Quantifying Antitrust Damages in Civil Proceedings:
A Pragmatic Approach

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This contribution presents several methods and techniques that can be used to estimate private antitrust damages depending on data availability, the applicable legal rules and case specificities. Since these methods and techniques vary in their assumptions, their results also vary in accuracy and precision for each case. This contribution therefore proposes a pragmatic approach to damages estimation, in which the biases of the chosen methods are clearly identified. It also makes the point that regression analysis is an intuitive technique that has the potential to provide a good level of accuracy and be relatively simple to implement by economic experts, as long as it is based on a good understanding of the functioning of the industry and the working of the antitrust infringement.

Cette contribution présente plusieurs méthodes et techniques qui peuvent être utilisées pour estimer les dommages résultant d'infractions au droit de la concurrence selon la disponibilité des données, les règles de droit applicables et les spécificités du cas. Puisque ces méthodes et techniques reposent sur des hypothèses différentes, leurs résultats varient également dans leur degré d'exactitude et de précision pour chaque cas. Cette contribution propose dès lors une approche pragmatique pour l'estimation des dommages, selon laquelle les biais des méthodes choisies sont clairement identifiés. Cette contribution explique également que l'analyse de régression est une technique intuitive qui a le potentiel de fournir un bon degré d'exactitude, tout en étant relativement simple à mettre en œuvre par des experts économiques, à condition d'être basée sur une bonne compréhension du fonctionnement de l'industrie et de l'infraction au droit de la concurrence.

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1. Introduction

The Court of Justice of the European Union has made it clear that victims of antitrust infringements have a right to be compensated for the harm they suffered.[2] However, the Commission's 2008 White Paper on antitrust damages actions identified a number of legal and procedural obstacles that these victims often face to obtain compensation. On this basis, the Commission proposed measures to ensure that victims of competition infringements have access to effective redress mechanisms in all Member States of the EU.[3]

One of the measures that the White Paper announced was the preparation of non-binding practical guidance on the quantification of antitrust damages to offer assistance to national courts and parties involved in private actions for damages. To that effect, DG Competition commissioned an external study[4] and consulted a number of economic experts.[5] Building on these various contributions and recent national and European court decisions, the guidance paper announced in the White Paper will aim at providing an overview of the various methods and techniques available to quantify antitrust damages, together with a number of practical illustrations.[6]

In light of these developments, this contribution provides personal views on some of the key issues regarding the quantification of private antitrust damages. In particular, it reviews some of the methods commonly used in civil proceedings and highlights that they all rely on a range of assumptions. The suitability of a particular method therefore depends on whether its assumptions appear reasonable in the case at hand, which should be assessed in light of data availability and the applicable legal rules, in particular regarding the standard and burden of proof. Further, this contribution makes the point that multiple regression analysis generally offers a good balance between accuracy and ease of implementation (when it can be carried out). Regression analysis allows for a refined application of comparison-based methods; as such, it is an intuitive technique and the various parties involved should be able to understand its main underlying assumptions.

This contribution is structured as follows. Section 2 highlights the importance of conducting a case-specific analysis for quantifying damages due to the wide range of effects of antitrust infringements. Section 3 illustrates how standard techniques can be

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[2] Case C-453/99, *Courage and Crehan,* [2001] ECR I-6297, and Joined Cases C-295−298/04, *Manfredi,* [2006] ECR I-6619.

[3] See the White Paper on damages actions for breach of the EC antitrust rules, COM(2008) 165, 2.4.2008 ("White Paper").

[4] Oxera / Komninos *et al.*, "Quantifying antitrust damages. Towards non-binding guidance for courts", Study prepared for the European Commission, December 2009, available online at http://ec.europa.eu/competition/antitrust/actionsdamages/quantification_study.pdf.

[5] DG Competition held in January 2010 a workshop with economist experts, whose written submissions are posted at http://ec.europa.eu/competition/antitrust/actionsdamages/economist_workshop.html.

[6] European Commission's Work Program for 2011, page 9 of the annex, available at http://ec.europa.eu/atwork/programmes/docs/cwp2011_annex_en.pdf.

used to estimate private antitrust damages. Section 4 underscores some of the trade-offs involved in the choice of different methods and techniques for estimating damages, and proposes a pragmatic approach to this question. Section 5 concludes.

2. The need for a case-specific approach

Judges assessing private antitrust damages within the relevant legal framework may be facing very different factual situations. For instance, they may be considering the effect of a cartel on the price paid by direct customers, or they may be considering the harm of a competitor abusively excluded from the market by a dominant competitor. Furthermore, within specific infringements, there are a wide variety of possible effects. This means that a general approach which does not reflect the specificities of a particular case are bound to significantly over- or under- estimate antitrust damages. An assessment of damages to victims of antitrust infringements therefore calls for a case-by-case analysis.[7]

Cartels for instance may lead to different effects depending on the specificities of the case. Indeed, the capacity of a cartel to successfully raise prices depends on the ability of its members to coordinate and to deter cheating, and on the strength of external constraints (such as new entry). In this context, cartel success will depend on both market characteristics and on the mechanisms set in place by cartel members to deal with potentially destabilizing factors.[8] For example, are there demand fluctuations that make it more difficult to agree on the terms of coordination and to detect cheating? If so, how is the behavior of the various cartel members monitored? These are just some of the elements that may affect not only by how much, but also how long, cartels may manage to increase prices. Although the magnitude of cartel overcharges is essentially an empirical question, such considerations explain why one should not expect a uniform price increase across different cartels, but also within the same cartel at different points in time.

From an empirical perspective, the available evidence on the magnitude of cartel effects, although imperfect,[9] suggests that cartels lead to a wide variety of overcharges. For instance, a study commissioned by DG Competition summarized the magnitude of cartel overcharge estimated in a number of empirical studies.[10] Figure 1 displays the distribution of overcharges in the sample of studies considered, i.e. indicating the percentage of observations within each overcharge bracket. It reads as follows: in 7% of

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[7] The need for a case-specific analysis is also emphasized in David Sevy, Raphaël De Coninck, Gunnar Niels, Robin Noble, Theon Van Dijk and Frank Verboven, "Competition damage evaluation: a short state-of-play", *Concurrences*, 2010-3.

[8] Levenstein M.C. and Suslow V.Y., "What Determines Cartel Success?", *Journal of Economic Literature*, 44, 43-95, 2006.

[9] See footnote 10.

[10] The analysis describes estimates of 114 cartel overcharges from a subset of peer-reviewed studies and book chapters, sourced from the wider set of overcharge estimates in Connor, J.M. and Lande, R.H. (2008), 'Cartel Overcharges and Optimal Cartel Fines', chapter 88, pp. 2203–18, in S.W. Waller (ed), *Issues in Competition Law and Policy*, volume 3, ABA Section of Antitrust Law. For more detail on the methodology, see Oxera / Komninos *et al.*, "Quantifying antitrust damages. Towards non-binding guidance for courts", Study prepared for the European Commission, December 2009, pages 88 et seq.

cases, there were no overcharges; in 16% of cases, the overcharge was between 0 and 10%; in 36% of cases, the overcharge was between 10 and 20%, etc. While this data should be interpreted with caution, it does suggest that cartel overcharges vary widely in their magnitude and that there is no *typical* overcharge that cartels would be able to impose independently of the specificities of the case.

Figure 1: Distribution of cartel overcharges in a sample of empirical studies[11]
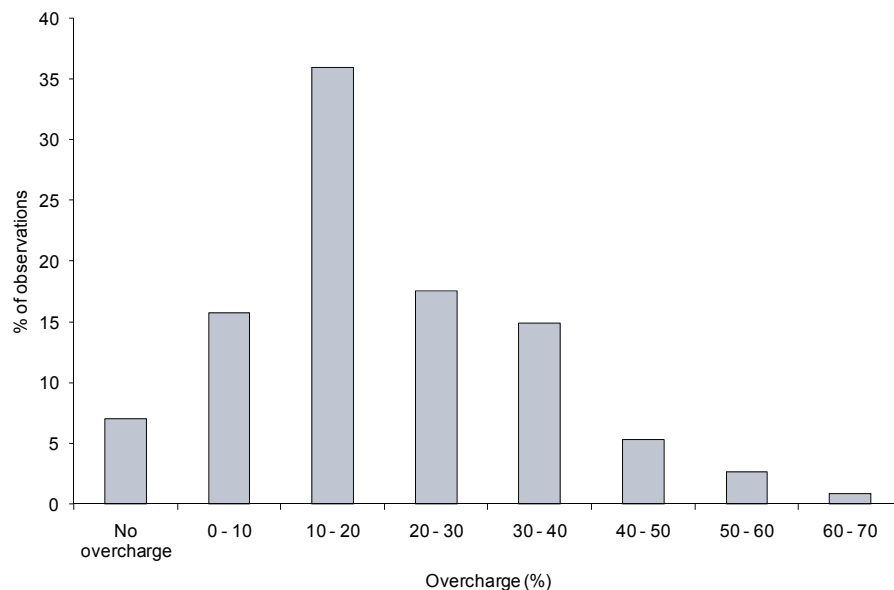
This evidence, despite its limitations,[12] indicates that cartels often impose a very significant harm on the economy, which justifies a strong policy aimed at deterring such infringements. At the same time, the significant variation in the magnitude of observed cartel overcharges implies that determining damages on the basis of a pre-determined average measure of cartel overcharge could result in significant under- or over-compensation in specific cases.[13]

More generally, one can also expect that the harm incurred by the victims of other types of antitrust infringements will depend very much on the specificities of the case. In exclusionary abuses for instance, the damages incurred by the foreclosed competitor will depend on the additional profits that it could have obtained in the absence of the

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[11] Figure 1 is copied from Oxera / Komninos *et al.*, "Quantifying antitrust damages. Towards non-binding guidance for courts", Study prepared for the European Commission, December 2009, p. 91.

[12] In particular, one we must keep in mind that the data described in Figure 1 does not necessarily form a representative sample of cartel overcharges. Rather, these are based on published estimates of cartel overcharges, which may not be representative due to possible sample selection (e.g. if estimates are more likely to be reported for more harmful cartels) or to possible shortcomings in the estimations methodologies used in some studies.

[13] In this respect, it is important to take into account that the relevant comparison point is not perfect competition, but prices that would be observed in the absence of the cartel (and which may be higher than perfectly competitive prices).

infringement, which is a function of the foreclosed competitor's specific prospects in the market. In such cases, it is particularly important to ensure that the damages are appropriate for the case, as over-compensation may risk deterring some efficient market behaviors while under-compensation falls short of the legal requirement under EU law.[14]

3. Methods used for the estimation of antitrust damages: an illustration

The core question of any damages quantification is to determine what would have happened in the absence of the infringement, which is also known as the "counterfactual" or "but for" scenario. In this respect, it is important to emphasize that damages estimation methods generate a counterfactual only under a set of specific assumptions, and does not provide an *exact* amount devoid of any uncertainty.

Different methods rely on different assumptions, and may therefore lead to more or less accurate and precise results. This section illustrates with a very simple example how antitrust damages can be estimated in the context of civil proceedings, highlighting some of the questions that the judges and parties involved must consider to determine whether the result will be sufficiently accurate and precise for the purpose of damages compensation.

Consider, for simplicity and purely illustrative purposes, a hypothetical cartel in the production of pasta in a particular country. Customers observe that prices of pasta, as reported in industry sources, have evolved as described in Figure 2. In this stylized illustration,[15] prices of pasta have increased by 20% during the 2 years in which the cartel took place (2007 to 2009).

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[14] See footnote 2.
[15] In this stylized example, the price effect of the cartel is assumed to be immediate for illustrative purposes. In practice, it is likely to be more gradual and less constant through time.

Figure 2: Stylized example of price variations before, during and after a cartel


Faced with this situation, one option for the plaintiff would be to argue that the price increase during the period of the cartel would constitute the cartel overcharge. This approach would be a simple application of the *before-after* method. Under such an assumption, the cartel overcharge in this example would be around 20%. An important limitation of this simple approach is that it risks attributing to the cartel price variations that are driven by other factors than the cartel.[16] It is therefore important to establish whether the assumption that all price changes observed during the cartel period are attributable to the cartel is reasonable in this case and at this stage of the proceedings. This assumption would not be validated if other important factors, such as input costs or demand, also fluctuated and explained some of the price variations observed during the cartel period.

Alternatively, or additionally, the plaintiff may point out that the price for pasta in the cartelized market during the cartel period was higher than in a neighboring market where there was no cartel. This is a simple application of the *yardstick* (or *cross-section*) method. Estimating damages on the basis of comparisons between average prices in the region where the infringement took place and in another region assumes that all differences between the two regions are due to the cartel. If some variation is due to other factors, the estimates based on a simple arithmetic calculation would not provide an accurate estimation of damages.

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[16] Conversely, this approach would underestimate the effect of the cartel if unrelated factors had a depressing impact on prices at the same time as the cartel.

An alternative would be to show that the price of pasta in the cartelized market increased during the cartel period more than in the market not subject to the cartel. For this approach to be appropriate, the control group must be sufficiently similar to the cartel market. This *difference-in-differences* method is illustrated in the graph below. In essence, it assumes that the effect of the infringement is equal to the difference between the prices in the cartel and control markets during the cartel period (difference between the blue and red time series, as highlighted by the red arrow), minus the difference between these prices in the non infringement periods (difference between the blue and green time series, as highlighted by the green arrow).

Figure 3: Illustration of the difference-in-differences method
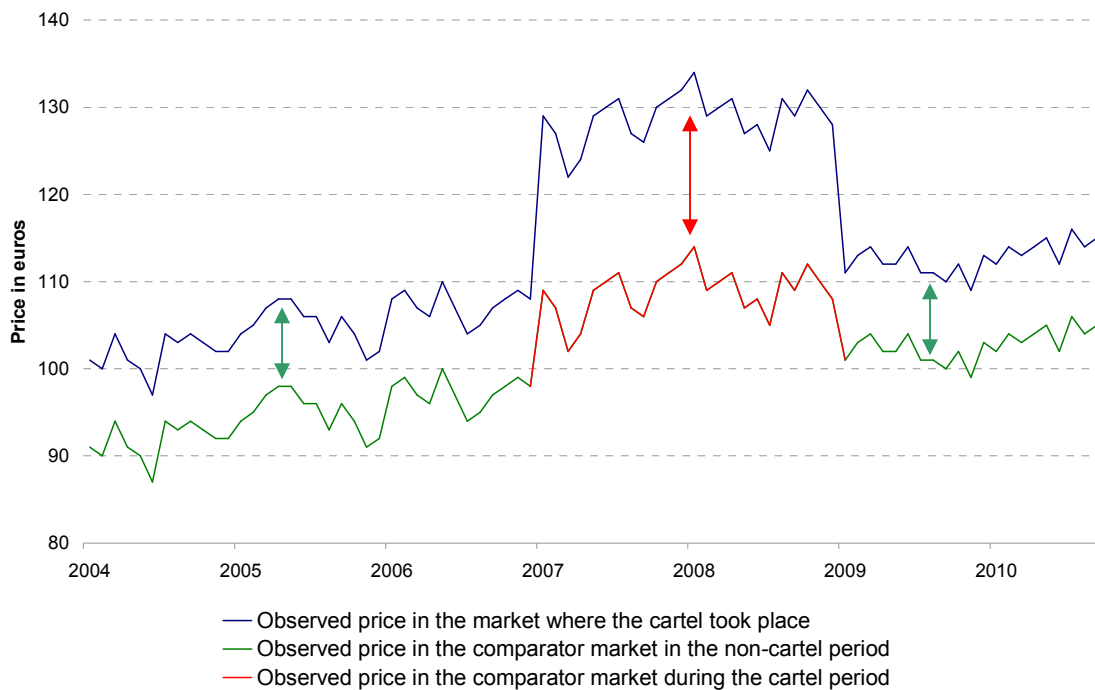
From a conceptual point of view, and to the extent that the control group is sufficiently similar to the infringement market, the difference-in-differences method is an improvement over the before-after method as it isolates changes that happen at the same time as the cartel but are unrelated to it (under the condition that these changes take place in the same way in both markets). It is also an improvement over the cross-section method as it controls for differences across the affected and control markets, as long as these differences are constant over time.

Still, even the difference-in-differences method, in this simple numerical form, cannot distinguish between the effect of the infringement and the effect of an unrelated factor that impacts the two markets differently (e.g. a change affecting the infringement market but not the control group at the time of the infringement). In the illustration above for instance, prices in the affected market may have risen by € 10 more than in the control

market during the cartel period not only because of the cartel, but maybe also because of a demand or supply shock that took place in only one of the markets.
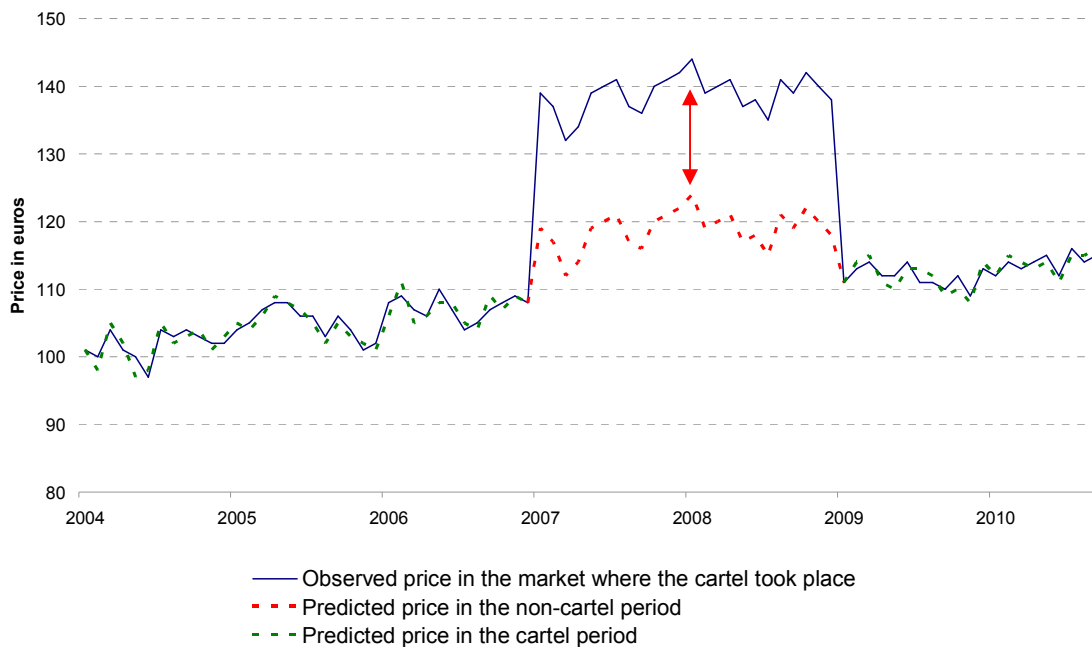
Such simple comparisons are necessarily imperfect. However, these could be considered by a judge as an acceptable starting point for assessing the damages if their underlying assumptions appear reasonable in the case at hand. However, the defendant may very well explain that there are factors other than the infringement, such as unrelated input cost variations, which explain the observed price evolution. Multiple regression analysis is a natural tool to perform this type of analysis.

In essence, regression analysis allows one to derive a counterfactual taking into account the effect of other observable variables that may affect prices during the cartel period. For example, if input costs increase during the cartel period due to reasons unrelated to the cartel, the effect on prices of the increased input costs can be isolated from the effect of the cartel. Conceptually, multiple regression analysis can be seen as a direct application of the cross-section, before-after or difference-in-differences estimation, with the appreciable advantage that it controls for other determinants of the variable of interest.

Figure 4 illustrates how regression analysis can be used to estimate damages, in this case using the before-after method.[17] In the figure, the observed price is displayed on the solid blue line. The regression model is estimated to fit the observed price in the non-cartel periods (the predicted price in the non-cartel period is shown on the green dotted line). In order to reliably estimate counterfactual prices in the cartel period, the regression must provide a good fit in the non-infringement period. On the basis of this model, one can then estimate the counterfactual price that would have been expected for the cartel period if the cartel had not taken place (displayed with the red dotted line). The effect of the cartel corresponds to the difference between the observed prices during the cartel period and this counterfactual price (indicated with a red arrow).

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[17] For ease of exposition, this paragraph describes the *residual* (or *fill-in-the gap*) technique. A commonly used alternative, the so-called *conspiracy dummy* (or *indicator*) technique estimates the regression on the entire data sample (including both infringement and non-infringement period), allowing for a shift during the cartel period (or possibly several shifts). The value of this shift during the cartel period measured by the regression corresponds to the effect of the cartel. For a discussion of the merits of the two approaches, see e.g. Daniel Rubinfeld, "Antitrust Damages", *Research Handbook on the Economics of Antitrust Law*, Einer Elhauge editor, November 21, 2009.

Figure 4: Illustration of observed and counterfactual prices using regression analysis

Observed price in the market where the cartel took place
Predicted price in the non-cartel period
Predicted price in the cartel period

Regression analysis can also implement the difference-in-differences method using time-series data from both the affected and control markets.[18] This is particularly interesting as it exploits both cross-sectional and time-series variation as a source of identification. In particular, the difference-in-differences method has the advantage that it controls not only for observable variables included in the regression, but also for unobservable variables to the extent that they impact both the affected and control groups in the same manner.[19]

Note that in the simple example above, we considered a case where the plaintiff was a direct purchaser. In the case of indirect purchasers, the question of pass-through arises at the different level of the supply chain. In this case, the techniques described above can be directly used to determine whether the price that the indirect customers paid were higher than in the counterfactual scenario without infringement. Alternatively, pass-through rates can be estimated when cost data is available. In addition, some general insights on pass-through rates may be informative of the key factors to consider in the analysis.[20]

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[18] Technically, the effect of the infringement can be estimated with a conspiracy variable defined as the interaction of a dummy variable indicating the market in which the infringement takes place with a dummy variable indicating the infringement period.

[19] Other potential methods not discussed here include simulation models and cost-based analysis. While simulations often rely on strong assumptions, the cost-based approach, which consists in adding a reasonable margin to the observed costs to generate a counterfactual, raises a number of questions because of the difficulty of defining a "reasonable" margin and the fact that the observed costs may be affected by the infringement.

[20] For example, everything else constant, pass-through rates are likely to be higher for industry-wide than for firm specific price increases, if demand becomes less elastic when prices increase, or if marginal cost does not significantly decrease when output is reduced (e.g. in the absence of capacity constraints).

In addition, it is important to mention that although the illustration above focused on the cartel overcharge, this constitutes only part of the cartel harm suffered by customers. In particular, together with a price increase, cartels typically lead to a reduction of output, which also harms customers. Such an effect can be estimated using the same type of analysis described above, or derived once the price effect is known using information on elasticities.

This output effect is particularly relevant when a passing-on defense is invoked by a defendant vis-à-vis an intermediate customer. In fact, the pass-through rate, price and volume effects are intrinsically linked as they are determined by the same underlying factors. In this respect, it is important to note that if the intermediate customer passed-on part of the price increase to its own customers, this implies that the intermediate customer had to decrease its sales, and hence incurred a corresponding loss of profit that needs to be compensated.[21]

4. A pragmatic approach to antitrust damages estimation

Once an antitrust infringement has been established, the evidentiary burden for the quantification of damages cannot be so high that it would impede the victims' right of effective compensation. In this sense, requiring certainty of the quantum of damages incurred would run counter to the compensation objective, since estimating damages necessarily requires building a counterfactual, which is by definition uncertain.

At the same time, antitrust infringements lead to a wide range of effects and there is thus no such thing as a typical damage for antitrust infringements. In an ideal economists' world, econometric analysis would normally be the preferred way to build this counterfactual. The role for this type of analysis in civil proceedings critically depends on the data availability for each party and the applicable rules of civil procedure, in particular regarding the standard and burden of proof.

Indeed, different methods are available, and, as illustrated in the previous section, their accuracy varies. For example, the yardstick method attributes all the difference between the infringement and comparator market to the infringement, while there may be a wealth of unrelated factors driving these differences. Similarly, the before-after method assumes that all the difference between the infringement and non-infringement period is attributable to the infringement, while these may also result from unrelated changes in the market. Difference-in-difference addresses some of these issues, but critically depends on the similarity of the infringement and control groups. Then again, econometric analysis can make these simple comparisons more accurate, as it provides a way to control for effects unrelated to the infringement.

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[21] See e.g. Frank Verboven and Theon van Dijk, "Cartel Damages Claims and the Passing-On Defense", *The Journal of Industrial Economics*, Vol. 57, Issue 3, pp. 457-491, September 2009.

When considering which method and technique to apply, there is thus an important trade-off between accuracy and ease of implementation.[22] On the one hand, simple comparisons are straightforward, but may reveal quite inaccurate. On the other hand, econometric analysis requires some more work and data, but may provide a significantly more accurate answer.

In the absence of an extensive discovery process, one cannot expect a party which does not have access to crucial data to do the same analysis as the party who does. For example, a cartel defendant is likely to have access to more refined cost data than its customers. In that case, a legal order may require or invite the defendant to put forward a more detailed analysis to challenge the conclusion from the data-challenged plaintiff. Such a process can only be meaningful if the various economic experts involved are granted an access to the data and can cross-check the analysis that has been performed by the other party's experts.[23]

In the end, what will be deemed acceptable depends on the specificities of the legal system and data availability. Yet, the judge must be aware of the limitations of the chosen methods, so that this is a conscious choice. If the underlying assumptions of the simplest methods appear reasonable given what is known of the case and limited data is available and the burden of proof is relatively low, these simple comparisons may be acceptable. On the other hand, if significantly more accurate answers can be obtained at a limited cost, regression analysis would provide good a balance between accuracy and ease of implementation.

In essence, regression analysis can be seen as a refined implementation of the comparison methods discussed above. Judges should thus be able to appreciate the main factors driving apparently conflicting results presented by opposite parties. In fact, the key questions for assessing econometric analysis are largely the same as for the naïve comparisons mentioned above. For example, when did the infringement start and finish? Is the control group sufficiently similar? Is it unaffected by the infringement? Which reference period should be considered: before the cartel, after the cartel or both? Are there factors other than the infringements that could explain the observed outcome?

Therefore, while regression analysis is an intuitive technique that addresses the shortcomings of simpler comparison-based techniques, it must be performed with great care and attention to the underlying market specificities to meet adequate quality standards. Otherwise, it may also lead to biased damages estimation.[24]

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[22] Another trade-off may arise between the accuracy and precision of the damages estimates. For more details on these trade-offs, see e.g. Hans W. Friederiszick and Lars-Hendrik Röller in "Quantification of harm in damages actions for antitrust infringements: insights from German cartel cases", *Journal of Competition Law and Economics*, 2010, 6(3), 595–618.
[23] Importantly, this is also one of the underlying principles of the Commission's best practices on the submission of economic evidence, which emphasize the importance of detailed cross-examination of economic analysis (e.g. through so-called data room exercises).
[24] For a discussion of how the questions mentioned above may affect the results of regression analysis, see Raphaël De Coninck, "Estimating Private Antitrust Damages", *Concurrences*, 2010-1, p. 39.

5. Conclusion

This contribution has argued that there are a number of methods and techniques that can be used to estimate damages depending on data availability, the applicable legal rules and case specificities. These methods and techniques vary in their assumptions and thus their results also vary in accuracy and precision. In this respect, some techniques, such as regression analysis, have the potential to provide a good level of accuracy and be easy to implement by careful economic experts.

Non-specialists should not see these methods and techniques as a black box. On the contrary, this contribution has argued that they rely on intuitive principles and that it is important for judges to appreciate the main factors driving apparently conflicting results presented by opposite parties. It is hoped that DG Competition's non-binding guidance on damages quantification will assist them in this task to ensure that victims of antitrust infringements receive adequate compensation.