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Guidelines for national courts on how to estimate the share of overcharge which was passed on to the indirect purchaser

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1. INTRODUCTION

1.1. Purpose and scope

(1) These guidelines intend to provide national courts, judges and other stakeholders in damages actions for infringements of Articles 101 and 102 of the Treaty on the Functioning of the European Union ("TFEU") with practical guidance on how to estimate the passing-on of overcharges. In particular, they set out the economic principles, methods and terminology concerning passing-on *inter alia* by reference to a number of examples. Further, these guidelines are designed to help determine the sources of relevant evidence, whether a disclosure request is proportionate, and assessing the statements of the parties on passing-on and any economic expert opinion that may be presented to the court.

(2) The legal basis for the guidelines is Article 16 of the Damages Directive[1]. They are non-binding and do not alter existing rules under EU law or the laws of the Member States. Accordingly, there is no obligation on a national court to follow them. The guidelines are also without prejudice to the case law of the Court of Justice of the European Union ("CJEU").

(3) As a reference source for good practices, the guidelines give indications on the relevant parameters that can be taken into account when dealing with economic evidence relevant for assessing the passing-on of overcharges. They build upon relevant economic studies gathered by the Commission and complement the Practical Guide on quantifying harm in actions for damages based on breaches of Article 101 or 102 TFEU ("Practical Guide")[2] accompanying the Communication from the Commission on quantifying antitrust harm in a damages action.[3] While the Practical Guide focuses on the overcharge, these guidelines specifically address in more detail the passing-on of such overcharges.[4] The Practical Guide and these guidelines should be read together.[5]

(4) As explained in paragraphs (16) *et seq.* below, these guidelines may be useful when an infringer invokes passing-on in its defence against a claim ("shield") or when an indirect purchaser claims damages from the infringer alleging passing-on of an overcharge ("sword"). However, as in any damages action, the degree to which the court has to consider the facts of a case will depend on the way the action is

(1) Directive 2014/104/EU of the European Parliament and of the Council of 26 November 2014 on certain rules governing actions for damages under national law for infringements of the competition law provisions of the Member States and of the European Union, OJ L 349/1, 5.12.2014.

(2) Commission, Staff Working Document – Practical Guide on Quantifying Harm in Actions for damages based on breaches of Article 101 or 102 of the Treaty on the Functioning of the European Union, 11.6.2013, SWD(2013) 205.

(3) Communication from the Commission on quantifying harm in actions for damages based on breaches of Article 101 or 102 of the Treaty on the Functioning of the European Union, OJ C 167/19, 13.6.2013.

(4) The Practical Guide only briefly deals with passing-on, namely in paragraphs 161-171.

(5) These guidelines focus on passing-on of overcharges in the context of infringements of Article 101 TFEU. However, they may also be a reference source for good practices in damages actions before national courts for infringements of Article 102 TFEU, e.g. excessive pricing, provided the specificities of the abuse of dominance standard under Article 102 TFEU are sufficiently taken into account.

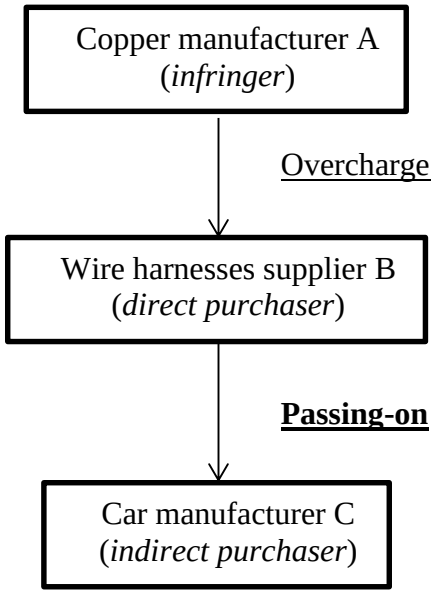
brought by the claimant and the nature of the defence raised by the defendant. For example, in some cases a claimant may not claim for loss of profit as a result of the volume effect because of the additional complexity this may involve. However, a claim by an indirect purchaser against an infringer will typically involve consideration of passing-on, since that is essential to the claim.

(5) Similarly, the manner in which the court would wish to approach the assessment and estimation of passing-on is likely to be influenced by the nature and size of the claim. The choice from the different economic methods and approaches explained in the guidelines should be proportionate to the case. What may be appropriate in terms of the scope of data required and cost of expert analysis for a claim of 20 million € may not be proportionate for a claim of 200,000 €.

1.2. What is passing-on of overcharges?

(6) The passing-on of overcharges may occur at different levels of the supply chain. It is illustrated in Box 1 below by reference to a hypothetical example.

Box 1: Passing-on of price increase for copper



Undertaking A is a manufacturer of copper and formed a cartel by agreeing with its competitors to fix sales prices for copper in violation of Article 101 of the Treaty ("TFEU"). The agreement allowed A to charge its customers, including undertaking B, higher prices for copper.

The price difference between the price actually paid and the price that would otherwise have prevailed in the absence of the infringement of EU competition law is referred to as the overcharge.[6]

Undertaking B is a supplier of automotive parts and used the copper it purchased

(6) See Article 2(20) Damages Directive.

from A to produce wiring harnesses which it sold to car manufacturer C. After the cartel-related price increase for copper, B also increased its sales price for the wiring harnesses it supplied to C. This behaviour constitutes passing-on of overcharges, in this case from B to C. Based on the definitions in the Damages Directive, A can be referred to as *infringer*, B as *direct purchaser* and C as *indirect purchaser*.[7]

(7) When the direct purchaser, fully or partially, passes on the overcharge to the indirect purchaser, the latter will not only face a price effect but in many cases also reduce its demand. This reduction is referred to as the volume effect. Its legal and economic implications are discussed in more detail below. Simply put, whenever the overcharge is passed on, the indirect purchaser may purchase less from the direct purchaser and consequently sell less to indirect purchasers further down the supply chain.

(8) The overcharge may be passed on down an entire supply chain and concerns products or services. For example, following the hypothetical case illustrated in Box 1 above, the car manufacturer C may have similarly increased the prices it charged its customer, the independent car retailer D. Subsequently, D may have also increased its end consumer price for the car in which the cartelized copper can be found. C, D and the end consumers are all indirect purchasers within the meaning of the definition of the Damages Directive.[8]

1.3. Structure of the guidelines

(9) By reference to legal principles, established case law and the provisions in the Damages Directive, these guidelines set out the legal framework applicable to passing-on. A short legal section summarises the procedural rules and instruments according to which national courts may take into account the passing-on of overcharges in damages actions. The legal framework combines EU law with national practice. In this context judges must pay particular attention to the principles of effectiveness and equivalence.[9] This means that they must apply national rules in such a way that the application does not render practically impossible or excessively difficult the exercise of the right to full compensation for harm caused by an infringement of EU competition law (principle of effectiveness).[10] Secondly judges must bear in mind that national rules and procedures relating to actions for damages resulting from infringements of Article 101 or 102 TFEU must not be less favourable to the alleged injured parties than those governing similar actions for damages resulting from infringements of national law (principle of equivalence).

(10) The main section of these guidelines deals with the economics of passing-on, namely the economic theory and quantification methods relevant for the purpose of

(7) See Article 2(2), (23) and (24) Damages Directive.

(8) According to Article 2 (24) Damages Directive "'indirect purchaser' means a natural or legal person who acquired, not directly from an infringer, but from a direct purchaser or a subsequent purchaser, products or services that were the object of an infringement of competition law, or products or services containing them or derived therefrom."

(9) See Article 4 Damages Directive.

(10) For the right to full compensation see paragraph (11) et seq. below.

estimating passing-on. The part on the economic theory focuses on the theoretical concepts underlying passing-on and sets out factors that can have an impact on it. In the part on economic quantification, different approaches and methods to quantify the passing-on effects are presented.

2. LEGAL FRAMEWORK

2.1. Passing-on of overcharges and the right to full compensation

(11) The Damages Directive's rules on the passing-on of overcharges are rooted in the compensatory principle, which underlies the entire Damages Directive.[11] Two elements of this principle have important implications for the passing-on of overcharges. Firstly, based on established CJEU case law, it means that "[a]ny person is entitled to claim compensation for the harm suffered where there is a causal relationship between that harm and an agreement or practice prohibited under Article 101 TFEU"[12].[13] Secondly, claimants having suffered such harm are entitled to full compensation which must be understood as placing a person in the position in which that person would have been had the infringement not been committed.[14]

(12) In the context of the passing-on of overcharges, the Damages Directive specifies that "any person" includes direct and indirect purchasers.[15] For example, in the hypothetical case mentioned in Box 1 above, the wire harnesses producer B, as direct purchaser, and the car manufacturer C, as indirect purchaser, may seek compensation from the copper manufacturer A, as the infringer. Other indirect purchasers further down the supply chain are also entitled to obtain damages from the infringer. As mentioned above in paragraph (8), this would be the independent car retailer D and end consumers in the hypothetical example in Box 1.

(13) It should be noted that the elements of the compensatory principle mentioned above, i.e. any person's right to claim full compensation for harm causally linked to an infringement of EU competition law, apply also to direct and indirect *suppliers* of an infringer. The Damages Directive refers to the situation of a buyer's cartel as an example in which harm could result from a lower price paid by infringers to their suppliers.[16]

(14) Full compensation covers compensation for actual loss (*damnum emergens*) and for loss of profit (*lucrum cessans*), plus the payment of interest.[17] Generally, actual loss refers to a reduction in person’s assets and loss of profit refers to an increase in

(11) See Articles 1(1) and 3(1) Damages Directive.

(12) CJEU 05 June 2014 C-557/12 (*Kone*) EU:C:2014:1317, paragraph 22 with reference to CJEU 13 July 2006 Case C-295/04 (*Manfredi*) EU:C:2006:461, paragraph 61.

(13) The Commission itself has early on recalled the CJEU's "emphasis on the compensatory principle and its premise that damages should be available to any injured person who can show a sufficient causal with the infringement", see Commission, WHITE PAPER on Damages actions for breach of EC antitrust rules, Brussels, 2 April 2008, COM(2008) 165 final, p. 7.

(14) First sentence of Article 3(2) Damages Directive.

(15) Article 12(1) Damages Directive.

(16) See Recital 43 Damages Directive. However, it should be noted that suppliers can also be adversely affected in the situation of a seller's cartel, namely if they supply less to the infringers because of the volume effect.

(17) See the second sentence of Article 3(2) Damages Directive.

those assets which would have occurred if the harmful act had not taken place.[18] In the context of passing-on, the distinction plays a particular role with regard to the characteristic economic effects and their legal classification. The general rule is set out below.

- The price effect relates to the overcharge as an increase in the price a direct or an indirect purchaser had to pay for a product or services due to the infringement of EU competition law.[19] It falls within the category of actual loss and is the part of the harm which is referred to as overcharge harm in the Damages Directive.[20] However, the direct or indirect purchaser may be able to pass on the overcharge further down the supply chain and thus either reduce (partial pass-on) or eliminate (full pass-on) its actual loss. When determining the actual loss in case of passing-on national courts will need to identify the overcharge harm which remains at a given level of the supply chain.

- The volume effect refers to the profit loss due to reduced sales that result from passing-on, i.e. a lower volume of sales due to increased prices. It can be recoverable as loss of profit.[21]

(15) While the Damages Directive distinguishes between actual loss because of the overcharge, on the one hand, and loss of profit due to reduced sales, on the other hand, there is an inherent link between the underlying price effect and volume effect. Therefore, if passing-on becomes relevant both effects and their interaction should be taken into account. The economic methods to do so are set out further below.

2.2. **Scenarios in which a court deals with passing-on issues**

(16) In actions for damages based on EU competition law infringements national courts typically deal with the passing-on of overcharges in two scenarios.

(17) Firstly, an infringer may invoke the passing-on of overcharges in its defence against claims, i.e. argue that the claimant has reduced its actual loss by passing it on, entirely or in part, to its own customers.[22] This situation, in which passing-on can be described as a shield, is illustrated in Box 2 below by reference to a direct purchaser's claim. It has to be noted that the passing-on defence may also be invoked against claims of indirect purchasers further down the supply chain.

(18) Secondly, indirect purchasers may base their damages actions on the argument that the direct purchasers from the infringers have passed on (parts of) the overcharge to them and that they have therefore suffered harm. In such a scenario passing-on can be described as a sword. This scenario is also illustrated in Box 2 below.

(18) Opinion Advocate General Capotorti 12 September 1979 Case 238/78 (*Ireks-Arkady*) ECLI:EU:C:1979:203, paragraph 9.

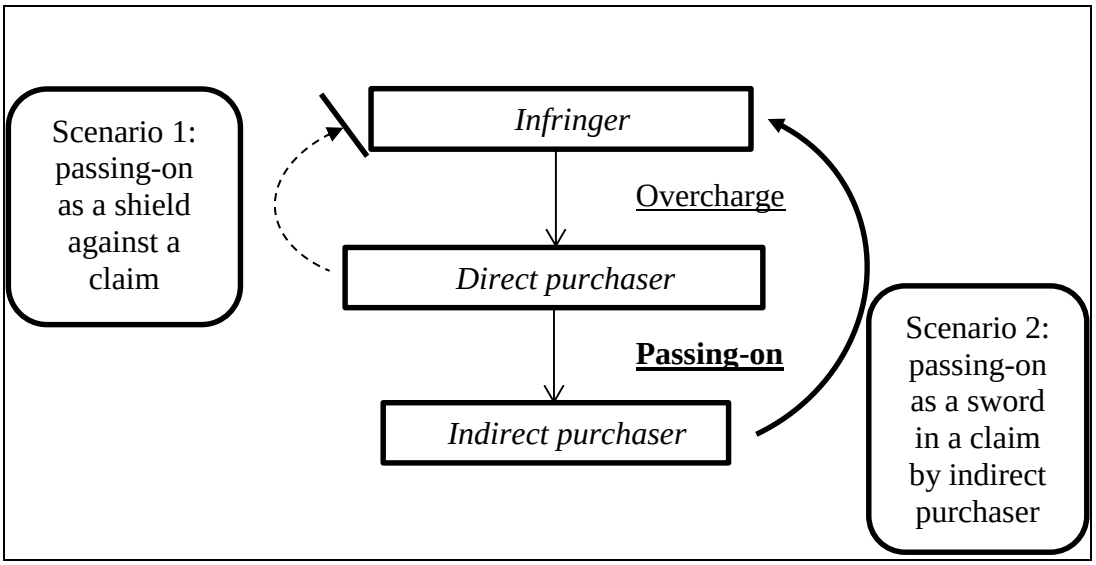
(19) Recital 39 Damages Directive.

(20) Article 12(2) Damages Directive.

(21) See Article 12(3) Damages Directive.

(22) See Recital 39 Damages Directive.

Box 2 Typical scenarios of passing-on



(19) When the passing-on of overcharges is used as a defence against an action based on an infringement of EU competition law, the defendant generally needs to prove that the claimant has passed on the overcharge.[23] This burden of proof relates to the existence and extent of pass-on of the overcharge. If the passing-on defence is fully or partially successful, the claimant may still claim compensation for loss of profit resulting from the pass-on.[24] In this case, the burden of proving such passing-on related volume effect is on the claimant.

(20) The Damages Directive also includes specific rules for the second scenario in which an indirect purchaser claims that it suffered harm due to the passing-on of overcharges. The burden of proving the existence and scope of such passing-on generally rests with the indirect purchaser seeking damages from the infringer. However, the Damages Directive recognizes the practical difficulties that this type of claimant further down the supply chain faces.[25] In order to remove the practical obstacles for indirect purchasers, the Damages Directive therefore includes rules which make it easier for them to meet the burden of proof. They concern rebuttable presumptions of law, most importantly Article 14(2) Damages Directive,[26] and presumptions of fact based on the typical course of events, e.g. Article 14(1) Damages Directive and Recital 41 Damages Directive mention that due to the conditions under which undertakings are operating it can be a commercial practice to pass on price increases down the supply chain. Article 17(2) Damages Directive establishes the more general presumption that cartel infringements cause harm.

(21) Presumptions of fact can be defined in accordance with national law by reference to economics and typical market developments, including the insight that in certain

(23) See the second sentence of Article 13 Damages Directive.

(24) Article 12(3) Damages Directive stipulates that the rules on passing-on shall be without prejudice to the right of an injured party to claim and obtain compensation for loss of profits due to a full or partial passing-on of the overcharge.

(25) Recital 41 Damages Directive.

(26) Article 14(2) Damages Directive stipulates a specific presumption for indirect purchaser claims and will be discussed in more detail in para.(22) et seq. below.

industries it is commercial practice that price increases are passed on down the supply chain.[27]

(22) This factual assumption also forms a basis for the presumption of law which can be found in Article 14 (1) Damages Directive. Under the conditions stipulated there, the indirect purchaser may benefit from a rebuttable presumption pursuant to which a claimant (i.e. the indirect purchaser) is deemed to have proved that a passing-on from the direct purchaser to the indirect purchaser occurred. The conditions, stipulated in Article 14 (2) Damages Directive and to be shown by the claimant, are as follows:

(a) the defendant has committed an infringement of EU competition law;

(b) the infringement of EU competition law has resulted in an overcharge for the direct purchaser of the defendant; and

(c) the indirect purchaser has purchased the goods or services that were the object of the infringement of EU competition law, or has purchased goods or services derived from or containing them.

(23) This presumption does not apply if the infringer can credibly demonstrate to the satisfaction of the court that the overcharge was not, or was not entirely, passed on to the indirect purchaser.[28] If the infringer meets this standard, the burden of proof, without prejudice to the application of factual presumptions, rests with the claimant.

(24) As a result of the compensatory principle, the practice of passing-on of overcharges and the abovementioned presumptions, it is possible that there are parallel claims from purchasers at different levels in the supply chain. In such situations, national courts should seek to avoid both over-compensation and under-compensation.[29] This can be achieved *inter alia* by taking due account of any actions for damages that are related to the same infringement of EU competition law, judgements resulting from such damages actions and relevant information in the public domain resulting from the public enforcement of EU competition law in the case at hand.[30] For instance, where related actions are pending in the courts of different Member States ("MS"), national courts may apply Article 30 of Regulation (EU) No 1215/2012 of the European Parliament and of the Council[31] to which the Damages Directive makes reference.[32] This article stipulates that national courts other than that first seized may stay proceedings or, under certain circumstances, may decline jurisdiction.

(27) See Article 14(1) Damages Directive and Recital 41 Damages Directive.

(28) See last sentence of Article 14(2) Damages Directive.

(29) See Articles 12(1), 12(2) and 15 Damages Directive.

(30) See Article 15(1) Damages Directive.

(31) Regulation (EU) No 1215/2012 of the European Parliament and of the Council of 12 December 2012 on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters (OJ L 351, 20 December 2012, p. 1).

(32) See Recital 44 and Article 15(2) Damages Directive.

(25) National courts should also use appropriate procedural means at their disposal under national law. The joinder of claims is a tool referred to in the Damages Directive.[33] Depending on the national legal system, other instruments may be applied, such as third-party interventions and rules on stays.

2.3. The role of evidence

(26) The legal assessment of passing-on typically requires a complex factual and economic analysis. While the taking of necessary evidence generally forms an important element in every action for damages resulting from infringements of Article 101 or 102 TFEU, the role of evidence on passing-on varies depending on the abovementioned scenarios and the extent to which a presumption applies.[34] The assessment and taking of evidence are determined by the different facts which are relevant and available for the assessment of passing-on. For example, the development of actual prices charged by the direct purchaser following an overcharge may directly be established by reference to price lists submitted by the parties.

(27) The Damages Directive aims to ensure the effective exercise of rights and equality of arms by stipulating rules to request the disclosure of evidence. Such rules apply in both passing-on scenarios mentioned above. As regards the scenario in which passing-on is used as a defence, Article 13 Damages Directive specifically mentions that the defendant may reasonably require disclosure from the claimant or from third parties. In a scenario in which an indirect purchaser seeks compensation, Article 14(1) Damages Directive stipulates that this indirect purchaser may reasonably require disclosure from the defendant or third parties. Such disclosure can be particularly important because the purchaser generally has the burden of proving the existence and scope of passing-on, as mentioned above.

(28) The abovementioned rules on disclosure limit disclosure requests to the extent that the party bearing the burden of proving the existence and scope of passing-on may only 'reasonably' require disclosure. Reflecting on the general rules on disclosure stipulated in Articles 5 Damages Directive, the national court may require that the requesting party has made a plausible assertion that the overcharge harm has been passed on by the direct purchaser onto the indirect purchaser. The requesting party must also use the facts which are already 'reasonably' available to it. In the passing-on context, this refers to information gathered during the course of business with the other party or information reasonably available from third parties, such as market intelligence providers.

(29) The first sentence of Article 5(3) Damages Directive stipulates a principle of proportionality in the sense that it requires national courts to "limit the disclosure of evidence to that which is proportionate". This principle is important for case management in damages actions resulting from infringements of Article 101 or 102 TFEU. As mentioned above, judges apply national procedural rules and must pay particular attention to the principles of effectiveness and equivalence. However, within this legal framework the principle of proportionality stipulated in the first sentence of Article 5(3) Damages Directive allows judges applying disclosure rules

(33) Recital 44 Damages Directive.

(34) See paragraphs (16) et seq. above.

to take into account the costs and benefits of ordering the requested disclosure. For example, this means that judges may come to the conclusion that the evidence presented by the parties already allows them to estimate the share of the overcharge that was passed on instead of gathering further data. Depending on the instruments available under national law, they may also appoint own economic experts or narrow down the questions to be addressed by party-appointed experts. More detailed guidance can be found in Chapter 4 below.

(30) Evidence may be requested from the other party through and under the strict control of the national court. The request must concern specific items or categories of evidence. However, provided the national court considers the general principles of proportionality and protection of legitimate interest as set out in Article 5(3) Damages Directive, even certain pieces of confidential information may have to be disclosed to the party having to prove passing-on effects. When ordering disclosure of such information, it is crucial for the court to have measures in place in order to protect confidential information. Examples of such measures may be the sharing of information through confidentiality rings or via data rooms where the parties' representatives gain access to confidential information relevant for the case at hand.[35]

(31) Disclosure of evidence included in the file of a competition authority could potentially be relevant for the quantification of the overcharge but is generally less relevant in the context of passing-on (in particular because the passing-on of overcharges deals with the pricing behaviour of the purchasers on which the file of a competition authority typically does not include any information). As Article 6(10) Damages Directive provides, disclosure of evidence from a competition authority is only a measure of last resort.

(32) The type of evidence necessary to show and quantify passing-on will depend to a great extent on the economic method used. As described in more detail below, the parties may generally base their analysis on economic theory and quantitative economics. Therefore, irrespective of the fact that there are other ways to categorize, evidence is typically divided into qualitative and quantitative evidence. The Damages Directive itself makes clear that 'evidence' means all types of means of proof admissible before the national court.[36] This could include the following:

- Qualitative evidence comprising e.g. (i) contracts, (ii) internal documents on business behaviour or pricing strategies, (iii) financial and accounting reports, (iv) witness statements, (iv) expert opinions as well as (v) industry reports and market studies;

- Quantitative evidence relating particularly to data for the use of econometric techniques[37], such as (i) sales prices, retail and end consumer prices of the product or service in question, and of comparable products or services, (ii)

(35) The Commission uses data-rooms in order to give parties in merger- and antitrust cases access to confidential information, see for example the Commission staff working paper "Best practices for the submission of evidence and data collection in cases concerning the application of articles 101 and 102 TFEU and in merger cases", paragraph 45.

(36) See Article 2(13) Damages Directive which explicitly clarifies that 'evidence' includes documents and all other objects containing information, irrespective of the medium on which the information is stored.

(37) Econometric techniques are explained in section 4.3 below and in Appendix 2.

financial reports, (iii) expert opinions (iv) prices set by regulation, (v) volume sales, (vi) rebates as well as (vii) other input cost and cost elements.

(33) As can be drawn from the non-exhaustive lists immediately above, certain types of evidence may qualify as both qualitative and quantitative evidence, e.g. financial reports and expert opinions.

(34) Finally, as indicated in Article 15 (1) Damages Directive, actions for damages related to the same infringement of EU competition law and related judgments may also form a source of information relevant for the quantification of passing-on.

2.4. **Quantifying passing-on: The court's power to estimate**

(35) Article 12(5) Damages Directive specifically requires MS to ensure that national courts have the power to estimate, in accordance with national procedures, the share of any overcharge that was passed on. Such power covers all passing-on effects, i.e. price and volume effect. This also follows from Article 17(1) Damages Directive which applies more generally to the quantification of harm.

(36) When the MS implement the power to estimate into national laws, they must take into account the rules and principles set out in the Damages Directive and the underlying CJEU case law. National courts must use their procedural instruments accordingly. In particular, as mentioned above, they must apply rules on the burden and standard of proof so that the full effectiveness of Article 101 TFEU is not put at risk.

(37) For example, based on the principle of effectiveness the CJEU held in *Kone* that the victims of so called umbrella pricing may obtain compensation for the loss caused by an infringement of EU competition law, stating that the full effectiveness of Article 101 TFEU would be put at risk if national law categorically and regardless of the particular circumstances of the case excluded their right to claim compensation for harm suffered. Further, the abovementioned case highlights that EU case law and the Damages Directive are relevant to the assessment of causation in damages actions for infringements of EU competition law. This aspect is important with regard to the passing on of overcharges because factual and legal questions of causation typically arise when the direct purchaser of an infringer is alleged to have, fully or partially, passed on the overcharge to an indirect purchaser.

(38) Similarly, when national courts estimate, in accordance with national procedures, the amount of harm and share of any overcharge that was passed on, as foreseen in the Damages Directive, they must observe the abovementioned principles of equivalence and effectiveness. As regards the power to estimate, this means that national courts cannot reject submissions on passing-on because a party is unable to precisely quantify the passing on effects.

(39) Furthermore, the power to estimate, as stipulated in Article 12(5) Damages Directive and Article 17(3) Damages Directive, requires national courts to base their assessment firstly on the information reasonably available and secondly strive for an approximation of the amount or share of passing-on which is plausible. This follows from the Damages Directive which stresses the existence of information

asymmetries and acknowledges that harm can hardly be quantified with perfect accuracy.[38] In practice, national courts will have to rely on assumptions.[39]

(40) The principle of full compensation nevertheless requires national courts to provide a best estimate. Article 101 and 102 TFEU give any person who is a victim of an infringement of EU competition law the right to be put in the position in which that person would have been had the infringement not been committed (see paragraph (11) above), no more and no less. For this reason, Article 15(1) Damages Directive stipulates that under- as well as over-compensation must be avoided.

(41) The exercise of estimation is subject to national law. In fact, a number of MS already have rules which correspond to the power to estimate foreseen in the Damages Directive.[40]

3. ECONOMIC THEORY OF PASSING-ON

3.1. Overview

(42) The passing-on of overcharges and the associated price and volume effects arise because of a firm's incentives to respond to increases in its costs by raising prices. The initial overcharge may be understood as an increase in the input costs for the direct purchaser. To estimate the passing-on effects, the court would need to consider how such a cost increase would affect 1) prices set by the direct purchaser in the downstream market and 2) the volume supplied by the direct purchaser.

(43) National courts estimate passing-on based on the circumstances of the specific case. However, a general understanding of the economic theory of passing-on and the associated effects may be important for the court for several reasons. Firstly, economic theory provides the court with a framework within which quantitative and qualitative evidence could be evaluated. Such evidence is further explained in section 4.2. Secondly, particularly at an early stage of the litigation, economic theory may assist judges when making decisions in relation to the disclosure of data or information by assessing its relevance. Finally, theoretical or conceptual considerations can also form a basis for discerning the credibility and reliability of different economic explanations underpinning the link between overcharge and passing-on put forward by the parties.

(44) In the Damages Directive there is no distinction between damages from 1) increased prices (price effects) and the pass-on of such overcharges and 2) reduced quality of products or hampered innovation (non-price effects) and the potential

(38) See Recital 46 Damages Directive. To address such issues the Damages Directive includes *inter alia* rules on disclosure (see paragraphs (27) et seq. below), the possibility to request assistance from national competition authorities in accordance with Article 17(3) Damages Directive and the obligation to take into account other proceedings relating to the same infringement (see paragraph (24) below).

(39) Practical Guide, paragraph 16. The general approach to quantifying harm in competition cases is also set out in paragraphs 11-20 of the Practical Guide.

(40) E.g., in the United Kingdom national courts quantify harm "by the exercise of a sound imagination and the practice of the broad axe" (*Gibson v Pride Mobility Products Ltd* [2017] CAT 9), in the Netherlands the national court awarding damages quantifies the amount of the harm to the extent that this is possible (see Article 612 Wetboek van Burgerlijke Rechtsvordering) and estimates it in the manner that is the best fit for the characteristics of the harm (see Article 6:97 Burgerlijk Wetboek).

effects along the supply chain of such damages. The guidelines will not cover pass-on in the context of the non-price effects.

(45) According to economic theory, the existence and the magnitude of the passing-on effects, i.e. the associated price and volume effects, are determined by a range of factors.[41] These factors include:

(i) The nature of input costs[42] subject to an overcharge (whether these costs are fixed or variable, whether the infringement increases these costs only to one customer or to all customers on a given market);

(ii) The nature of the product demand the direct or indirect customers face (in particular, the link between the demand and price level);

(iii) The nature and intensity of the competitive interaction between the firms in the market where the direct or indirect customers are active; and

(iv) As set out in further detail in Annex 1, other elements such as customer characteristics (consumers or businesses), the proportion of a firm's various inputs affected by the overcharge, buyer power, vertical integration of direct and indirect customers, price regulation or the timing of the pricing decisions undertaken at the various levels of the supply chain.[43]

(46) Firstly, the nature of the input costs of the direct purchaser subject to an overcharge affects whether, and to what extent, this overcharge can be passed on. When the overcharge impacts the direct purchaser's costs which do not vary according to the input quantity (i.e. fixed costs), it will probably not be passed-on because such costs typically do not affect the direct purchaser's price setting, at least not in the short run.[44] By contrast, when the overcharge impacts the direct purchaser's costs which actually vary according to the input quantity (i.e. variable costs), it will generally be more likely to be passed on, at least to some extent. This is because marginal costs (a subcategory of variable costs) typically affect the direct purchaser's price-setting decisions.[45]

(47) Secondly, the product demand the direct customer faces affects the level of pass-on. A standard price formation mechanism builds on the fact that the demand a firm faces (i.e. the quantity it sells) decreases when it raises its price. The extent to which a direct purchaser raises its own price when facing an overcharge depends on whether the demand reacts strongly or not to such a price change. For instance, if the direct purchaser is a monopolist and the demand it faces is equally sensitive to a change in prices for all price levels, typically half of the overcharge will be passed

(41) The reasons why the factors listed in paragraph (45) might be important in determining the existence and the degree of the passing-on related price effect and the passing-on related volume effect are explained in this section. A more detailed explanation of the impact of each factor is provided in Appendix 1, together with an explanation of the standard price formation mechanism.

(42) This is further explained in Appendix I.

(43) The timing of the pricing decisions might affect, inter alia, the time horizon of the infringement and the potentially delayed time pattern of passing-on of overcharges.

(44) However, in the long run, fixed costs may affect a firm's strategic decision analysis to, e.g. adjust its production capacity, which, in turn, might impact the subsequent (short run) price formation mechanism.

(45) See also, Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings, OJ C 31, 05 February 2004, paragraph 80.

on. If the demand the monopolist faces drops 'more and more' (i.e. at an increasing rate) when price increases, not more than half of the overcharge will typically be passed on by the direct purchaser. By contrast, when the demand such a monopolist faces drops 'less and less' (i.e. at a decreasing rate) as price increases, more than one half of the overcharge will typically be passed on by the direct purchaser.

(48) Thirdly, the nature and intensity of the competitive interaction between the firms on the market where the infringer's customers are active also affects the level of pass-on. It is important to be aware that the effect of increased competition on the degree of pass-on depends on whether the initial overcharge affects only the direct customer (i.e. firm specific overcharge) or also the competitors of the direct customer (i.e. industry wide overcharge). If the overcharge affects only one direct purchaser, fiercely competing with other direct purchasers, passing-on is less likely compared to a situation where the only affected direct purchaser faces weak competition. However, if there is an industry-wide overcharge, a large number of competing direct purchasers will generally favour a higher pass-on of that overcharge compared to markets characterised by weaker competition.[46]

(49) A number of judgements from national courts in damages actions have underlined the importance of considering how demand reacts to changes in prices, the intensity of competition and whether or not the direct customer's competitors are affected by the overcharge.[47]

(50) Fourthly, as mentioned in paragraph (45) and in Appendix 1, other elements may, under certain circumstances, play a crucial role in the direct purchaser's price formation mechanism, and, hence, for passing-on of the overcharge by the direct purchaser. For instance, these elements may not only impact the extent of the passing-on related price effect but also the volume effect (e.g. an overcharge on one product may also affect the prices of other products sold by the direct purchaser when these products are substitutes to one another), or when such effects would materialize (e.g. a passing-on of overcharges delayed in time, or the case where a direct purchaser which would face a cost of modifying its prices could decide not to pass-on a small overcharge because of such 'menu costs'). Another element which might be important in order to quantify passing-on of an overcharge is whether the input affected by the overcharge represents a large or small share of the direct purchaser's variable costs. Some of these factors have also been considered by national courts in cases involving passing-on.[48]

(51) Finally, it is also important to note that the above-mentioned factors affect the outcome of a passing-on scenario simultaneously, and that their interdependency

(46) These predictions from economic theory are further illustrated and explained in Example 3 in chapter 3.2.

(47) For examples of judgements dealing with the importance of market dynamics and how demand reacts to changes in prices, see for instance Bundesgerichtshof (Federal Court of Justice), decision of 28 June 2011, Case no KZR 75/10 (*ORWI*) paragraph 59 and 69 and Regional Court Düsseldorf, decision of 19 November 2015, Case no 14d O 4/14 (*German Car Glass*) , paragraph 221. The importance of the degree of competition and whether the initial overcharge is firm-specific or industry wide is also dealt with in a number of judgements from national courts, see for example a Danish judgement, Maritime and Commercial Court, Case no. V 15/01, *EKKO*, (2002, and a Spanish judgement, Supreme Court, decision 07 November 2013, Case no 5819/2013 (*Nestle and ors v. Ebro Puleva*)..

(48) For an example of a case considering whether pass-on is likely when the input affected by the overcharge represents a small share of the direct purchaser's variable costs, see for instance a French judgement, Appeals Court of Paris, decision of 27 February 2014, Case no 10/18285 (*DOUX v Ajinomoto & CEVA*), . This judgement is also further explained in **Error! Reference source not found.** below.

should also be taken into account. The relative importance of each factor might, however, vary from case to case.

(52) The existence and extent of pass-on are linked to the loss of sales that generally will accompany any increase in prices. As described above, this loss of sales may be characterized as the volume effect. The volume effect arises because the purchaser usually faces a downward sloping demand curve. If the initial overcharge is passed on down the supply chain, a volume effect will arise at all levels of the vertical chain. Hence, when the claim includes damages for volume effects, courts should estimate such an effect, as well.

(53) As mentioned above, any victim of an infringement of EU competition law may claim full compensation for the harm suffered causally linked to the infringement. When passing-on is invoked, an assessment of the volume effect is important in order to quantify the damages from an overcharge. An estimation of the total harm by simply subtracting the passing-on related price effect from the overcharge effect leads to an underestimation of the harm suffered by the direct or indirect customer, as the volume effect is not taken into account.

(54) The lost volume stemming from an overcharge is influenced by the sensitivity of demand that the purchaser faces and how the purchaser's competitors react to the overcharge. For example, if the purchaser faces an inelastic demand, i.e. its customers are only to a small extent sensitive to increases in price, the price increase leads to a relatively small decrease in volume sold. This will, everything else being equal, lead to a smaller volume effect than in the case of more elastic demand. At the same time, if the purchaser's competitors also increase their prices after an overcharge, this might also reduce the impact of the purchaser's own price increase on its sales.[49]

3.2. **Examples**

(55) Example 1 below describes firm specific overcharges in a market with strong competition.

> Example 1
>
> **Situation**: There are 10 producers of apple juice in the same relevant market. One of the producers sources apples from a supplier involved in a price fixing cartel. The apple juice producer claims damages as compensation for an overcharge. However, the defendant (the supplier of apples) raises the passing-on defence and argues that the apple juice producer has passed on the entire overcharge to the indirect purchasers.
>
> **Analysis**: The apple juice producer facing the overcharge is in strong competition with nine other companies for the production and supply of apple juice. All products sold by the ten companies are rather homogeneous to consumers. In so

(49) If only the purchaser increases its price its customers might switch to buying from the competitors. If, however, the competitors also raise their prices to some extent, the switch might be less attractive for the customers, so the overall sales of the first purchaser might be reduced less. It should be noted though that if some or all customers respond to a market wide price increase by stop buying the product altogether the volume effect might even be larger than in the single purchaser price increase case.

far as the other producers do not obtain apples form the cartel members, but are able to buy them at a lower price elsewhere, the producer having to buy from the cartel is placed at a competitive disadvantage vis-à-vis its competitors. The apple juice producer's ability to pass on the cost increase would hence be constrained due to the fact that he would lose sale (and profit) to its competitors to a very large extent if he passes on the overcharge, even only partially. The stronger the competition between the 10 apple juice producers, the greater the constraint on the ability to pass on the cost increase. Hence, in this scenario, the direct customer will normally not be able to pass on the increase in cost (the overcharge).

(58) Example 2 below sets out a situation of industry wide overcharges and the intensity of competition.

Example 2

Situation: All of the 10 producers of apple juice in Example 1 source apples from suppliers involved in a price fixing cartel. The members of the cartel claim that any overcharge is passed on to the indirect purchasers.

Analysis: The producers of apple juice are similarly exposed to the overcharge and the market is characterised as competitive. Since all of the producers are faced with the overcharge, one firm will not have a competitive disadvantage compared to the other firms. It is therefore more likely that each apple juice producer to a large extent will pass on the overcharge, in contrast to the case detailed in Example 1 (where the overcharge is firm-specific). As an illustration, in a perfectly competitive market, the price equals marginal costs and a rise in the cost of an input will therefore directly lead to an equal rise in the price.

(60) Pass-on rate for monopolists facing different demand

Example 3

Situation: Apple juice producer A is a monopolist in the market for production of apple juice in Member State 1, while apple juice producer B is a monopolist in the same product market in Member State 2. The cost of producing one additional batch of apple juice is constant and similar for A and B.

The two apple juice producers source apples from C, a supplier involved in a price fixing cartel. As a consequence, A and B face an overcharge of 6 €/apple case they buy from C.

A and B face different demands from the grocery retail chains in each Member State. In Member State 1, demand is equally sensitive to a change in prices for all price levels (that is, the demand is linear, see also Box 9). In Member State 2, this is not the case. There, demand drops 'less and less' (that is, at a decreasing rate) when price increases (that is, the demand is convex, see also Box 9). A and B claim compensation from C (the member of the cartel) for the harm of the overcharge. C raises the passing on defence, claiming that A and B will pass on

half of the overcharge.

Analysis: The monopolists in Member State 1 and 2 face different demand from the retail grocery chains in each MS. Their costs when producing one additional batch of apple juice is constant. The overcharge of 6 € apple per case is considered as an increase in marginal cost for each of them. Following such a cost increase, the scope to adjust the prices upwards will depend on how much output each will have to sacrifice to pass on a certain amount of the cost change, i.e. increase prices. If the volume lost when increasing prices is relatively low, the price increase will be more attractive compared to the situation where the loss of volume is high. The loss of volume when increasing prices is related to the curvature of the demand the monopolist face, i.e. whether the demand is linear, convex or concave. This is also further explained in Box 10 below.

Regarding the monopolist A in member State 1, economic theory predicts that such a monopolist would pass on half of the overcharge, i.e. 3 €. However, as the monopolist B faces a convex demand, the remaining demand will become less price sensitive as the price goes up. Compared to A, (facing linear demand), B will lose less volume when increasing prices with 3 €. This implies that B will have an incentive to pass on more than half of the initial overcharge.

4. QUANTIFICATION OF PASSING-ON RELATED PRICE AND VOLUME EFFECTS

4.1. Introduction

(62) Compensation for harm suffered aims at placing the injured party in the position in which it would have been had the infringement not occurred. In order to be able to assess this position, one needs to compare the observed situation, i.e. a situation where the infringement took place, with a hypothetical situation, i.e. a situation where the infringement did not take place. This hypothetical situation is referred to as the "counterfactual scenario".

(63) The purpose of building a counterfactual scenario is to isolate the effect of the infringement from other factors affecting prices, which would have influenced prices in the affected market even if the infringement had not taken place.[50] For instance, an increase in demand would typically lead to a price increase even absent a cartel. Direct or indirect purchasers should not be compensated for that effect. Hence, when constructing a counterfactual scenario, it is necessary to control for factors that are not related to the infringement.[51]

(50) It should be noted that the need to construct a counterfactual when assessing pass-on is in line with the case law of the CJEU on passing-on in the context of reimbursement of unlawfully levies and custom duties charged by MS, see CJEU 04 October 1979 C-238/78 (*Ireks-Arkady v. Council and Commission*) EU:C:1979:226, paragraph 14; CJEU 21December 2000 C-441/98 (*Michailidis*) EU:C:2000:479, paragraph 33 et seq.; CJEU 06 September 2011 C-398/09 (*Lady & Kid and Others*) EU:C:2011:540. Further, in CJEU 09 December 2003 Case C-129/00 (*Commission of the European Communities v. Italian Republic)* EU:C:2003:319, paragraph 78, the Advocate General pointed to the fact that a counterfactual would be required to show what would have occurred to prices in the downstream market in the absence of the initial overcharge.

(51) See the related discussion in paragraph (79).

(64) As the counterfactual scenario is hypothetical, it cannot be directly observed. As described below, different methods and techniques have been developed in economics and legal practice to establish the counterfactual. These methods and techniques vary in terms of the underlying assumptions and the variety of data needed.

(65) In a given case, the choice of technique will usually depend on a range of aspects. As explained in section 2 above, national courts must observe the principles of effectiveness and proportionality when they estimate the share of any overcharge that is passed on. Furthermore, the power to estimate requires national courts to base their assessment firstly on the information reasonably available and secondly to strive for an approximation of the amount or share of passing-on which is plausible.

(66) For instance, if the claimant and the defendant rely on different methods and the application of these methods leads to contradictory results, it is normally not appropriate to consider the estimated pass-on to be the average of the two results, nor would it be appropriate to consider that the contradictory results cancel each other out in the sense that both methods should be disregarded. As mentioned in the Practical Guide, in such a scenario it would rather be appropriate to examine the reasons for the diverging results and to consider the strengths and weaknesses of each method and its implementation.[52]

(67) The following sections provide an overview of different techniques for the estimation of passing-on related price and volume effects. As explained below, the techniques vary in complexity and data needed, from analyses based on qualitative evidence on the one hand to econometric techniques[53] based on quantitative data on the other. In any case, the approach for estimation must be in line with the applicable rules of national law, subject to the principles of equivalence and effectiveness.[54]

(68) In this context, there is no technique that could be singled out as the one that would in all cases be more appropriate than others. The use of econometric techniques is an example of this. In most cases the implementation of such techniques may increase the degree of accuracy of an estimate. However, such techniques usually require a significant amount of data which may not always be available. Hence, the gathering of data and their economic analyses may entail considerable costs that may be disproportionate to the amount of damages in question.

(69) The costs to be considered in this context may not only be those incurred when the party bearing the burden of proof applies a certain method, but also those of the other party to rebut a submission, the costs of third parties and those to the judicial system when the court estimates passing-on, including costs of a possible economic expert appointed by the court. If the abovementioned costs are too high this may

(52) See also the Practical guide, paragraph 125.

(53) The concept of econometric techniques is further explained in section 4.3 below and in Appendix 2.

(54) See paragraph (9) above.

render practically impossible or excessively difficult to exercise the right to full compensation.[55]

(70) When estimating the passing-on effects, national courts may use pieces of direct evidence relevant for the case. For instance, internal documents or other documents of a qualitative nature produced by the direct or indirect purchaser regarding the relationship between the overcharge and changes in its own prices. If this type of evidence is available, the court may find it sufficient to estimate the pass-on effects (price and volume effects) by taking into consideration qualitative evidence or making adjustments to the quantitative data without the use of a regression analysis. Hence, the availability of qualitative evidence may play an important role when a court decides whether any or which of the quantitative techniques set out in the following sections can be used by a party to meet the required standard of proof under the applicable law.[56]

(71) As illustrated in Figure 5 in Annex 1, the three components of the harm derive from the overcharge, the passing-on related price effect and the passing-on related volume effect. Judges and economic experts may choose to estimate the three components of damages sequentially. Quantification or estimation of the overcharge will constitute the first step. A number of different methods can be employed to obtain an estimate of this effect. These methods are considered in some detail in the Practical Guide.

(72) The second step involves estimating the magnitude of the passing-on related price effect. The extent of this effect may be estimated directly, employing similar methods as when quantifying the overcharge, or, if certain assumptions are fulfilled, indirectly by obtaining an estimate of the rate at which the increase in the affected input cost should have been passed on and combining this estimate with information on the overcharge and sales. Sections 4.3.1 to 4.3.2 provide an overview of different approaches for the quantification of these effects.

(73) In a third step the passing-on related volume effects are estimated. Similar to the passing-on related price effect, the volume effect may be estimated directly or indirectly. Different approaches for quantifying these effects are considered in Section 4.4.2and 4.4.3.

(74) Other approaches, such as a holistic approach, accounting simultaneously for pass-on and the volume effects, may also be used to quantify the harm in damages actions before national courts for the infringement of EU competition law.

4.2. Data and information needed when quantifying the passing-on effects

(75) As explained in section 2.2, the Damages Directive aims to ensure the effective exercise of rights and equality of arms by stipulating rules governing the disclosure of evidence. Data and information in the hands of parties or third parties are important factors in order to carry out a sound economic analysis of passing-on.

(55) The importance of the principle of effectiveness is also stressed in the Practical Guide in the context of estimation of overcharges.

(56) This is also pointed out in the Practical Guide, paragraph 14.

Hence, a useful first step when quantifying the passing-on related price effect may be to identify the needs and availability of data.

(76) As mentioned above, the guiding economic principle when estimating pass-on in this context is the comparison of the actual scenario with the scenario that would have occurred absent the infringement, i.e. the counterfactual. Hence, the collection of data and information should be focused on gathering quantitative and qualitative evidence relevant for constructing the counterfactual.

(77) Making a choice regarding the type of data needed for estimating the pass-on will usually require good knowledge of the industry in question and the prevailing market characteristics in the case at hand. Therefore, it may be useful to initially consider documents which indicate the plausibility of passing-on in the first place, such as existing court decisions, parallel civil proceedings at the same or different level of the supply chain in the same market, market studies or decisions from competition authorities describing the relevant market dynamics.

(78) As pointed out above, the court may have to consider evidence of both qualitative and quantitative nature. Qualitative evidence, such as internal documents on pricing, strategy, contracts and financial reporting, may be analysed in the context of economic theory. They may also give information on whether there is evidence or a link between the downstream pricing and the upstream overcharge that results from the infringement.

(79) However, in order to be able to construct a counterfactual and control for different factors affecting passing-on, in most cases the parties need quantitative evidence. Such evidence may include data on actual prices, costs or margins as well as external indicators which would influence pricing decisions of firms, e.g. aggregated measures of economic activity (including GDP growth, inflation and employment rates). In some cases, regional variables of economic activity might be useful to control for different regional tendencies which are not related to the infringement.

(80) The court may also take into account more industry or firm-specific factors influencing the price formation. For example, in the hypothetical case set out above in Box 1, if plastic had also been an essential input for the production of wire harness during the infringement period when copper manufacturer A had agreed with its competitors to fix prices for copper as the main input for the wire harness supplier B, it is likely that B would have passed on to its customer also an increase in prices for plastic which was not a subject to an infringement of EU competition law. In this case, an estimation of passing-on which fails to take into account the effects related to the increase in prices for plastic could materially overestimate the passing-on of the overcharge by wrongly attributing the entire price increase to the infringement. Similar reasoning applies to potential decreases in other input costs which, if not accounted for and passed-on down the supply chain, would artificially decrease the estimated pass-on of the cartel overcharge.

(81) The relevance of data varies not only according to methodology or technique employed but may also depend on the respective case at hand. The different requirements for each method are described in more detail below. In the examples that follow, the application of the methods focuses on the price. Depending on the availability of data and the circumstances of a given case, the court may also

consider the same methods to estimate other economic variables, such as profit margins or the level of costs of an undertaking. The data used to compare the affected market with the counterfactual may relate to the entire market (e.g. the average of the price of wire harnesses for all customers in other product-or geographic markets) or to certain customers or customer groups.

(82) When ordering disclosure of data under national law, the court needs to take into consideration the principles of reasonableness and proportionality, as stated in the Damages Directive.[57] In line with these principles the court may e.g. consider the availability, the volume and the cost of retrieval and possibly cleaning of data[58] or more generally the time expenditure.

(83) In many cases where passing-on of overcharges is assessed, economic experts may be involved in damages actions before national courts. The rules on expert evidence vary significantly between the MS.[59] Nevertheless, national courts may find it helpful to have guidance on general principles and tools relevant for the involvement of economic experts. In any case, they should apply national procedures in such a way as to manage the use of expert witness evidence with the objective of ensuring an effective and proportionate application of EU law.

(84) Early in the proceedings, the court may facilitate a discussion between experts representing the parties involved. Such discussions may aim at narrowing down areas of agreement and disagreement on issues relevant to the case, including issues related to disclosure requirements. An example of such an approach is provided in Box 3 below.

Box 3: Example of a case involving evidence provided by economic experts[60]

In a case pending before a UK court, economic experts representing each side (the infringer and the claimant) had proposed their own distinct method for estimating pass-on. The judge expressed concerns about the potential complexity of the expert evidence, and requested the parties' experts' to reach an agreement on the proposed approach to economic evidence on pass-on before any disclosure was ordered. If the experts failed to reach an agreement on the approach, the judge would hear submissions on the respective approaches, including an explanation of what each expert proposed, the information required and the cost of the exercise, and then decide which method should be applied.

(85) In some jurisdictions national courts may appoint economic experts who assist the judge when estimating pass-on and they have traditionally taken this approach to

(57) See paragraphs (28) and (29) above.

(58) Data cleaning refers to the process of detecting and removing logical inconsistencies in the data.

(59) For instance, courts in France, the Netherlands and the United Kingdom to a large extent deal directly with economic experts appointed by the parties. In other Member States, such as Belgium, Denmark Germany, Hungary and Italy, courts have in many cases sought to seek advice from court appointed experts. There are also variations in national legislation with regard to whom the expert owes a duty. In some Member States, such as UK and Ireland, the expert owes a duty to the court, even if their fees are paid by the parties. In Spain, experts appointed by the parties have a duty of objectiveness and independence, while some Member States, such as Germany and Italy, there is no such explicit requirement.

(60) High Court of England and Wales, *Emerald Supplies v. British Airways Plc*, HC-2008-000002.

estimate the initial overcharge. As explained below, the court may employ a similar approach when estimating pass-on, e.g. by using the so-called comparator-based methods. The experience from using court appointed experts when estimating the overcharge may, therefore, also be relevant for the estimation of passing-on. An example of an approach where the court has appointed an economic expert is provided in Box 4 below.

Box 4: Example of a case[61] in which the court appoints an economic expert

In this case, an economic expert was appointed by the court. The expert's task was to propose a methodology and subsequently quantify the overcharge. As a first step, the expert proposed an empirical method for estimation of the overcharges. The approach suggested by the expert was discussed in written format and in oral hearings before the court decided on which approach to take.

In the next step the chosen method was applied and overcharges were calculated. The underlying data used for the calculations was submitted to the court and to the parties.

The third step consisted of a robustness check where various parties (the defendants, the public prosecutor and the national competition authority) were given the opportunity to give comments and ask questions. These comments were taken into account in a final assessment delivered to the court. The final assessment also considered the plausibility of the estimated results, the robustness of estimated effects and the quality of the underlying data.

(89) In a case where the economic experts representing the parties have conflicting views on which approach to employ in order to estimate pass-on, the national court may also seek advice from the national competition authority on which method to employ.[62] Moreover, to assess the degree of passing-on a national court may in principle also rely on information included in a decision issued by a competition authority, e.g. regarding the initial overcharge.[63]

(90) The estimation of passing-on related price effects is based on an analysis of firms' financial information or data. Such data is often historic but in some cases the data involved might be commercially sensitive to the parties involved in a given case, and hence regarded as confidential information. However, as explained in section 2 above, the court may order disclosure of evidence containing confidential information, provided there are measures in place to protect confidential information.

(61) Higher Regional Court of Düsseldorf, decision of 26 June 2009, Case no VI-2a Kart 2 – 06/08, (*Zement*).

(62) It follows from Article 17(3) Damages Directive that a national competition authority may, upon request of a national court, assist that national court with respect to the determination of the quantum of damages where that national competition authority considers such assistance to be appropriate.

(63) For instance, in a judgement by the Commercial Court of Nanterre, Case No. 2004FO22643, *Arkopharma v. Group Hoffman La Roche*, 2006, a French court referred to the European Commission's findings in Case COMP/E-1/37.512, *Vitamins*, as to the impact of the cartel on the market and on consumers to support the conclusion that passing-on to the consumers was likely to have occurred.

4.3. Quantification and estimation of passing-on related price effects

(91) When estimating the passing-on related price effect national courts may rely on different types of economic approaches to quantification, particularly the direct approach, as described in paragraphs (92) et seq. below, but also the indirect approach,[64] as described in paragraphs 4.3.2.1 et seq. below.

4.3.1. Direct approaches – comparator based methods

(92) The passing-on related price effect at various stages in the supply chain may be computed by estimating directly the increase in prices or change in margin that has resulted from the impact of the initial overcharge.

(93) Comparator-based methods have the advantage that they use real-life data observed on the same or a similar market.[65] They rely on the fact that the comparator scenario can be considered representative of the non-infringement scenario. Whether the level of similarity between the market on which the infringement took place and the comparator markets is considered to be sufficient in order for the results of such comparison to be used in quantifying pass-on depends on national legal systems.[66]

4.3.1.1. Methods

(94) When estimating the passing-on related price effect by using the direct method, national courts may use different approaches. Subject to data availability, the court may estimate the price increase at the downstream market that is caused by the cost increase directly or infer passing-on by using margin data.[67] If the first approach is employed, the court may estimate the differences between the observed and counterfactual prices using the same methods as used to compute the initial overcharge, i.e. comparator-based methods for quantifying the overcharge.

(95) As explained above, when estimating passing-on the techniques and methods employed should control for factors other than the one stemming from the infringement. Ideally one would compare the affected market to the exact same market absent the infringement. However, as pointed out in the Practical Guide, it is generally not possible to know exactly how a market would have evolved in the absence of an infringement. Therefore, in practice, a "similar" market has to be tried as a comparator.

(96) Comparator markets can differ from the infringement market in two respects, either with regard to the time dimension or the product dimension. A comparison over

(64) The indirect approach relies *inter alia* on the strong assumption that changes in input costs are passed on at an identical rate irrespective of the relevance of the input costs and the extent of the change in such input costs. As further explained below in paragraph **Error! Reference source not found.** the indirect method should normally only be considered if the assumption is plausible based on the facts of the case.

(65) This fact is emphasised in the Practical Guide, paragraph 37 and the case law on estimation of overcharges cited there. A German Court, also in the context of estimation of overcharges, holds the view that comparable methods can be preferable compared to other approaches, see Higher Regional Court of Düsseldorf, Case VI-2a Kart 2 – 06/08, 2009, paragraph 469 et seq.

(66) The Practical Guide deals with this issue in the context of assessment of overcharges, see for example paragraph 37 and 59-95.

(67) The approach using margin data is explained in more detail in the section on estimation of the volume effect below.

time means that the infringement market is compared to itself at a different point in time. A comparison by product means that the infringement market is compared to either the same market but in a different geographical area or another product market that is considered to evolve in a similar manner to the infringement market.[68]

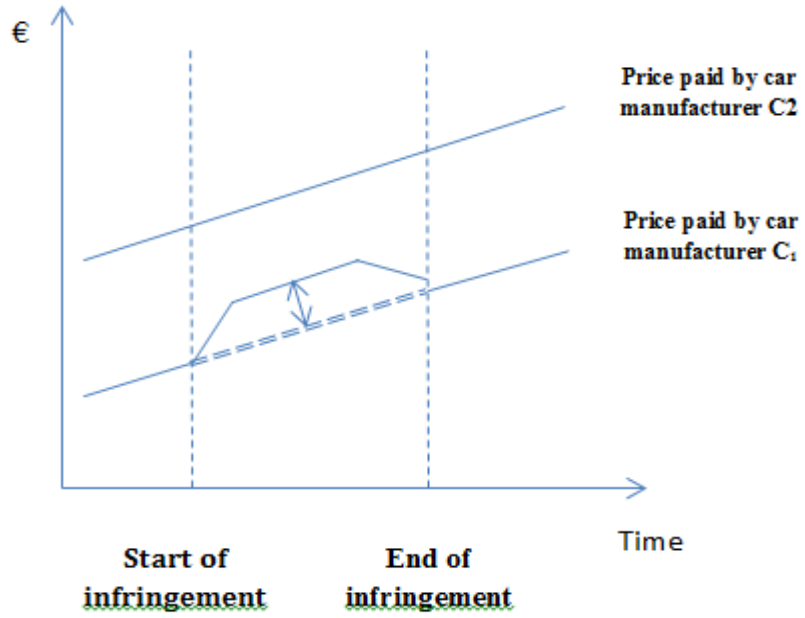
(97) The method that should be used ideally is the one that combines the two dimensions, i.e. the time dimension *and* the product dimension. This method is referred to as "difference-in-differences". It looks at the development of the relevant economic variable in the market affected by the pass-on during a certain period (difference over time in the pass-on market) and compares it to the development of the same variable during the same time period in an unaffected comparator market (for instance in another geographical market).

(98) In order to illustrate how this method may be employed, it is useful to consider the stylised examples of the copper cartel illustrated in Figure 1 and Figure 3 below.

(99) Assuming in a hypothetical case that car manufacturer C_1 in Member State 1 (the indirect purchaser) claims damages from the copper manufacturer A_1 (the infringer), as explained in paragraph (19), any harm C_1 suffers stems from the passing-on of overcharges from the wire harnesses supplier B_1. Using a difference-in-differences approach would involve assessment of the development of the price paid by the car manufacturer C_1 in Member State 1 (the market with a passing-on related price effect) during a certain period, and comparing it to development of the price paid by the car manufacturer C_2 in Member State 2 (unaffected by the infringement and hence with no passing-on related price effects) in the same time period. The comparison shows the difference between these two differences over time. This provides an estimate of the change in the price paid by the car manufacturer, excluding all those factors that affected the markets both in Member State 1 and Member State 2 in the same way. Hence, the method isolates the passing-on related price effect from other influences on the price of wire harnesses common to both markets. This approach is illustrated in Figure 1 below.

(68) If for a counterfactual scenario comparator markets in foreign countries are taken into consideration, the national court should also keep in mind possible differences in legislation. This is particularly important when dealing with regulated markets, e.g. pharmaceuticals or energy.

Figure 1 Illustration of difference-in-differences approach



(100) A simple example derived from the copper cartel example mentioned in paragraph (6) above may illustrate the method. Assume that a before, during and after comparison reveals an increase in the unit price of wire harnesses of 100 € in the Member State 1 (where the infringement and passing-on occurred) between 2005 and 2010. Looking at the unaffected market in Member State 2 over the same period shows that the unit price of wire harnesses has increased by only 10 €, due to an increase in another input cost, e.g. plastic. Assuming that the higher input cost (of plastic) also concerned Member State 1, a comparison of the different development of prices on wire harnesses in Member State 1 and 2 would indicate the price increase caused by the passing-on effect. In the example, this would be 90 €.

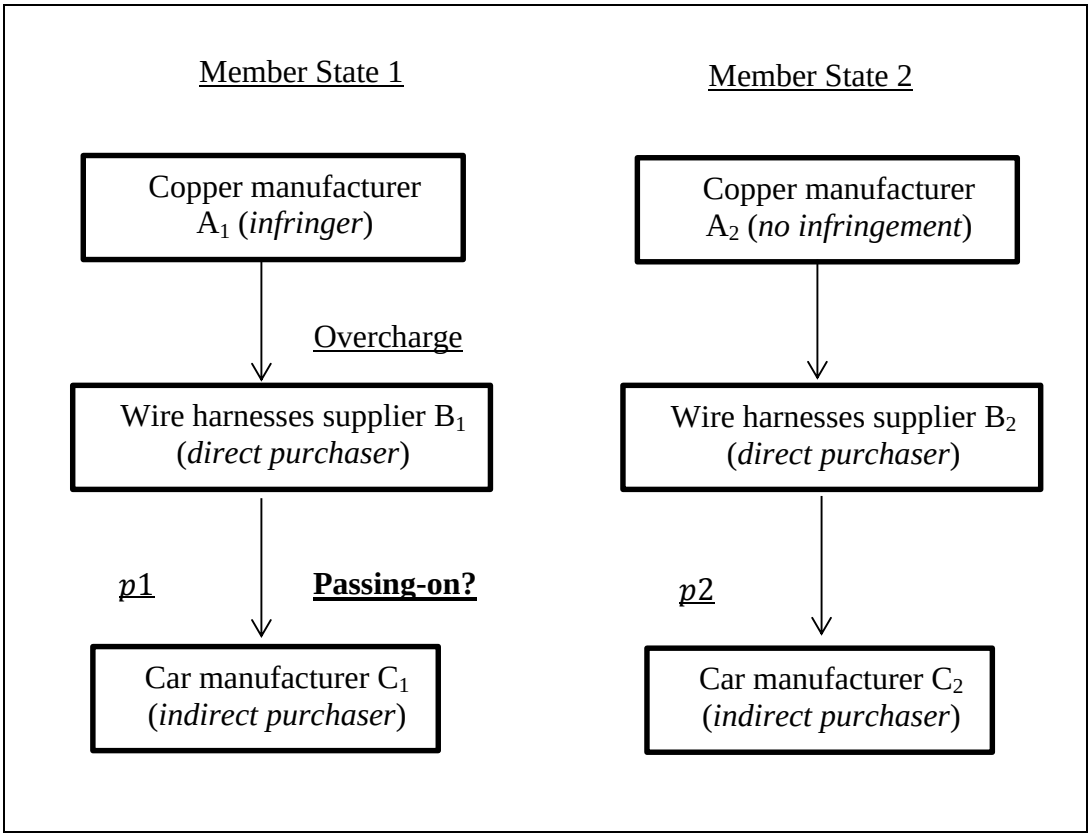
(101) A significant strength of this method is therefore that it can filter out changes unrelated to the passing-on related price effect that occurred during the same period as the passing-on. However, it rests on the assumption that other factors, in the example above the price of plastic, affect the markets similarly. If this is not the case, an econometric implementation of the difference-in-differences technique may be necessary. Such approaches are described in more detail below.

(102) As pointed out in the Practical Guide,[69] other methods may also be employed to construct a counterfactual. They are particularly helpful if historical data on prices, either in the infringement market, or the comparator market, is not available. In practice, this means that it can be impossible to observe price developments over time in the comparator or infringement markets. In such case another comparator based method could be employed, namely a method which compares different geographical markets. For example, as shown in Figure 2 below, a national court may consider the comparison of prices paid by the car manufacturer C_1 during the

(69) See Practical Guide, paragraph 49 et seq.

infringement period in Member State 1 (*p1*), with the average price paid by similar car manufacturers in Member State 2, i.e. on a separate geographical market which is unaffected by the infringement (*p2*). This method is referred to as cross-market comparison.[70]

Figure 2 Comparator based methods for quantifying passing-on



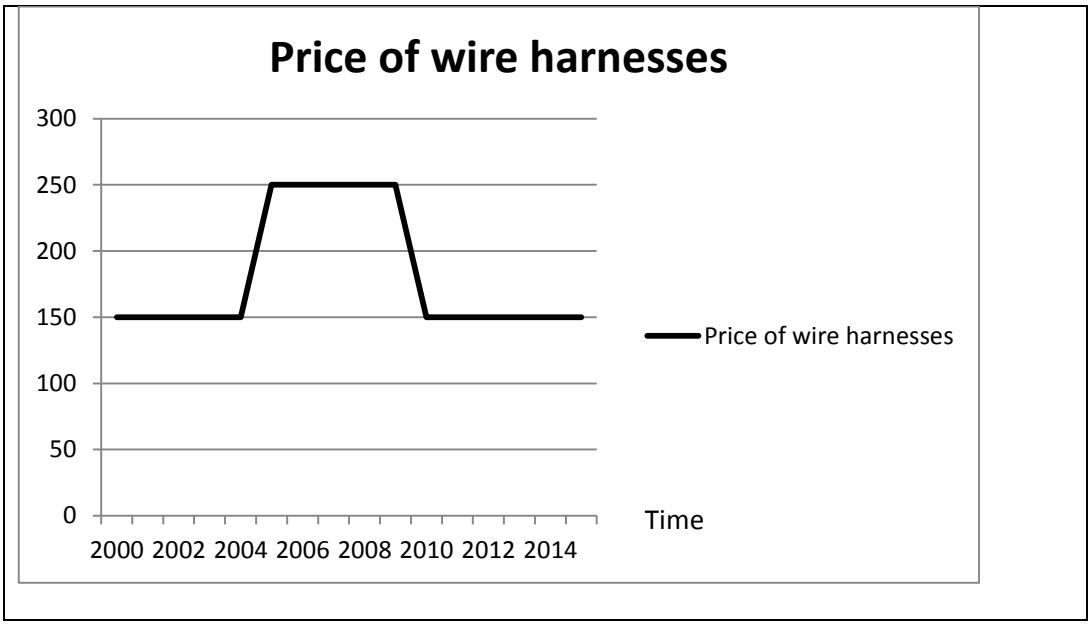
(103) If *p1* is found to be higher than *p2*, this indicates a passing-on related price effect from wire harnesses supplier B_1 to car Manufacturer C_1 in Member State 1. The same type of comparison can be undertaken with regard to any other economic variable, e.g. margins or volumes sold.

(104) It may not be possible to find another product market sufficiently similar to the infringement market for a cross-market comparison to be warranted. Another comparator based approach which can be applied would be to compare prices over time on the same market, i.e. before-after comparison.[71] In that case the comparator market is the exact same product market as the infringement market but analysed at different points in time. The approach is illustrated in Figure 3 below.

(70) This method has been employed frequently to assess the initial overcharge in actions for damages, see for instance the cases cited in footnote 45 of the Practical Guide.

(71) See practical Guide, paragraph 38-48.

Figure 3: Comparator based methods for quantifying passing-on- over time[72]



(105) In this example, it is assumed that the illegal price fixing in the copper-industry had a duration of five years from 2005 to 2010. In this period[73] the initial overcharge was passed-on to the car manufacturer C. When applying this method the price paid by the car manufacturer during the infringement period is compared to the price paid by the car manufacturer in a period not affected by the infringement and the pass-on, e.g. in 2003 and 2004. An example of a case where a claimant applied this approach is given in Box 5 below.

(106) When applying the methods described above it is necessary to control for factors other than the ones stemming from the infringement that may have affected the degree of pass-on. For example, when considering whether other markets or time periods are suitable as counterfactuals, the court should also take into account other factors affecting passing-on mentioned above in section 3 (dealing with the economic theory of passing-on). Moreover, other factors such as differences in input costs, inflation etc., may also vary between the different markets. In order to construct a plausible counterfactual, it is therefore crucial to take into account such factors. Various techniques to implement this approach are described below.

Box 5 Before, during and after comparison – the German car glass case[74]

The claimant in this damages action was an indirect purchaser from the members of a car glass cartel. The members of the cartel infringed Article 101 TFEU and were fined by the European Commission in 2008.

The claimants' experts carried out an analysis of the price developments before,

(72) For the sake of simplicity, this graph only illustrates the effect on price stemming from the infringement. In a real-world scenario prices will also be affected by other factors than the pass-on rate, such as inflation and other cost shocks.

(73) Note however that the issue of delayed pass-on, mentioned in Appendix 1, may be of importance when comparing prices during the infringement with price before and after.

(74) Regional Court Düsseldorf, decision of 19 November 2015, Case no 14d O 4/14 (*German Car Glass*).

during and after the cartel period. No regression or correlation analyses were run, rather, the experts sought to establish a link between the price of car glass (the cartelized product) and replacement car glass purely by observing the price patterns.

The court however considered that this analysis failed to show sufficiently any direct causal link between the pricing of the two products mentioned above. Hence, in this case this approach was considered to provide insufficient evidence of pass-on.

4.3.1.2. Implementing direct approaches in practice

(107) Various techniques are available for estimating passing-on related price effects based on the direct approach described above. Certain factors, such as an increase in the raw material costs in the example above, will in many cases influence only the comparator market or only the market affected by the pass-on. As explained above, adjustments should be made to the observed data in order to account for such influences. These could be simple adjustments to the data in cases where the influencing factor and the magnitude of its effects can relatively easily be accounted for.

(108) In certain cases, when the availability and quality of the data permit, adjustments of comparator data can be made on the basis of econometric techniques, in particular through the use of regression analysis. Regression analysis is a statistical technique which helps to analyse patterns in the relationship between economic variables.

(109) In a regression analysis, a number of data observations for the variable under consideration and the likely influencing variables are examined by means of statistical techniques. The relationship identified is usually expressed in the form of an equation. This equation makes it possible to estimate the effects of influencing variables on the variable under consideration and to isolate them from the effects of the infringement. Based on a regression analysis it is possible to estimate how closely the relevant variables are correlated with each other, which may in some instances be suggestive of a causal influence of one variable on the other.[75]

(110) The different techniques available for adjustments of comparator data are described in more detail in the Practical Guide.[76] By reference to examples and illustrations the Practical Guide provides guidance on the concepts, approaches and conditions for the application of the different techniques and should serve as the basis for dealing with issues regarding the approaches available to implement the comparator-based methods.

(111) As mentioned above, techniques based on econometric analyses may in certain cases entail considerable costs that may be disproportionate to the value of the damages claimed. In such cases, the court may find it sufficient to estimate the

(75) Regression analyses are explained in detail in the Practical Guide, paragraphs 69 et seq.

(76) Ibid, chapter II B.

pass-on by simultaneously assessing quantitative data without the use of regression analysis and by taking into consideration qualitative evidence.

(112) In the context of estimating pass-on based on qualitative evidence, internal documents describing a firm's pricing policy may be of particular relevance. When assessing internal documents the court should be aware of the fact that firms in different industries, or even within the same industry, may adopt different pricing policies. In some cases, a firm may have a clear policy or established practice which identifies the price adjustments that will result from specific changes in cost. In other cases the firm may seek to achieve certain performance objectives. For instance, the direct purchaser may apply a specific margin to the pricing of the products it supplies. In principle, such a policy suggests that they would pass on cost changes.

(113) Moreover, when assessing pricing policies, the court should also take into account whether the pricing policy of the relevant firm has actually been implemented, e.g. by considering price data to determine whether these correspond to the pricing policy in question.

(114) Examples of cases in which national courts have taken into consideration qualitative evidence are given below.

Box 6: Estimating pass-on based on qualitative evidence – *Cheminova* (2015)

In this judgement, the Court found that a producer of pesticide had passed on 50% of the initial overcharge to the indirect customers. This finding was based on economic theory predicting that 50% of an overcharge will be passed on if the direct customer is a monopolist facing linear demand. In this case the court could rely on publicly available market studies characterizing the market on which the direct customer was active as a monopoly market. In a report provided by the direct customer, it was argued that the market should in fact be characterised as competitive rather than a monopoly. For instance, the direct customer alleged that a large number of products were competing on the market and that moderate market shares indicated a competitive market. However, due to the facts of the specific case, the court disagreed with this approach.

Box 7: Estimating pass-on based on qualitative evidence – *DOUX Aliments* (2014)

In this judgement, the court found that the claimant had proved the absence of pass-on. The overcharge in this case concerned lysine, an input into production of chickens. The court found that lysine only represented 1 % of the costs of chicken production, and such a small increase in costs was not sufficient evidence to convince the court that it would also lead to an increase in prices of chicken. The Court found that the prices responded to other factors, such as competition with other meat products and buyer power. When concluding that the overcharge was not passed on to the indirect retailers, the court referred to the fact that chickens were sold in an international and competitive market and that grocery retail chains had strong buyer power.

(115) Furthermore, when applying comparator based methods in the estimation of overcharges, courts have also sometimes applied a so-called safety discount, i.e. deducted from the observed data values an amount sufficient to take account of uncertainties in the estimate.[77] If the implementation of econometric analysis is not feasible, such an approach may also be applied in the estimation of pass-on. The objective of such an approach would be to exclude the effects on the variable under consideration, for instance the price offered by the indirect customer, of other possible factors.

4.3.1.3. Challenges

(116) When estimating the passing-on related price effect the court may particularly consider techniques which, to an extent as large as possible, control for factors other than the one stemming from the infringement. The difference-in-differences method is such a technique. It requires information or data from a comparator market (for instance another geographical market) and time-series data from the market affected by the pass-on. However, the court should be aware that there are potential challenges that may affect how valid the comparator-based methods may be.

(117) As explained above, ideally the comparator-market is similar to the infringement market, but itself not affected by the infringement. However, the purchasers on each of the markets often use the same input. In such a case it might be difficult to find an unaffected comparator. In particular, if the scope of the infringement covers a broad geographic area, it is likely that products, similar to the product in question and incorporating the same input, have potentially been affected, as well. This can make it difficult to find a suitable comparator-market.

(118) Under other circumstances, the comparator-market may be indirectly affected by the initial overcharge. In the stylised example of the copper cartel mentioned in Figure 2, the wire harnesses supplier B_1 purchases copper from the infringer A_1. Even though the wire harnesses supplier B_2 in the comparator market does not purchase from the infringer A_1, the wire harnesses suppliers B_2 and B_1 may be competitors on the same geographic downstream markets. This implies that if wire harnesses supplier B_1 increases its prices in response to the initial infringement, its competitors may raise their prices, as well. In this case, the price that the wire harnesses supplier B_2 offers may have been indirectly affected by the infringement, and as a result may not provide a suitable comparator.[78]

(119) As regards comparison over time, it may be challenging to identify with sufficient precision the period when the market was affected by an infringement. The parties may present a decision issued by a competition authority which provides an infringement period, i.e. sets out dates at which the infringement started and ended. However, this period may not correspond to the period in which a market was actually affected by the infringement. It is also important to note that determining the dates of either, the infringement period or the period in which the market was affected, can have a strong impact on the outcome of the analysis.

(77) See also the Practical Guide, paragraph 95.

(78) This effect is similar to the effects of umbrella pricing mentioned in paragraph (37) above.

(120) As mentioned above, in reality the effect of the infringement may not be limited to the period provided in such decision.[79] On the one hand, the start date identified by the competition authority may post-date the actual start of the infringement, for instance due to lack of reliable evidence. On the other hand, the end date provided in an infringement decision may pre-date the end of the actual infringement.

(121) The effects of an infringement may also not be limited to the duration of the infringement. It is possible that the infringement will affect the market concerned even after the conduct prohibited under EU competition law has ceased. In particular, this may be the case in oligopolistic markets, if the information gathered during the infringement allows the suppliers of a certain product to adopt, on a sustainable basis after the infringement has ended, a course of action aimed at selling at a higher price than the competitive price, i.e. that would have been charged in the absence of the infringement, without engaging in practices prohibited by EU competition law.[80]

(122) The possibility that purchasers at different levels of the supply chain may delay passing-on the overcharge can also affect the comparison significantly.[81] The copper cartel example mentioned in Box 1 above may illustrate this. Suppose the car manufacturer C negotiates prices with the wire harnesses supplier B on an annual basis. The wire harnesses supplier B only adjusts prices once a year after the negotiations with the car manufacturer C have been finalised. If a price fixing cartel in the copper market is established just after the negotiations between the wire harness supplier and the car manufacturer are ending, it is only when the next year's annual negotiations take place that the wire harnesses supplier may have had an opportunity to pass on the copper-price increase in their own price.

(123) Hence, the delay of pass-on down the supply chain may result in difficulties when deciding the relevant period for comparing prices during and before or during and after the infringement (or both). The court may adjust the analysis by considering the nature of each case, for instance by analysing the pricing policy of the parties, and based on that introduce a certain time lag when analysing the pricing patterns at different levels of the supply chain.

4.3.2. Indirect approaches – estimation of pass-on rate

4.3.2.1. Overview

(124) The section above describes methods and techniques for direct estimation of the passing-on related price effect. In general, the direct method is preferable when it is feasible and proportionate to implement. This is due to the direct method's clear advantage of allowing for an estimation of pass-on based on the *actual* prices set by a direct or indirect purchaser during the infringement period. However, it relies *inter alia* on the availability of data on these prices. Such information may be

(79) See also Practical Guide, paragraph 43.

(80) See also the Practical Guide, paragraph 153. For example, a case in which a national court ruled that the prices charged in the five months after the infringement ended were still influenced by the cartel, see Higher Regional Court of Karlsruhe, decision of 11 June 2010 Case 6 U 118/05, also cited in the Practical Guide, paragraph 44.

(81) Moreover, undertakings may be aware that there is a risk of facing claims for damages, and that the scope of such a claim may be estimated based on post-infringement prices. Thus, they may have the incentives to maintain the price level after the infringement has come to an end.

available in many cases. However, if information on actual prices cannot be presented before the court, for instance if the court finds that disclosure of such information is disproportionate to the value of the claim in the case at hand, passing-on may be estimated *indirectly*.

(125) This indirect approach can be implemented by analysing how previous changes in a firm's costs have affected its prices before or after the infringement period. For instance, in the copper cartel example mentioned in paragraph (6) above, the pass-on rate may be estimated by analysing how historical changes in the cost of copper have affected the price of wire harnesses. Put simply, if an increase in the cost of copper by 10 € is followed by a price increase of wire harnesses by 5 €, the pass-on rate is estimated to be 50 %. To estimate the pass-on during the infringement period, the court could then combine this estimated pass-on rate with information on the overcharge and sales.

(126) However, the indirect method is not without risks and can even deliver misleading results in some cases. This is because when using the indirect method to estimate pass-on, the court can neither establish if the overcharge is actually passed on nor can it observe whether changes in the cost of the affected input are reflected in prices in the downstream markets. It is therefore crucial for the court to be aware that the indirect method relies on the assumption that, during the infringement period, changes in input costs are reflected in prices downstream. If this assumption is incorrect, this approach may produce estimates which are misleading in that they find a pass-on of overcharges where none has actually happened.

(127) When using the indirect method, the court should endeavour to estimate the pass on based on how changes in the cost of the affected input have previously been reflected in prices downstream. However, if such information is not available, the court may look at the development of other components of the purchaser's marginal cost and analyse how such cost changes affect downstream prices. In the hypothetical case set out in paragraph (6) and further modified and explained in paragraph (80) above, this means that a court could consider an analysis of the relationship between the price of wire harnesses and the cost of plastic (not affected by the infringement), and estimate a pass-on rate based on the latter relationship.

(128) In most cases the infringement at issue concerns the cost of an input which constitutes just one component of the purchaser's marginal cost. For instance, the wire harnesses supplier may have to pay more for copper if copper is affected by the infringement. However, the cost of copper will only represent a portion of the overall marginal cost.

(129) If the input affected by the infringement constitutes only a very small fraction of the marginal cost, even a significant increase in the cost of that input may hardly be detected in the purchaser's price data, even if it is passed on in full. Although an alternative approach may be to estimate the pass-on rate based on changes in costs of more significant inputs and not just the cost of the affected less significant input, such an approach comes at the price of the strong assumption of marginal cost increases being passed on at an identical rate irrespective of the source for the cost increase. Moreover, if a direct method, i.e. actual price based estimation, finds no statistically significant pass-on this can be considered as evidence supporting the hypothesis that no passing-on actually happened. In other words, the finding of no

pass-on by the direct method is not a valid or sufficient argument in itself to adopt an indirect method.

(130) As explained in Appendix 1, there are also good reasons why firms may not always pass on small changes in their marginal costs, at least not in the short run, even if they would pass on larger cost changes. Hence, it may not be legitimate to assume that the pass-on rate will be similar for different changes in the input cost. One explanation may be that the firm may incur so-called menu costs, and thus prefer waiting until marginal cost increases accumulate beyond a certain threshold before changing its prices. Another explanation could be that the direct purchaser may not have recognised that a relevant change in input costs has occurred.

(131) When assessing the indirect evidence of passing-on based developments of cost components that are not affected by the overcharge, the national court should in specific cases also take into account qualitative evidence showing that passing-on of small cost increases is in line with the commercial practice of the direct or indirect purchaser.

4.3.2.2. Methods

(132) The indirect approach requires information on the initial overcharge and the relevant pass-on rate. As a starting point, an estimate of the overcharge may have been already established in other proceedings or can be inferred from earlier court cases. If no prior estimation of the overcharge is available, the court may consider the techniques mentioned in the Practical Guide.[82] In such cases, upon request of the claimant, the court may order disclosure of relevant data from the infringer.

(133) An advantage of the *direct* method is that it allows for the construction of a counterfactual. As mentioned in paragraph (63) above, the purpose of this exercise is to isolate the effect of the infringement from other factors also affecting prices. While the *indirect* method does not allow for such an approach, it is still important to control for factors that are not related to the infringement. One approach may be to use quantitative techniques, for instance regression analysis,[83]. For instance, in the copper cartel example, a court may take into account an analysis of the relationship between the prices charged by the wire harnesses supplier and changes in the input costs of wire harnesses. However, other factors also may affect the price at the downstream level, e.g. the price for wire harness may also be affected by fluctuations in the demand of car manufacturers. If the court fails to take into account such additional factors, the estimated pass-on rate will most likely be biased.

(134) A regression analysis typically requires a large amount of data on costs and prices. Thus, for the purpose of estimating the pass-on rate, the court may alternatively consider whether estimates from other sources could provide a reasonable estimate for the pass-on rate in the case at hand. Examples of such other sources may include pass-on rates found in other cases concerning the same industry or in other industries, academic studies relevant for the industry in the case at hand or evidence provided in witness statements. This is a particularly viable alternative when the

(82) See Practical Guide, paragraph 26 et seq.

(83) The concept of regression analysis is explained in detail in the Practical Guide, chapter II (2).

necessary data is not available or quantitative methods fail to include relevant control factors.

(135) However, it is crucial for the court to be aware of the fact that estimates based on other sources bear the risk of not taking into account factors relevant for the pass-on rate in the case at hand. In particular, it may be important to consider the methodology underlying the estimate found in other sources and the sensitivity of any result to potential differences between such an estimate and the pass-on rate in the case at hand. To do this, the court may take into account the relevant insights from economic theory, as explained in section 2.4 above and in Appendix 1, such as the degree of competition. If there is only limited information e.g. on the different market conditions or how the pass-on rate was determined, the indirect method may not be suitable.

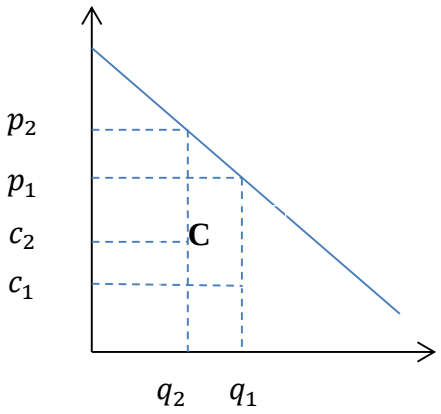
4.4. Quantification and estimation of volume effects

4.4.1. Introduction

(136) As set out in paragraph (11) above, victims of infringements of EU competition law have the right to full compensation. If passing-on is taken into account without the volume effect, this underestimates the true harm. Hence, the estimation of the volume effect is as essential as the estimation of the passing-on related price effect.[84]

(137) As illustrated in Figure 4 below, the volume effect refers to the profit-loss due to reduced sales that result from passing-on, i.e. less volume sold because of increased prices. In the sequential approach, mentioned above in paragraph (71), the third step in a full quantification of the damages from overcharges is to estimate the magnitude of the volume-effect.

Figure 4: The volume effect



(84) National courts in EU have in several cases confirmed the importance of estimating the volume effect. For instance, in Case U 2014/15, Oberlandsgericht Karlsruhe, 2016, a German court found that the passing-on of an overcharge may subsequently lead to a reduction in the quantity sold by the direct purchaser.

(138) The volume effect corresponds to the difference between q_1 and q_2. The lost profit from the loss in sales is given by the area C, which is obtained by multiplying this lost volume with the profit margin (p_1-c_1) achieved by the purchaser in the counterfactual, i.e. the margin the purchaser would have earned in the absence of the infringement without any passing-on.

(139) The estimation of the volume effect requires an assessment of two factors, namely (i) the change in quantity due to increased prices and (ii) the counterfactual margin. The estimation of these factors requires data on parameters other than the ones necessary for the estimation of the passing-on related price effect. The availability of data is also a crucial element for the court to consider when estimating the volume effect. Depending on the data available, different methods may be employed. These are described in more detail below.

4.4.2. Direct approach

4.4.2.1. Data/information needed

(140) The direct approach for the purpose of estimating the volume effect requires information on (i) the observed quantity sold by the firm affected by the overcharge, (ii) the counterfactual volume sold and (iii) the price-cost margin that would have been achieved by the purchaser absent the infringement. Upon request of the other party, the court may order disclosure of such data from the relevant purchaser. However, it is important to note that the observed price-cost margin is not the relevant margin required to estimate the volume effect. For instance, if the purchaser passes on half of the overcharge, this will reduce its margin, implying that the observed margin will be smaller than the counterfactual measure. In this case, using the observed margin would understate the size of the volume effect.

(141) Moreover, the court should be aware that the relevant margin to estimate the volume effect does not necessarily correspond to standard measures of a firm's accounting margin, such as “Earnings before interest and taxes” (EBIT) or the net income of the firm.

(142) The relevant margins for the assessment of the volume effects are defined by the prices of the relevant products subtracted by the avoided costs, i.e. costs that have been saved as a result of the output reduction. Hence, in addition to an assessment of which costs are considered to be avoidable, the court may order disclosure of prices of the relevant products. In this context, it may also order disclosure of internal documents providing information on the contribution margins the purchaser uses for its own pricing decisions.

4.4.2.2. Methods and challenges

(143) The lost profit associated with the volume effect can be estimated directly by multiplying the counterfactual margin by the reduction in sales volumes stemming from the pass-on of overcharges.

(144) Using the relevant data from the claimant, the court may consider the comparator-based techniques described above to estimate the counterfactual margin and the counterfactual quantity. Since the observed profit margin and quantity may be affected by other factors unrelated to the infringement, it will in many cases be

necessary to control for such additional factors. Hence, the court should endeavour to employ one of the approaches described above in order to control for factors unrelated to the infringement, for instance by developing a regression analysis.

(145) If the data needed to perform the difference-in-differences approach is not available, the court may consider other techniques described above, i.e. cross-market comparison or comparison over time. However, if such techniques are employed, it is also important to construct a sound counterfactual, taking into account factors varying between the different markets or time periods.

(146) The comparator based methods rest on the assumption that the reference period or market are sufficiently similar, in particular with respect to market characteristics that are relevant for profit margins such as the level of competition in the market or the cost structure of the suppliers. These assumptions are not easily verified, as a large number of factors and strategic decisions are likely to determine a firm's margins.

4.4.3. Elasticity approach

(147) The volume effect may also be estimated by combining the price increase observed as a result of passing-on related price effect with an estimate of the price sensitivity of the relevant demand. As mentioned above, the price sensitivity of demand determines the strength of the relationship between price and demand. For example, if a price increase of 1 € is associated with a significant reduction in the quantity purchased, demand is said to be more price sensitive than if the purchase quantity reduction is less important for the same price increase of 1 €. The so-called price elasticity of demand shows the percentage change in demanded quantity associated with a one percent price increase.

4.4.3.1. Methods and information needed

(148) In general, the decrease in volume, illustrated by the decrease in sales from q_1 to q_2 in Figure 4 above, will be affected by a firm's own price increase as well as changes in the prices of the competitors.[85] Hence, the magnitude of the loss in volume will require an assessment of how the passing-on has affected prices of all competitors in the market, as well as the sensitivity of demand to those price changes. When applying this method, the volume effect[86] is estimated by multiplying the volume loss by the counterfactual margin.

(149) The data requirements when estimating the volume effect by employing the elasticity approach will depend on whether the relevant firms are equally affected by the overcharge, i.e. whether it is an industry-wide overcharge. If this is the case, any loss in sales would normally concern products and firms outside the market. Further, the volume effects of both the own-price and the cross-price elasticity could be captured by the market price elasticity. Under such circumstances the volume effect may be estimated based on the counterfactual margin, the market elasticity of demand and observed prices and quantities, given by p_1 and q_2.

(85) Given that firms compete on prices.

(86) The volume effect is illustrated by area C in Figure 5 of the Appendix 1.

(150) The counterfactual margin may also be estimated by employing the direct approach. A quantitative estimation of the market elasticity of demand may require a vast amount of data on prices and quantities, which may not be available or proportionate in a specific case. Under such circumstances, the court may find it sufficient to use other sources of evidence, for instance information in previous market studies of the relevant market or internal documents providing information on the relevant elasticity.[87]

(151) As explained in paragraph (179) et seq., firms may also have the incentive to raise prices and reduce output in response to firm-specific overcharges. In such cases it might be necessary to estimate both the firm's own-price elasticity and the cross-price elasticity, i.e. how a firm's volume sold changes when this firm changes its own prices and how a firm's volume sold is affected by price changes of other firms active on the market. The extent of the second effect will depend on whether the products offered on the market are close substitutes or not. Thus, if the rival's products are not close substitutes, it may be inferred that competitor responses are unlikely to affect the volume sold significantly, even if it is not possible to measure these effects accurately, for instance due to availability of data.

4.4.3.2. Challenges

(152) When employing the elasticity approach the court may estimate the relevant elasticity parameters. One way to do this is to develop a demand model and use econometrics. However, as mentioned above, such an approach is demanding in terms of data requirements and assumptions. If data is not available and other sources are used, e.g. market studies or information from previous cases, it is important to note that such sources may not be appropriate if the market in the case at hand is different from the market described in the studies in terms of market structure. Under such circumstances, the elasticity approach might not provide an accurate estimate of the volume effect.

(153) As mentioned in the introduction of this section on quantification, the three potential components of the harm in a damages case derive from the initial overcharge, the pass on effect and the volume effect.[88] The court may choose to estimate the three components sequentially, where quantification of the overcharge would constitute the first step, estimation of the passing-on related price effect the second step and the estimation of the passing-on related volume effect the third step.

5. ANNEX 1 – ECONOMIC THEORY

5.1. Introduction

(154) This appendix explains in more detail the insights from economic theory relevant in the context of estimating the pass-on. As described in paragraph (45) et seq. above, different factors may affect the degree of passing-on in a given case, such as the nature of input costs subject to an overcharge, the nature of the product demand

(87) See for example Case no U-4-07 – Cheminova v Akzo Nobel, judgement of 15. January 2015.

(88) See paragraph (71).

faced by the direct or indirect customer, the nature and intensity of competitive interaction between the firms in the market where the direct or indirect customers are active and other elements such as the share of a firm's various inputs affected by the overcharge or the time horizon of the infringement.

5.2. Input costs and their effect on pricing decisions

(155) As explained in paragraph (42) above, the initial overcharge results in an input cost increase for purchasers of the overcharged products or services. Whether these purchasers are able and willing to pass-on the overcharge to their own customers – and, if so, to what extent – depends, among other factors, on the cost structure of the purchasers. Below, the impact of fixed and variable costs and the structure of contracts between firms at different levels of the supply chain on the degree of overcharge pass-on is further explained.

(156) To identify passing-on effects, it is important to determine whether the input cost incurred by a purchaser facing an overcharge varies with the input quantity it orders (i.e. variable input cost) or not (i.e. fixed input cost). Indeed, economic theory indicates that the relevant cost category for short run price formation is variable cost or more precisely, marginal cost; that is, the cost increment incurred when purchasing one additional input (see Box 8 below). The opposite of such costs are fixed costs which, in turn, typically affect the long run strategic decisions of firms, such as market participation, product introduction and level of investment.

Box 8: Examples of marginal and fixed costs

In order to explain the concepts of marginal (variable) and fixed costs it is useful to consider the stylised examples of the copper cartel already mentioned in Box 1.

For instance, the variable costs of the wire harnesses supplier would be the costs associated with producing one additional wire harness. Such costs may include inputs needed to produce the additional wire harness, (including copper and plastic) electricity and labour-costs associated with the additional production.

However, the wire harnesses supplier also incurs fixed costs in its production, such as marketing of its products and investment in new machinery. These costs are not affected by the production of one additional wire harness, and are hence considered to be fixed.

(157) It is typically the impact of the overcharge on the purchaser's marginal or variable costs that would be the relevant starting point for the assessment of passing-on effects.

(158) Contracts between firms at different levels of the supply chain, which set out the conditions at which firms would supply their products or services to purchasers may concern components considered either as variable or fixed costs. For instance, often some components of the price paid by a purchaser are not dependent on the volume purchased, whereas some other components are. It follows, that in a damages case involving any pass-on argument it is important to determine whether

the price components affected by the infringement are fixed or not from the point of view of the purchaser.

(159) In the extreme case where only a fixed price component is increased by the infringer no passing-on in the form of an increase in the price set by the purchaser on its own product is to be expected in the short run. However, in the long run fixed input price components could affect strategic decisions of firms. Hence, the effect of the increased fixed input prices might also be relevant from a passing-on point of view. For example, if the high fixed input price component set by the infringers induces exit of one or more of their direct purchasers from the market where they have been active, the competitiveness of that market would be reduced, thereby leading to higher prices set by the remaining purchasers. In other words, the higher input costs from the increased fixed component is to some extent affecting the active purchasers' prices and hence also passed-on to the indirect purchaser.

(160) The time frame over which pricing is considered will affect whether costs are categorized as variable or fixed. Generally, economic theory suggests that the longer the relevant time frame, the greater the proportion of total costs that should be considered as variable. In other words, a certain cost category which is viewed as fixed in the short run might be regarded by the firm as variable when considering a longer time frame. When assessing the relevant time frame in a specific case, the court may have regard to information from the party's internal documents, e.g. information on which costs the firms take into account in their own pricing decisions.

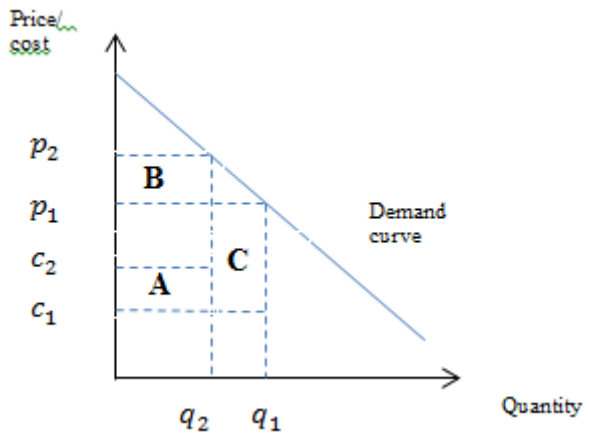
(161) The considerations of fixed and variable costs are of particular importance for the court when the volume effect is estimated, as the estimation of this effect requires an assessment of the margin of the firms involved in the case at hand.

5.3. **Characteristics of demand and links to prices**

(162) Another factor crucial for estimating pass-on effects is the nature of demand the direct purchasers face on the market where they are active. In economics, the relationship between demand and the price level is an important factor in describing the working of a market. In any market, demand is referred to as the quantity of the good or service in question that purchasers on this market would buy at a given price level.

(163) Most typically, the association between demand and the price level is negative. That is, the higher the price level the lower the aggregate quantity of the products that the purchasers on the market are willing to buy. The price sensitivity of demand determines the strength of the relationship between price and demand. If, for example, an increase in price of 1 € is associated with a significant reduction in the quantity purchased demand is said to be more price-sensitive than if the purchase quantity reduction is less important for the same one euro price increase.

Figure 5 The demand curve



The standard downward sloping inverse demand curve is illustrated in the figure above.[89] As illustrated, a relatively high price level, i.e. P_2, correspond to a relatively low quantity supplied, i.e. q_2.

Area A in the figure corresponds to the overcharge from the infringement. The direct purchaser is harmed by the price increase as it faces higher input costs, given by C_2- C_1. The passing-on related price effect is illustrated by area B, while its volume effect is illustrated by area C. These effects are further explained below.

(164) A commonly used summary of the demand's own price sensitivity is the so-called price elasticity of demand. The price elasticity of demand shows the percent change in demand quantity associated with a one percent price increase. For example, a firm's own price demand elasticity of -0.5 means that a one percent price increase is associated with a 0.5 percent reduction in demand. An elasticity of -0.2, on the other hand, implies only a 0.2 percent reduction in demand for a one percent price increase. In the latter case, demand is said to be less elastic than in the former case, that is, less price sensitive as the purchase quantity reacts less strongly to the price increase.

(165) In the context of passing-on from a direct to an indirect customer, the demand the direct customer faces is the one of interest. The indirect customers might reduce their demand as a response to a price increase by the direct customer. In a damages action before a national court for an infringement of EU competition law, this price increase may result from the passing-on of some or all of the input cost increase from the direct purchaser to the indirect purchaser.

(166) The extent of the volume effect is directly affected by the price sensitivity of the demand. This is because the price sensitivity determines the reduction of demand

(89) The figure illustrates prices (vertical axis) as a function of quantity demanded (horizontal axis). This demand curve is often referred to as the "inverse demand curve", while a curve depicting demand on the vertical axis as a function of prices on the horizontal axis is simply referred to as "demand curve". In the subsequent graphical examples, inverse demand curves are shown. However, for ease of language they are referred to as "demand curves".

following a price increase. For a given price increase, the reduction of output is larger the more price sensitive is the demand. Therefore, the volume effect, i.e. the profit lost by the infringer's customer due to the reduction of output (demand), is closely linked to the price sensitivity of demand.

(167) The extent of the passing-on, and hence the size of the passing-on effects, is also related to the relationship between demand and the price level. In this case, however, it is not the demand price sensitivity that is directly relevant. It is rather the change of the demand price sensitivity as the price level changes. This change of the price sensitivity with respect to the price level is referred to as the curvature of demand.

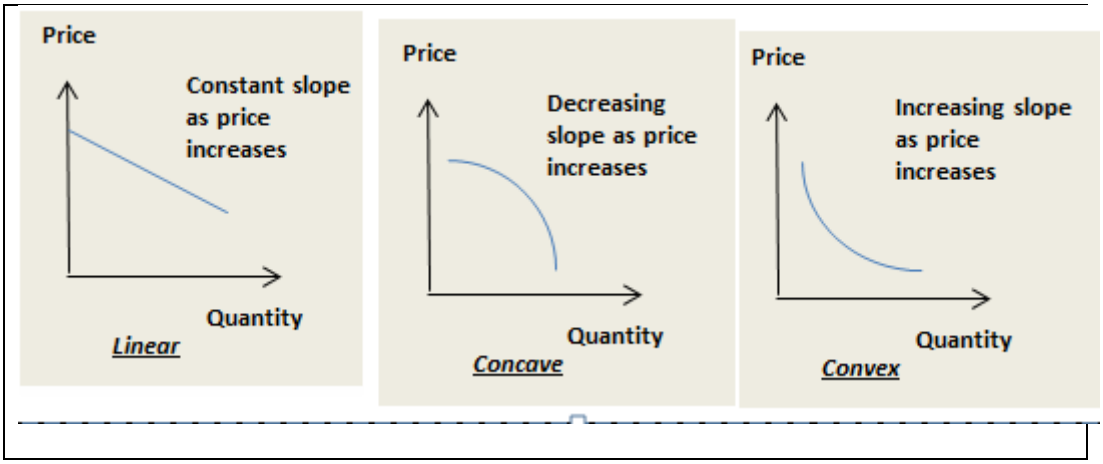
(168) The curvature of demand is the rate at which the responsiveness of demand to price-changes varies as price or output changes. When the demand curve is linear, as shown to the left in Box 9 below, it has no curvature and the slope is constant. In the case of convex demand, illustrated to the right in Box 9 below, the demand becomes less sensitive to price changes as the price increases. This may be the case if the products or services affected by the overcharge are characterised as essential goods. An example may be the demand for drinking water, because a customer may be decreasingly sensitive to a price increase as the quantity available is reduced.

(169) Conversely, if the demand curve is concave, as shown in the centre of Box 9, the demand becomes more sensitive to price changes as price increases. This could for instance be the case if a substitute of the product affected by the overcharge is available to the customer. An example may be the demand for gasoline. At a certain price level, the customers may switch their consumption away from cars using gasoline to electrical cars. This would imply that the demand for gasoline will become more sensitive to price changes, as more customers switch their supply if the price on gasoline increases.

(170) The curvature of the demand curve may have a significant impact on the passing-on of overcharges. For a given level of competition the pass-on of an industry wide overcharge will increase the more convex the demand curve is. If demand is sufficiently convex, the pass-on rate may exceed 100 percent.

Box 9: The curvature of demand

Depending on the characteristics of the market, the demand curve may be linear, convex or concave as illustrated below. The downward shape of a demand curve indicates that, as price decreases, customers will demand more of a product. The slope of the demand curve illustrates how the quantity of demand changes with the price. A steeper demand curve implies that demand is less sensitive to price increases.



5.4. A firm's pricing decision

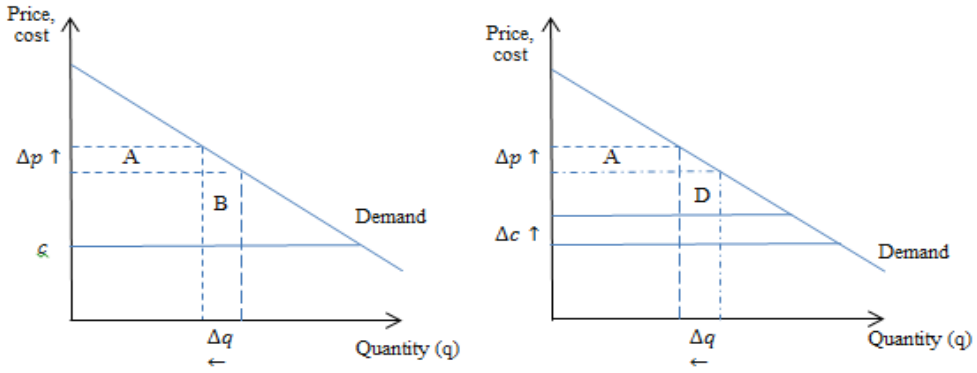
(171) As explained above in paragraphs (46) and (47), a firm's incentive to pass on an overcharge to its customers is determined by the type of demand and costs concerned.[90] According to economic theory, a firm will adjust prices only where this will increase profits. However, in order to receive a higher price, a firm will usually have to accept reduced sales. The assessment of the trade-off between increased profit from higher prices and decreased profit from reduced sales is important to understand the extent of the passing-on effects in damages actions.

(172) This trade-off is presented in a stylised way in Box 10 below. If a firm, for instance a direct customer of a producer of raw materials, increases prices, the effect on profit from higher prices may be illustrated by the area A in the left section of Box 10. The accompanied lost profit stemming from decreased sales is equal to the area B. When the effect of another small increase in the price is such that area A is equal to area B, there is no scope to earn additional profit through further price adjustments. If prices are increased beyond this point, the profit margin lost through the resulting reduction in sales volumes will outweigh the increased margins earned on the remaining sales.

(173) If the direct purchaser faces higher costs of raw materials, for instance if the suppliers of raw material increase prices in violation of Article 101 TFEU, this may alter the terms of the trade-off described in paragraph (172) above. An increase in the direct customer's costs will reduce the margins earned on the sales at the prevailing price. In profit terms, this makes it less costly to increase price at the expense of losing some sales. The lost profit due to lower sales when costs have increased is the area D in the right section of Box 10 below. As area D is smaller than area B, the direct customer has an incentive to increase its price in response to the cost increase, i.e. to pass on the cost change, at least to some extent.

(90) See also "Guidelines on the application of Article 81 (3) of the Treaty" (2004/C 101/08), paragraph 98.

Box 10 Trade-off between price increase and lost sales



5.5. Intensity of competition and links to passing-on

5.5.1. Continuum of competitiveness of markets

(174) At a given level of the supply chain, competition between firms can be more or less intense. At one extreme, when a firm is a monopolist at its level of the supply chain, there is no competition. At the other extreme, competition between firms can be very intense (e.g. when many firms sell rather homogeneous products in a market with low barriers to entry), such that each firm acts as a price-taker and does not influence market prices which will be at or very close to the marginal cost of production. This latter case is referred to as perfect competition. In between these two extreme cases lies a broad range of intermediary scenarios, where competition could be more or less intense, depending on, e.g. the number of firms in the industry or whether products sold by different firms are close substitutes or not.

(175) Such market competitiveness directly impacts passing-on. In the benchmark case of perfect competition, industry-wide cost shocks are passed on by 100 percent to direct customers. Such stylized market structure of perfect competition may function as a benchmark for the court when assessing passing-on effects (even though in real world markets it is less often observed).

(176) By contrast, under monopoly or various intermediary scenarios, the pass-on of an overcharge may not be 100 percent, but instead can lie below or above this threshold. Therefore, when dealing with damages actions before national courts for infringements of EU competition law estimating passing-on and the volume effects is generally relevant in addition to estimating the overcharge, whenever the market structure departs from the benchmark of perfect competition.

(177) One example of market structures characterised by imperfect competition is a market with differentiated products. Differentiation can arise either in terms of product characteristics or geography. For instance, the direct purchasers may offer products which differ from each other in their actual quality, respectively the quality perceived by the customers of the product. Alternatively, due to different location of the direct purchasers, the transportation cost of the goods offered may vary to different customers (whose location might also differ). Differentiation can

make products less than perfect substitutes of each other. Customers might not view all products as perfectly interchangeable.

(178) This less than perfect substitutability might result in reduced competitive pressure on suppliers who may not face competitors offering closely interchangeable products. In other words, according to economic theory the intensity of competition will be reduced when product differentiation increases. As explained in paragraphs (175) et seq. above, weaker competition will decrease the pass-on rate of an industry wide overcharge, i.e. as the differentiation of the direct purchasers' products increases, the pass-on rate of the industry-wide overcharge they were subject to will approach the rate where each direct purchaser is a monopolist. Conversely, when the product differentiation is limited, the pass-on rate of an industry-wide overcharge will be larger.

5.5.2. Industry-wide vs. firm-specific overcharge and pass-on

(179) The passing-on of overcharges by a given purchaser vis-à-vis its own customers typically differs, depending on whether the purchaser's competitors are also affected by the overcharge or not. When a single purchaser is impacted by the overcharge, the passing-on will necessarily be firm-specific. By contrast, if all purchasers at a given level of the supply chain are impacted by the overcharge, one may consider pass-on rates for each firm, but also the industry-wide pass-on.

(180) If only one purchaser is affected, i.e. the overcharge is firm-specific, the passing-on effects could be rather limited, in particular when this purchaser is not able to affect selling prices in its market due to intense pressure from its competitors.

(181) Conversely, where all the undertakings in a market are affected by an overcharge, i.e. the overcharge is industry-wide, all of the undertakings will face higher input costs, implying that they may be able to pass on at least part of the overcharge to their own customers. However, an industry wide overcharge may still affect different competitors differently.

5.6. **Some further factors impacting pass-on**

(182) In some markets firms sell multiple products, e.g. in grocery retail markets. In such markets products may be interrelated through their demand, for instance if a retailer sells competing brands of many product categories. If the products are substitutes, a cost shock on one product may also affect the prices of other products sold by the retailer. A change in the price of other products may also change the price of the product directly affected by the cost shock. Hence, such feedback effects from other products may increase the initial cost pass-through in markets where firms sell multiple products.

(183) To which extent a passing-on effect is observed, may also depend on the time horizon taken into account when estimating such effect. Particularly, the passing-on of an overcharge down the supply chain may be delayed for a number of reasons. Firstly, the initial overcharge may only affect the fixed costs of the firms facing the overcharge. Even though the relevant starting point for the assessment of passing-on effects is the impact of the overcharge on the purchaser's marginal or variable

costs, an increase in fixed costs could affect the strategic decisions of a firm and hence also the passing-on effects, as explained in paragraph (159) above.

(184) Moreover, as mentioned in paragraph (50), firms may incur so-called menu costs in changing prices, i.e. costs associated with the process of price adjustment. If this is the case, a firm will prefer to limit the number of price changes it makes and may pass-on an overcharge only after some time, for instance wait until marginal costs increases accumulate beyond a certain threshold. In certain cases, the overcharge may constitute such a small increase in marginal cost that the affected purchaser may not find it profitable to pass-on the overcharge at all. The possible impact on the estimation of pass-on effects from the existence of menu costs is further discussed in section 4.3.2.1.

(185) Under some circumstances, an indirect purchaser may be able to use its negotiating strength to limit the ability of a direct purchaser to pass on an overcharge. The indirect purchaser's negotiating strength may be referred to as countervailing buyer power.[91] Buyer power is not only limited to the ability to switch to other suppliers, but also e.g. to integrate upstream or the bargaining power of the buyers.

(186) In general, buyer power will not prevent passing-on if there is an industry-wide overcharge but it will affect the degree of passing-on. On the one hand, one can think of a scenario where strong buyer power forces the direct purchasers to swallow the overcharge and thus limit passing-on. One the other hand, one could also think of a scenario where the strong bargaining power of the indirect purchaser forces direct purchasers to make a zero mark-up and to sell at a price only covering their marginal costs, thus leading to a pass-on rate of 100% in case of an overcharge.

(187) As the degree of buyer power and its implications for the passing-on effects will depend on the nature of the individual negotiations and the specific context in which they take place, the court may assess this topic on a case-by-case basis.

(188) Further, if the direct purchaser facing an overcharge is vertically integrated into a downstream retail market, i.e. also active on the market where the indirect purchasers operate, this may affect the direct purchaser's incentive to pass on the initial overcharge. In such a scenario, the direct purchaser facing an overcharge (i.e. an increase in marginal costs) will typically pass on the entire overcharge within the integrated firm. However, the pass-on rate to non-integrated indirect purchasers would generally differ from this, e.g. depending on the level of costs or profit margins of the different indirect purchasers.

(189) In certain industries, the price offered by the direct or indirect purchaser may be subject to regulation, e.g. price regulation by governmental agencies. Price regulation may affect the extent of passing-on. For instance, if the regulated price is set independently of the specific costs of the product subject to an overcharge when setting the price, the passing-on related price effect may be limited or null. However, as also mentioned in paragraph (44), harm stemming from a violation of

(91) The assessment of countervailing buyer power is an important factor in the area of EU merger control. In the Commission's guidelines for horizontal mergers paragraph 64, countervailing buyer power is defined as the bargaining strength that the buyer has vis-à-vis the seller in commercial negotiations due to its size, its commercial significance to the seller and its ability to switch to alternative suppliers.

EU competition law may also affect non-price factors. On the other hand, if the regulator fully takes into account the cost of the product subject to an overcharge when setting the regulated price, the degree of passing-on may be substantial also in regulated markets.

6. ANNEX 2 – GLOSSARY

(190) This appendix gives an overview of economic terms used throughout the guidelines.

- Curvature of the demand: The change of the elasticity of demand as the price level changes.
- Demand: The quantity of a good or service that purchasers on a market would buy at a given price level.
- Demand curve: An illustration of the relationship between the quantity demanded and the price of a product..
- Econometric technique: Also referred to as regression analysis, this technique is statistical in its nature and helps to analyse patterns in the relationship between economic variables, for instance how the development of costs affect the development of prices in a given market.
- Elasticity of demand: Percentage change in quantity demanded in response to a one percent price increase.
- Firm-specific overcharge: Only one single purchaser is impacted by the overcharge.
- Fixed costs: Costs that do not vary with the quantity of output produced.
- Industry-wide overcharge: All purchasers at a given level of the supply chain are impacted by the overcharge.
- Marginal cost: The increase in total costs that arises from an extra unit of production.
- Slope of the demand: Ratio of a change in quantity to the change in prices between two points of the demand curve chosen arbitrarily close to one another.
- Variable cost: Costs that vary with the quantity of output produced.