 100 per cent minus the level of confidence would indicate the probability that the true damages lie outside the interval, that is, are either larger or smaller than the damages indicated in the interval. In the context of a corresponding hypothesis test, this value is called the significance level.

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